NSW GOVERNMENT

Natural Resources Commission

Final report

Review of the Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012

June 2023

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 Gomeroi / Kamilaroi, Yuwaalaraay and Anaiwan People who are the Traditional Owners past, present and future, as well as other Aboriginal peoples for whom these waterways are significant.

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Cover image: Bunnor hide - Waterbird lagoon, March 2023. David Preston, NSW Department of Planning and Environment – Environment, and Heritage Group

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Acronyms and units of measurement

Act	the Water Management Act 2000 (NSW)
Commission	the Natural Resources Commission
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPI-Fisheries	Department of Primary Industries – Fisheries
DPE-E&H	Department of Planning and Environment – Environment, and Heritage (the former Office of Environment and Heritage, subsequently Energy, Environment and Science)
DPE-Water	Department of Planning and Environment – Water
GDE	Groundwater dependent ecosystem
HEVAE	High Ecological Values Aquatic Ecosystems
LALC	Local Aboriginal Land Council
LTAAEL	Long-term 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
NPWS	National Parks and Wildlife Service
NRAR	The Natural Resources Access Regulator
NSW	New South Wales
Plan	The Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012
R	Recommendation
SMART	Specific, measurable, achievable, relevant and time-bound

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Executive summary

The Natural Resources Commission (the Commission) has reviewed the *Water Sharing Plan for the Gwydir 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 Plan provisions 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 the Plan for up to two years before replacing it.

The Commission continues to identify significant issues related to the establishment and management of extraction through Long Term Average Annual Extraction Limits (LTAAELs). Risks associated with the lack of numeric LTAAEL and LTAAEL compliance are particularly high in the Plan area given entitlement far exceeds previously estimated extraction limits and users are continually granted 100 percent of their allocation.

The Plan is the first of the unregulated water sharing plans in NSW to include specific provisions for floodplain harvesting. While it is important to licence this significant form of take, the Plan rules have not been amended to manage floodplain harvesting impacts.

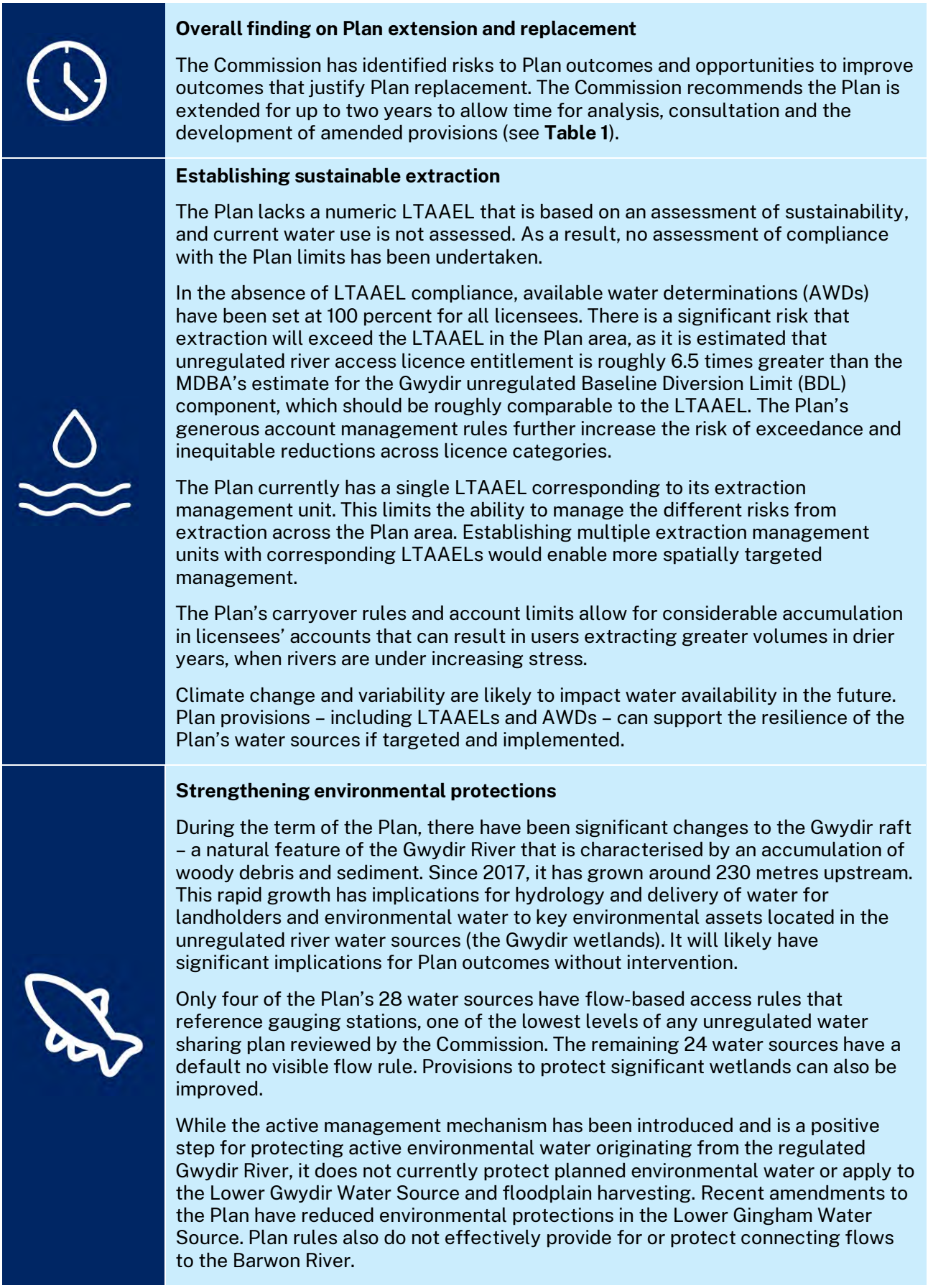
Despite equity being a fundamental requirement of the Act, the Plan's management of extraction creates significant inequities between and within licence types, management zones and regulated and unregulated water sharing plans. Some licensees in the Plan area can extract water that is protected in, and provided from, connected regulated rivers for specific purposes, including replenishment flows. Differences in account management provisions allow floodplain harvesting licences to accumulate and potentially extract water at a greater rate than other licences. If LTAAEL compliance action is required, it will result in inequitable reductions for other licensees. Plan rules that contribute to inequities risk further eroding water users' trust in NSW water management.

Several critical issues could be addressed by reconsidering the Plan's extraction management units and water source boundaries. Adjusting these elements could allow for more targeted management of extraction risks, as well as better management of the impacts of floodplain harvesting.

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 16 recommendations (**Table 1**).

Although these issues are significant, considerable work is being undertaken in the Plan area to understand environmental and town water needs and risks. The existing gauge network can be better referenced in the Plan and improved to better target Plan provisions and manage water access. This information can be drawn upon to quantify sustainable extraction and strengthen rules in a replacement Plan.

Figure 1: Key areas to improve Plan performance



Supporting connectivity objectives

The Gwydir's unregulated water sources are highly connected to the regulated water source and to alluvial groundwater. Water resource development in the region has not adequately recognised this connectivity, contributing to fragmented riverine and floodplain environments and impacting on downstream flows and the management of floodplain wetlands and lagoons.

Daily access rules are insufficient to allow a percentage of outflows from the Plan to pass through to the Barwon-Darling to support the environment, security of supply for towns and basic rights. The boundaries between the Plan and the Barwon-Darling Plan are currently unclear, further impacting the effectiveness of access rules.

The Plan does not protect replenishment flows from the Gwydir Regulated Plan to meet their intended purposes, such as maintenance of water quality and supply for basic landholder rights. The existing gauging system is not used to its full capacity, limiting the use of access rules to protect low flows, and potentially impacting on downstream outcomes. The Plan does not consider connectivity at different levels of flow.

The impacts of extraction from unmapped alluvial deposits on the Plan's water sources are also not considered.

Supporting equitable water sharing

There are several issues related to the inconsistent application of access rules. Many access conditions for unregulated licences have been placed on works approvals that are not codified in the Plan. This reduces the ability of the Plan to ensure that the priorities under the Act are met. In addition, trading rules allow for different access conditions to be placed on the same type of licence within the same water source, raising issues of equity. Further risks associated with this – including diminished protections for town water supply – may arise if licences are traded.

The Plan does not effectively protect replenishment flows from the regulated river, allowing releases that are protected under the Gwydir Regulated Plan to be extracted by any unregulated licensee. It would be beneficial to require replenishment flows to be made based on conditions in the receiving watercourses, noting these conditions may vary under projected climate change.

There are also inequities associated with account management provisions and relative AWD reductions between licence categories. Different carryover rules, account limits, and patterns of extraction mean unregulated access licences and unregulated floodplain harvesting licences in the same extraction management unit may result in growth within one category being offset by an inequitable reduction in the other category.

Within the same licence category, provisions also have different impacts and benefits for different users, which are similarly not considered when applying reductions, meaning an opportunistic extraction pattern by one industry can result in reductions to another. The Plan also does not have clear equity objectives.

Managing floodplain harvesting impacts

The Plan was recently amended to include provisions for floodplain harvesting, which DPE-Water has been working to licence during the Plan period. However, these amendments do not adequately address potential impacts of floodplain harvesting.

In particular, current water source boundaries do not align with the gazetted regulated river management zones, making it difficult to quantify extraction across the area and manage impacts and outcomes at the water source scale. The

	cumulative impact of floodplain harvesting across the unregulated and regulated plans, as well as downstream, has not been assessed or managed. Daily access rules (specifically, cease to pump thresholds) are not commensurate with risks from floodplain harvesting extraction. Daily access rules are also not aligned between the unregulated and regulated Gwydir plans.
	**Improving outcomes through trade** Trading in the Plan is currently highly restricted and there is a clear demand from users to increase trade. Provided protections for environmental water are maintained, reducing some trade restrictions could support socio-economic outcomes and optimise water use as demand increases and water availability is reduced. Specifically, introducing a high flow category that may be traded into could increase the pool of licences and the opportunities for how and where water is used, while also reducing low flow hydrological stress. Introducing larger trading areas while using more granular ecological mapping for targeted trade restrictions could allow trade to be expanded in low-risk settings.
	**Restoring Aboriginal water rights, values and uses** The Commission has identified key issues from available information that will likely require further engagement to address during DPE-Water's replacement Plan process. Many of these are state-wide issues in water sharing plans identified across all water sharing plan reviews in the 2020-22 period. In particular, the Plan does not proactively consider water requirements for registered native title claims and other Aboriginal land ownership, there is limited meaningful water access and uses, and Aboriginal water-dependent cultural assets are not adequately identified and protected.
	**Protecting town water supply and basic landholder rights** The Plan does not clearly specify protections for town water supplies, which will face continued pressures during droughts. Entitlement and estimated basic landholder rights volumes have changed since the Plan was made, with estimates for basic landholder rights increasing. The replacement Plan should reflect the latest figures.

Table 1: Recommendations (R)

Overall recommendation	
R 1	The Plan should be: a) extended for up to two years until 30 June 2025, to allow time to complete data collection and analysis b) replaced by 1 July 2025, supported by the completion of these recommendations.
Establishing sustainable extraction	
R 2	To support sustainable extraction and improve transparency, as soon as possible in the next two years, DPE-Water should: a) assess the benefits and risks of establishing multiple EMUs for the Plan area and corresponding LTAAELs b) establish and include numeric values for LTAAEL(s) in the replacement Plan c) prioritise LTAAEL compliance assessment using best available estimates of extraction and make this publicly available d) review the impact of the Plan's carryover provision on the risk of exceeding LTAAEL(s) and risk to low flows. If the risk is considered significant, only apply carryover provisions to high flow access licences.
R 3	DPE-Water should ensure the replacement Plan includes requirements for: a) AWDs to be set conservatively if DPE-Water does not annually make and publish a reasonable estimate of extraction and assess compliance with the LTAAEL(s) b) proactive AWDs to support sustainable numeric LTAAEL(s) and revision to account management rules (carryover and account limits) to support any AWD changes. These proactive AWDs should be developed in consultation with stakeholders by Year 5 of the replacement Plan.
R 4	To support adaptive management during the next Plan period, the replacement Plan should include a provision requiring DPE-Water to: a) determine the sustainable levels of extraction by Year 5 based on best available ecological requirements, hydrological and historical and projected climate information b) use these levels to define the Plan's LTAAEL(s) for each extraction management unit.
R 5	As a priority in the next two years, DPE-Water should complete a hydrological analysis to determine the impacts of the Plan's five-year LTAAEL compliance assessment rule compared to the more common three-year averaging approach. This should consider if there is a material difference between the two assessment time scales, and if the five-year time scale risks environmental or other outcomes. DPE-Water should use this analysis to inform the replacement Plan's provisions.
Strengthening environmental protections	
R 6	As part of the Plan replacement, to strengthen daily access rules, DPE-Water should: a) review the current hydrometric network to identify where the Plan can reference operational gauges for establishing flow classes and flow-based access rules for water sources that currently have a 'no visible' flow rule, and make improvements to gauging where necessary to prioritise high value water sources b) review daily access rules and amend them where required, prioritising the 17 high-value water sources at high risk from extraction – this should be informed by existing

	conditions in Appendix 4 of the Plan, the *Gwydir Water Resource Plan*'s risk assessment, the *Gwydir Long Term Water Plan* (the Gwydir Regulated Plan) and any other appropriate evidence c) amend the Lower Gingham Watercourse Management Zone A Class cease to pump thresholds to return the intended meaning to the pre-2020 Plan, with a flow rather than gauge height and recognition that the annual measure (4,000 ML per year) must occur over the previous 12 months.
R 7	As part of Plan replacement, to protect significant wetlands and clarify operating rules for structures involved in delivering water to significant wetlands, DPE-Water should: a) refer to Ramsar obligations in the Plan objectives, including to maintain the ecological character of the Ramsar listed Gwydir wetlands sites b) update the Plan schedules to include all significant wetlands including those listed as part of endangered ecological communities, internationally, nationally and regionally significant wetlands in the Plan area c) address risks of not meeting Plan objectives and Ramsar obligations and water management principles under the Act. This should include consideration of where changes to Plan rules are warranted to manage risks associated with changes to the Gwydir raft to ensure that environmental water is protected from extraction and can achieve its intended purpose. d) ensure that interdependencies between regulated and unregulated water sharing plans in relation to significant wetlands are addressed, for example, operating rules for structures regulating flows into significant wetlands are clearly articulated and the Plan cross-references the Gwydir Regulated River Plan.
R 8	As part of Plan replacement, to improve the protection of active environmental water in the Gwydir via the active management mechanism, DPE Water should: a) In line with the intent of existing licence conditions to protect planned environmental water from the regulated river into the unregulated water sources, review the definition of active environmental water for the Gwydir b) extend the list of water sources where active management applies to include the Lower Gwydir Water Source c) extend the active management mechanism to protect active environmental water from floodplain harvesting.
R 9	As part of the Plan replacement, ensure that the Plan's rules effectively provide for and protect connecting flows to the Barwon River to align with the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*'s contribution to downstream flow targets.
Supporting connectivity objectives	
R 10	To inform the replacement Plan and ensure downstream flows are maintained to the Barwon-Darling, DPE-Water should: a) define the flows from the Plan water sources required to support downstream outcomes and assess whether Plan provisions support these outcomes b) assess the boundary between the Plan and the *Water Sharing Plan for the Barwon-Darling Unregulated River Water Source 2012* (the Barwon-Darling Plan). This should include confirming the status of the six watercourses originally included in the Plan's Schedule 1 -Watercourses to which this plan does not apply. c) ensure the risk profile for the water source is based on full entitlement, as well as considering transfer of the Barwon Water Source to the Barwon-Darling Plan to align with floodplain management plan boundaries.

Supporting equitable water sharing	
R 11	As part of the replacement Plan, to ensure access is equitable within the Plan area and downstream of the Plan, DPE-Water should: a) include appropriate minimum cease to pump thresholds (as based on Recommendation 6b) in the body of the Plan for application to all licences in that water source or management zone, and specify that daily access conditions are mandatory conditions on access licences b) remove Schedule 1A of the Plan to ensure they are exempt in accordance with Clause 43(13) to extract below full pool capacity c) revise the AWD provisions to require reduction for the licence category which causes LTAAEL exceedance, consistent with the rules in the Gwydir Regulated Water Sharing Plan d) include explicit equity objectives, strategies and performance indicators.
R 12	To improve the delivery and protection of replenishment flows from the regulated Gwydir River into unregulated river water sources, DPE-Water should: a) review the adequacy and appropriateness of existing replenishment flow requirements for unregulated river water sources given projected climate change b) clearly stipulate the conditions under which replenishment flows are to be provided based on climate variability, domestic and stock and environmental needs c) ensure that the replacement Plan includes provisions that clarify how replenishment flows will be announced and protected from extraction by access licences other than domestic and stock access licences and under basic rights.
Managing floodplain harvesting impacts	
R 13	As part of the replacement Plan, to improve the management of floodplain harvesting, DPE-Water should: a) align management units between the Gwydir Regulated Plan, the Floodplain Management Plan for the Gwydir Valley Floodplain and the Plan to: i. quantify total extraction in each unit ii. assess the cumulative impacts of unregulated and regulated floodplain harvesting extraction across the Gwydir Valley iii. develop access rules to manage the cumulative risks b) determine the cumulative impact of the total surface water extraction across the Plan and the Gwydir Regulated Plan area and revise Plan rules to reflect the risk of extraction across the flow profiles and adequately protect the water sources c) include in the replacement Plan appropriate provisions for floodplain harvesting to adequately protect the water sources, their dependent ecosystems and downstream outcomes d) once appropriate thresholds have been defined, align daily access rules for floodplain harvesting access licences between the Plan and the Gwydir Regulated Plan for each water source or management zone to improve equity between licensees who may be accessing the same overland flows.

Improving outcomes through trade	
R 14	To inform the replacement Plan, DPE-Water should complete a trade analysis assessing the use of water source groupings as the basis for trading rules. This should include but not be limited to: a) the potential for daily access thresholds for high flow access licences which allow a set volume of trade (this requires establishment of low and high flow access licences) b) trade into high flows in various water source groupings while managing LTAAEL exceedance and protecting the environment, cultural values and basic landholder rights c) potential impacts on all flow categories including high flow dependent environmental values d) regulated and unregulated floodplain harvesting to assess hydrological stress and consider separate trade rules for these licence categories e) the latest information on connectivity, hydrological stress, HEVAE mapping and cultural assets and values f) interrelationships between the unregulated and regulated plans.
R 15	DPE-Water should remove Clause 73(a)(iii) in the current Plan to mitigate the risk of unlimited trade and all water sources should contain high and low flow trading limits.
Restoring Aboriginal water rights, values and uses	
R 16	To better achieve the Plan's Aboriginal water objectives, DPE-Water should continue its current related work, address state-wide issues identified in the Commission's water sharing plan reviews and: a) ensure Plan objectives and corresponding provisions are consistent with the *NSW Water Strategy* relating to Aboriginal peoples' rights and values and increase access to, and ownership of, water for cultural and economic purposes b) consult with Aboriginal stakeholders to accommodate any future native title determinations, and other water access rights for a range of desired uses, including cultural and economic uses c) protect high value water dependent cultural assets in the replacement Plan area, by: i) undertaking detailed engagement with Traditional Owners, native title claimants and other Aboriginal groups and knowledge holders to identify high value water dependent cultural assets in the Plan area and co-design provisions to protect and support these assets ii) reviewing existing provisions to consider if they provide appropriate protection, and revise if appropriate. d) include provisions in the replacement Plan to protect water dependent cultural assets identified in R 16(c)(i), consistent with the existing amendment provision e) prioritise Aboriginal cultural rights and interest when making controlled allocations and codify this process in relevant guidelines and policies.
Protecting town water supply and basic landholder rights	
R 17	DPE-Water should work with councils to inform the replacement Plan regarding specific provisions to protect town water supplies, using the most appropriate gauging stations. Relevant provisions included in the replacement Plan should be applied to all relevant licences/works approvals.

R 18	DPE-Water should: a) annually review the Plan's entitlement and estimated basic landholder rights volume and update these figures whenever the Plan is being reviewed or amended b) undertake a risk assessment if the entitlement and basic landholder rights estimate changes by more than 5 percent in any water source to determine whether Plan provisions remain adequate to protect the water source, the environment and basic landholder rights.
Monitoring, evaluation and reporting (MER)	
R 19	By June 2025, to improve Plan-specific MER, DPE-Water should: a) expedite the finalisation and publication of DPE-Water's water sharing plan evaluation framework and methods manuals and ensure there is multi-agency support and oversight of their implementation b) identify feasible and appropriate resourcing to support ongoing MER activities as outlined in the NSW Water Strategy c) specify timely reporting requirements of the results of MER activities to support transparency and adaptive management d) identify and address critical knowledge gaps to support adaptive management e) use the recently developed prioritisation framework to prioritise MER activities based on values and risk.

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 for water users regarding how available water will be shared over the life of the water sharing plan, which is typically 10 years, unless it is extended.

The *Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012* (the Plan) commenced on 3 August 2013 and is due for extension or replacement on 1 July 2023. When the Plan was developed in 2012, it included one alluvial groundwater source (Upper Gwydir Alluvial Groundwater source). This was removed from the Plan in 2020. In 2016, the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source, which was previously managed under its own plan, was included in the Plan.

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 plans 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's review must consider the water management principles,[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]

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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.

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.

1.2 Review approach

The Commission's review approach for water sharing plans is outlined on its website.[6] The Commission has largely relied on a desktop review, agency interviews and submissions to gather evidence for this review. Stakeholder engagement was targeted and limited in scope due to COVID-19.

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

- **Consultation** – targeted engagement with government agencies, community, Aboriginal and industry organisations.[7]
- **Document review** – the Commission reviewed the Plan, its background document,[8] public reports and unpublished information from water management agencies. As required, the Commission considered other relevant state-wide and regional government policies and agreements.
- **Technical advice** – consultants provided analysis and peer review.
- **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?
  - 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.[9]

The Commission evaluated the Plan's performance against its stated objectives, strategies, and performance indicators. These were linked to environmental, social, cultural, and economic outcomes for this review. The Plan objectives were amended over the Plan period, most recently in 2020. The Commission has assessed the Plan against the current objectives, strategies and indicators. As found in the Plan's Section 44 implementation audit,[10] its vision, objectives, strategies, and performance indicators were not being given effect.[11] The lack of clearly linked objectives, strategies and indicators, and limited MER made it difficult to determine the Plan's performance. This report presents the Commission's findings using the best available evidence.

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5 Section 9(1) of the Act.
6 Natural Resources Commission (2022) *WSP Reviews - Review approach*
7 Interviews carried out as part of targeted consultation were documented but not recorded and transcribed, hence quotes are reported as 'indirect' rather than "direct" quotes.
8 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
9 Natural Resources Commission (n.d.) *Water sharing plan reviews*
10 Section 44 of the Act requires auditing within five years of the making of a plan to ascertain whether the plan has been given effect.
11 Alluvium and Vista Advisory (2019) *Audit of the Water Sharing Plan for the Gwydir Unregulated Water Sources 2012*

2 The Plan area

The Plan's 28 water sources cover 26,000 square kilometres and extraction of water is centred around Moree, about 90 kilometres south of the Queensland border (**Figure 1**),[12] with landscapes transitioning from eastern tablelands, to central slopes and western floodplains and wetlands.[13] The traditional lands of the Gomeroi/Kamilaroi people cover most of the Plan area, with the traditional lands of Yuwaalaraay to the west and the Anaiwan people in the eastern headwaters around Guyra, Uralla and Tenterfield.[14] These peoples maintain strong cultural and spiritual connections with the Plan area's rivers and wetlands.

The Plan area represents around 3 percent of the Murray-Darling Basin. The Gwydir River begins in the eastern tablelands around Guyra and Uralla before flowing north-west through steep sided valleys. It is joined by the Horton River before it enters the plains near Gravesend. Most of the catchment's runoff falls above Pallamallawa.[15] West of Pallamallawa the valley widens into an almost completely flat floodplain, through which the Gwydir River flows slowly westward between low natural levee banks towards the Barwon River.

The Gwydir raft which is situated approximately 10 kilometres northwest of Moree is a natural feature of the Gwydir River (**Figure 1**). The raft is characterised by an accumulation of woody debris and sediment that has built up over millennia. The accumulation of debris has gradually filled channels and new ones have become established.[16] Significant changes to the Gwydir raft since 2017 have impacted flows into the Gingham Watercourse and Gwydir wetlands[17] (**Section 4.3**). Prior to 2020 during low flows (<450ML/day), flows could pass around the raft blockage. Currently some water makes its way through the raft to the Gingham channel whilst other water pools behind the raft and breaks out to the north into Gingham Watercourse. Other water flows through Tyreel regulator and south, then west into the South Arm/ Lower Gwydir Channel.

A significant amount of the Gwydir catchment inflows (around 55 percent on average long term)[18] are regulated by Copeton dam (capacity 1,364 GL). Several unregulated tributaries flow into the Gwydir River below the dam, with the Horton River providing most of the flow.[19] Regulating structures including Tareelaroi, Boolooroo and Tyreel divert flows from the Gwydir River into the Mehi River, Carole Creek and Lower Gwydir River/Gingham Watercourse, while structures on the Mehi River at Combadello and Gundare control flows to the regulator between the Mehi and the Moomin Creek (low flows) and the Mallowa Creek (medium flows).[20] There is about 600,000 ML of permanent irrigation capacity in on farm storages on the lower Gwydir floodplain extracting water from the regulated river,

12 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
13 *Ibid.*
14 MDBA (2018) *A Guide to Traditional Owner Groups for Water Resource Plan Areas - Surface Water*. Note: The map that this information was drawn from was endorsed by the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) representative organisation on 20 August 2018 and the Northern Basin Aboriginal Nations (NBAN) representative organisation on 23 October 2018.
15 Commonwealth Environmental Water Office (2019) *Commonwealth Environmental Water Portfolio Management Plan: Gwydir River Valley 2019–20*
16 Pietsch, T. J. (2006) Fluvial geomorphology and late quaternary geomorphology of the Gwydir fan-plain, PhD thesis, School of Earth and Environmental Sciences, University of Wollongong, 2006.
17 Personal communications, NSW DPE EHG, 21 April 2023.
18 Commonwealth Environmental Water Office (2019) *Commonwealth Environmental Water Portfolio Management Plan: Gwydir River Valley 2019–20*
19 *Ibid.*
20 *Ibid.*

unregulated rivers and floodplain.[21] The ratio of private to public storage capacity is higher than any other river valley.

[21] *Ibid.*

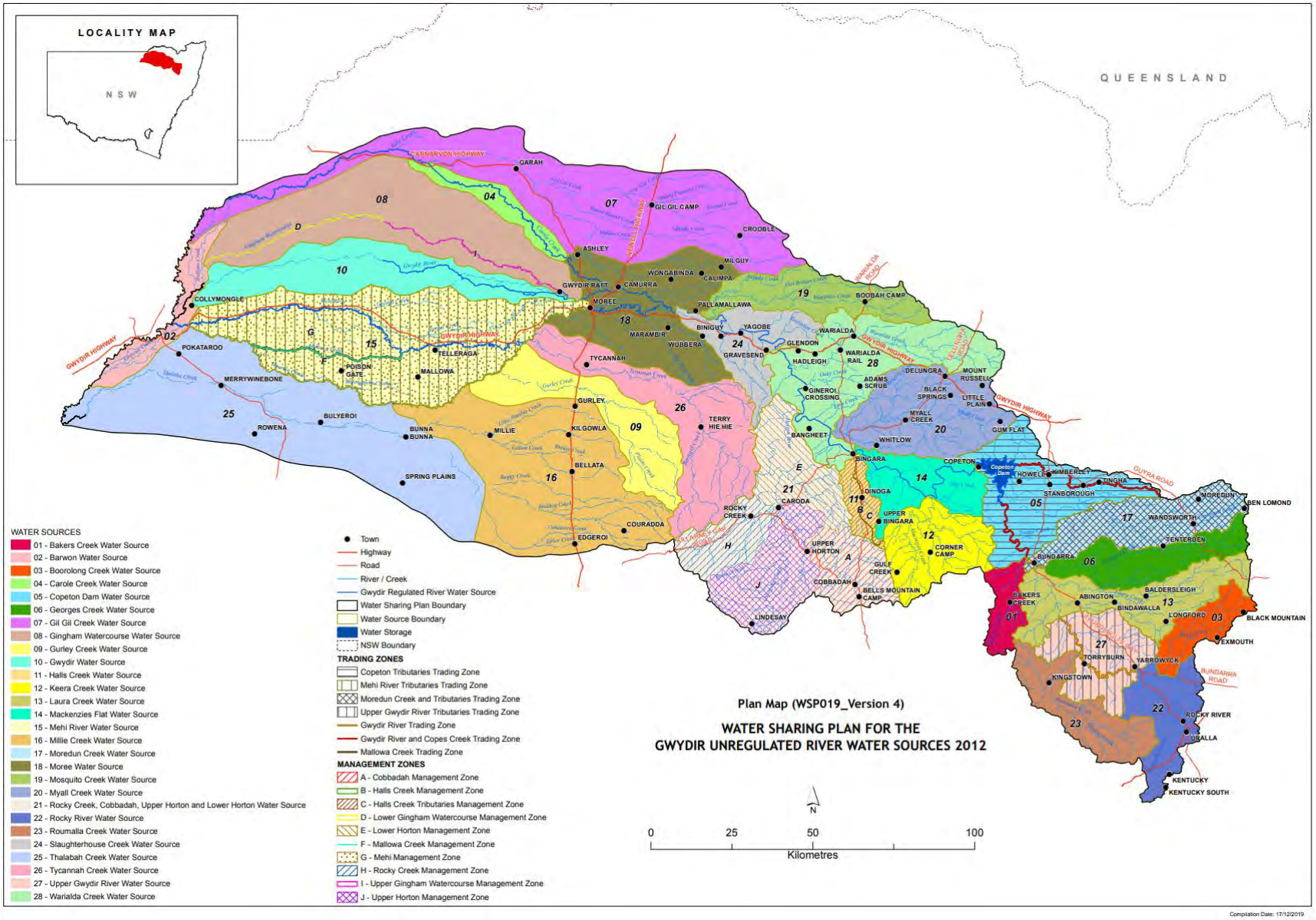

Figure 1: The Plan area

The Plan area supports many environmental values, including internationally significant wetlands, threatened species and populations, and endangered ecological communities. Key threatened fish species include the southern purple spotted gudgeon (*Mogurnda adspersa*), freshwater catfish (*Tandanus tandanus*), olive perchlet (*Ambassis agassizii*), silver perch (*Bidyanus bidyanus*) and Murray cod (*Maccullochella peelii peelii*).[22] The river snail species *Notopala sublineata* – listed as endangered in NSW – is also present in the catchment.[23] The variety of water-dependent ecosystems in the Gwydir catchment supports an equally diverse range of water-dependent species, including water rats, woodland birds, platypus, snakes, turtles, bats, and frogs.[24]

The Gwydir Wetlands cover over 100,000 hectares on the lower floodplain west of Moree and are among the most extensive and significant semi-permanent wetlands in north-west NSW. The wetlands include four Ramsar-listed sites: Goddard's Lease, Crinolyn, Windella and Old Dromana.[25] When flooded, the wetlands, particularly the Old Dromana site, provide breeding and feeding grounds for and habitat for many threatened species.[26] The wetlands include one of NSW's largest stands of water couch (*Paspalum distichum*), coolibah (*Eucalyptus coolabah*) woodland and marsh club-rush (*Bolboschoenus fluviatilis*) sedgeland (a critically endangered ecological community).[27] They are also culturally significant for the Gomeroi Nation, containing culturally significant plants, scar trees, dreaming sites, burial sites and artefacts.[28]

The ecological values of the Gwydir Wetlands have been impacted by river regulation, which has reduced the frequency of larger flow events, reducing opportunities for bird breeding.[29] The native vegetation of Mallowa Creek also provides valuable habitat for waterbirds, woodland birds, and other fauna, and prior to river regulation supported large scale waterbird breeding events.[30]

The Gwydir region has a naturally variable climate that includes periods dominated by either wet or dry conditions.[31] The climate in the region has already shifted since the 1970s, with 94 percent of gauges across the northern Murray-Darling Basin indicating declining streamflow trends since this time, particularly in the headwaters of catchments in the northern Basin.[32] This is attributed to a combination of natural variability and climate change.[33] During the Plan period, 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).[34] Climate modelling undertaken by DPE-Water indicate notable potential impacts on rainfall, water availability and runoff during the next plan period (the potential impacts of climate change are discussed in **Section 3.3**). Rainfall throughout the Plan area is highly variable year-to-year, with the highest falls in summer.

Moree is the region's major service centre within the Gwydir catchment with about 9,000 residents. Smaller towns and villages in the Plan area include Uralla, Guyra, Bingara and

22 DPIE (2020) *Draft Regional Water Strategy: Gwydir Strategy*
23 *Ibid.*
24 DPIE (2020) *Gwydir Long Term Water Management Plan Part A: Gwydir catchment*
25 DPIE (2020) *Draft Regional Water Strategy: Gwydir Strategy*
26 DPIE (2020) *Gwydir Long Term Water Management Plan Part A: Gwydir catchment*
27 *Ibid.*
28 DPIE (2020) *Draft Regional Water Strategy: Gwydir Strategy*
29 DPIE (2020) *Gwydir Long Term Water Management Plan Part A: Gwydir catchment*
30 Commonwealth of Australia (2020) *Commonwealth Environmental Water Office Water Management Plan 2020-21*
31 DPIE (2020) *Draft Regional Water Strategy: Gwydir Strategy*
32 CSIRO and Bureau of Meteorology (2020) *State of the Climate 2020*
33 *Ibid.*
34 Bureau of Meteorology (2021) *Recent and historical rainfall maps* (accessed 5 November 2021).

Warialda (**Figure 3**). Populations in the Plan area are expected to decline, with a 23 percent decrease by 2041 projected for the Moree Plains.[35]

The Plan manages town water supplies for Uralla and Bundarra (via Uralla Shire Council) and Garah (via Moree Plains Shire Council) (see **Chapter 10**).[36] Other villages in the Plan area obtain town water from the regulated Gwydir River or groundwater via bores.[37] There are inherent town water security risks for the communities in the Plan area that are managed outside the Plan.[38] Groundwater is an important town water source for Moree, Warialda, Gravesend and North Star and is also used by some remote Aboriginal communities, but is covered under separate water sharing plans.

The region has a large population of Aboriginal and Torres Strait Islander people, comprising 22 percent of the population in Moree Plains.[39] This is significantly higher than the NSW average of about 3 percent.[40] There is one native title claim, filed by the Gomeroi People, 10 Local Aboriginal Land Councils (LALCs), and one Indigenous Protected Area in the Plan area (**Figure 3**).

The region's main industry is agriculture, accounting for 40 percent of employment in the Gwydir local government area.[41] In the eastern tablelands and slopes, land use is dominated by grazing for cattle and sheep production, with lucerne and pasture grown on the narrow alluvial floodplains of the upper Gwydir River.[42] The floodplains are predominantly used for cropping, with cotton the main irrigated crop (about 180,000 ha in 2017)[43] and wheat the main dryland crop. There are also significant areas of irrigated pecans and oranges (these increased during the Plan period and covered about 1,700 ha in 2017) and a range of cereals, legumes and oilseeds grown as dryland crops.[44]

While irrigated cotton – grown largely on the alluvial plains downstream of Moree – represents a small proportion of land use (around 5 percent), it is highly significant to the local economy (contributing around 34 percent of local agricultural value) and is the primary water user.[45] While tourism is not a major employer compared to agriculture, it also generates important economic value and relies on the availability and quality of water. Key attractions include Copeton Dam, sections of the Gwydir and Mehi rivers for recreation activities and the artesian water complex in Moree (fed by the Great Artesian Basin), which attracts 250,000 visitors from outside the local area annually.[46]

35 NSW Government (2021) *NSW Projections Explorer: NSW 2019 Population Projections (by LGA)*
36 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
37 DPE-Water (2020) *Draft Regional Water Strategy*
38 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. University of Canberra.
39 Australian Bureau of Statistics (2021) *Regional Statistics by LGA 2011-2019*
40 Australian Bureau of Statistics (2016) *2016 Census Quick Stats - Rural Balance*
41 Australian Bureau of Statistics (2021) *Quick Stats by LGA*
42 Commonwealth Environmental Water Office (2019) *Commonwealth Environmental Water Portfolio Management Plan: Gwydir River Valley 2019–20*
43 Provided by DPE-Water
44 Commonwealth Environmental Water Office (2019) *Commonwealth Environmental Water Portfolio Management Plan: Gwydir River Valley 2019–20*
45 DPIE (2020) *Draft Regional Water Strategy: Gwydir Strategy*
46 *Ibid.*

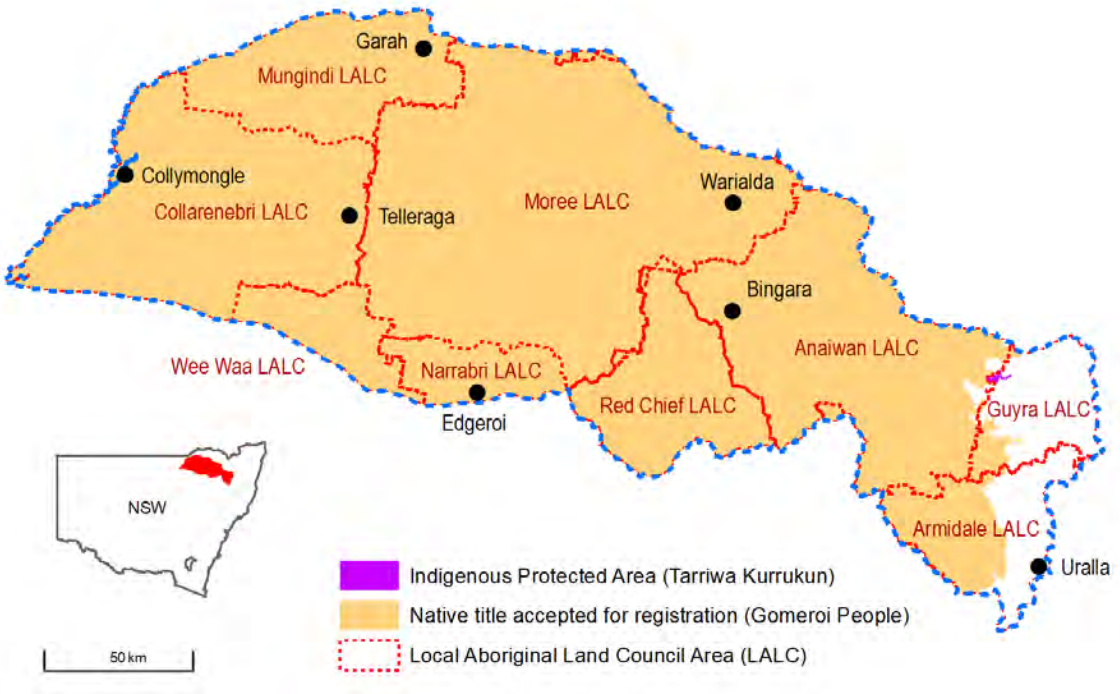

Figure 3: LALC and native title claim areas for the Plan area

Table 1 shows the breakdown of licence entitlements. Current entitlement is 68,606 units,[47] about 98 percent of which are unregulated river access licences. Most of the unregulated river access entitlement is held in the Mehi River (16,038 unit shares), followed by Millie Creek (9,967 unit shares) and Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source (5,596 unit shares).[48]

Table 1: Breakdown of entitlement by licence category for the Plan

Category*	Entitlement^ (as estimated at Plan commencement)[49]	Entitlement^ (as estimated in current Plan)[50]	Number of licences as at 2022
Unregulated river access	61,722	67,318	205
Local water utility access [Domestic and Stock Access (town water supply)]	817[51]	757	3
Domestic and stock access (not including town water supply)	518.6	470.5	59

47 Data provided by WaterNSW from its Water Licensing System, as at 1 April 2022.
48 Clause 24 of the Plan.
49 NSW Government (2012) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012*
50 Note: the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source was added to the Plan in 2016, and the Upper Gwydir Alluvial Groundwater Source was removed from the Plan in 2020. See: NSW Government (2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources Amendment Order 2016*; NSW Government (2020) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources Amendment Order 2020*
51 Rocky River Water Source (621 ML per year), Moredun Creek Water Source (94 ML per year), Gil Gil Creek Water Source (43 ML per year) and Upper Gwydir Alluvial Groundwater Source (60 ML per year).

Category*	Entitlement^ (as estimated at Plan commencement)[49]	Entitlement^ (as estimated in current Plan)[50]	Number of licences as at 2022
Floodplain harvesting (unregulated river) access	N/A	10,579	10
Aquifer (high security) access	1,115	N/A	N/A
Total entitlement	64,173	68,606	277

*The WaterNSW Water Licencing 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 and aquifer access licences, entitlement is issued as a unit share with the volume provided per unit share determined by the available water determination.

3 Establishing sustainable extraction

A fundamental role of a water sharing plan is to define how much water can be extracted by licensed users, while the remaining water must protect the water sources, their dependent ecosystems and basic landholder rights. Ensuring extraction remains within the LTAAEL is critical to protect the environment, basic landholder rights and the sharing of water as intended by the Act and Plan.[52] The Plan establishes rules to manage extraction at three scales:

- **Long term**: LTAAELs control the maximum amount of water that can be extracted over the long term in each extraction management unit.[53] Setting these limits is critical; a limit that is too high will reduce the amount of water remaining for the environment and downstream water users, and will not meet the key requirements of the Act, while a limit that is too low reduces economic and social opportunities. LTAAEL assessment should include all extraction for consumptive (non-environmental) use, including basic landholder rights, as well as interception activities. The Plan has a descriptive LTAAEL which is based on historic levels of extraction and is less than entitlement.[54] The Plan also includes provisions referring to the Basin Plan for calculating the BDL and assessing SDL compliance in the Plan area (see **Section 3.1**).[55]
- **Medium term**: AWDs allocate the volume of water that can be extracted under access licences each year. The Plan requires AWDs to be used to retrospectively reduce extraction if the LTAAEL is exceeded and not pre-emptively reduce risks (see **Section 3.5**).
- **Short term**: daily access rules define when licensees can extract water. They are intended to protect the needs of the environment, basic landholder rights and water utilities on a daily basis and enable equitable access to variable flow levels. The Plan includes cease to pump rules, which require licence holders to stop pumping when the river or pool falls below a specified level each day, to protect that portion of the flow regime and maintain aquatic refuges. Only four[56] of the Plan's 28 water sources include cease to pump provisions above 'no visible flow'[57] rules. Specific examples are discussed in **Chapter 4**. Reactive Section 324 orders can also be used in extreme situations such as drought to protect flows, but as discussed in previous plan reviews[58] their use is sub-optimal and is not regulated by the Plan.

52 See clauses 17(1)(b), of the Plan.
53 Part 4 of the Plan.
54 The extraction levels are based on various times: with extraction from licences and floodplain harvesting activities based on average annual take from 1 July 1993 to 30 June 1999; basic landholder rights extraction for most water sources based on 3 August 2012, except for the Rocky Creek Water Source, Cobbadah Water Source, the Upper Horton Water Source and the Lower Horton Water Source which are based on 20 June 2003; and plantation forestry diversion based on take at 30 June 2009.
55 Divisions 3 and 4 in Part 6 of the Plan.
56 The Gwydir Water Source; Halls Creek Management Zone in the Halls Creek Water Source; Lower Horton Management Zone in the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source; and Gingham Watercourse Water Source, which includes active management when necessary (as defined by the Minister) in the Upper Gingham Watercourse Management Zone.
57 Plan Clause 43 requires that, except for exemptions under Clauses 43(1) and (13), water must not be extracted when there is no visible flow at the extraction point, or from an in-river or off-river pool unless the pool is at full capacity.
58 Natural Resources Commission (2022) *Final Report – Review of the Review of the Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012*

The Commission continues to identify significant issues around establishing and managing extraction and interception activities through LTAAELs. Specific issues to address in this Plan include:

- the Plan does not include a volumetric extraction limit, DPE-Water has not released a numeric LTAAEL, and there is limited public data on current extraction (**Section 3.1**)
- the LTAAEL is not based on a sustainability assessment (**Section 3.2**) and it does not consider climate change (**Section 3.3**)
- DPE-Water has not assessed extraction against the LTAAEL to determine if AWD reductions are needed (**Section 3.4**)
- in the absence of LTAAEL compliance assessment, the Plan should require a precautionary AWD to be implemented to address the risk of overextraction and safeguard the priorities under the Act (**Section 3.5**)
- the Plan only has one extraction management unit, which does not allow for regionally specific risks from extraction to be managed by LTAAELs and AWDs at the appropriate scale (**Section 3.6**)
- the Plan does not currently use AWDs to proactively manage variability and risks (**Section 3.7**)
- the Plan's carryover rules and account limits allow for considerable accumulation in licensees' accounts that allows them to extract greater volumes in drier years, when rivers are under increasing stress (**Section 3.8**).

3.1 The Plan lacks a numeric LTAAEL

The Plan establishes a single LTAAEL to align with the Plan's single extraction management unit. As with many water sharing plans, the Plan's LTAAEL is not specified numerically (in ML per year) but is described as the sum of historic extractions. The Commission has a recurring recommendation that DPE-Water should define numeric LTAAELs based on sustainable levels of extraction, to:

- protect environmental and community needs
- manage extraction and development impacts on connected water sources
- support efficient LTAAEL compliance monitoring and allow action to be taken through AWDs if extraction limits are exceeded
- provide clarity and transparency to stakeholders of overextraction risks
- underpin an effective water market and the valuing of water as a limited resource.

Defining and implementing sustainable extraction limits protects water-dependent ecosystems, aligns with the Act's extraction priorities, and is fundamental to achieving the Plan's objectives.

Activation of previously inactive licensed entitlements is a material risk to the various limits and the water security of both environment and other users. The Plan's LTAAEL and unregulated river water users' BDL component are based on the 'volumetric conversion' assessment data for the period 1993-1999. These data were not gathered for these purposes, but to issue volumetric licences under the Act.[59] Despite using the same base

[59] 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. The process was based on a survey of licensed water users from July 1993 to June 1999,

data, the LTAAEL and BDL components are not directly comparable as the BDL component most comparable to unregulated river access licence entitlement (identified as 'take from a watercourse') does not include licensed farm dams.[60]

However, in the absence of a numeric LTAAEL, the Commission has compared the MDBA's estimated BDL component value with the level of entitlement to consider the risk of exceedance. The estimated BDL components include 11,200 ML per year of take from watercourses (excluding farm dam entitlement and basic landholder rights),[61] while there is about 73,842 ML per year[62] of unregulated river entitlement (excluding harvestable rights) in the Plan area.

Based on best available information, the Commission determined that unregulated river access licence entitlement is roughly 6.5 times greater than the Basin Plan's estimated unregulated BDL component.

The Basin Plan's estimated unregulated BDL component should be roughly comparable to the LTAAEL and has been used as a proxy for the purpose of this review (**Figure 2**). Combined with the Plan's generous account management rules (see **Section 6.2**), there is a high risk that water extraction in the Plan area will exceed the LTAAEL.

which collected information on active and inactive irrigated areas, crops planted and water extraction method. The active irrigated areas were converted to an annual volume based on history of use. The inactive areas were also converted to an annual volume, based on the lowest crop conversion rate for the related climate. As per DLWC (2000) *Volumetric Conversion – the next stage. A booklet for landholders with licences on unregulated rivers in NSW*.

60 The long-term average LTAAEL is equal to the baseline diversion limit attributable to the Plan's water sources. Note that the Basin Plan's Gwydir Sustainable Diversion Limit resource unit includes extractions from both the Gwydir Regulated River Water Source and the Gwydir Unregulated River Water Sources.

61 Australian Government (2012) *Basin Plan 2012* and MDBA (2019) *Sustainable Diversion Limits (SDLs) as at 1 July 2019 - surface water*

62 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.

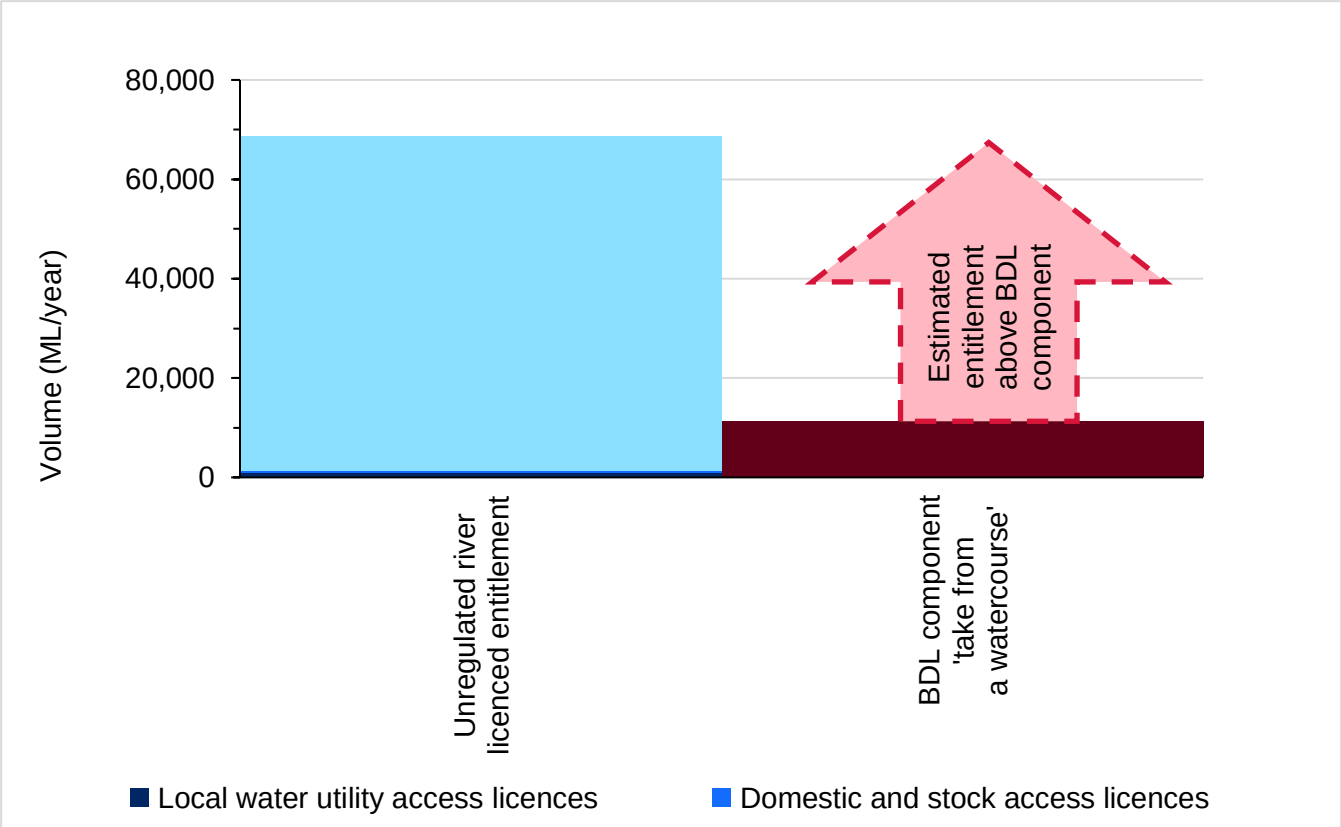

Figure 2: Comparison of entitlement, excluding floodplain harvesting, with BDL components (as a proxy for LTAAEL)[63]

Stakeholders supported the need for the Plan to clearly articulate its fundamental elements, including LTAAELs, observing that it should include:

- 'a note outlining what the long-term annual average extraction limit and the Basin Plan SDL are for these water sources and progress monitoring against this limit are included in the Plan. The NSW Government should concurrently establish a clear reporting process for transparent reporting of plan limit compliance for unregulated water sources as with other water sources.'[64]
- 'strong safeguards and targets to protect Aboriginal cultural heritage, Aboriginal fishers, water quality, town water supplies, the environment and downstream users/ impacts.'[65]

DPE-Water should publish a numeric estimate of the current Plan's LTAAEL as soon as possible. This should include assumptions and issues with data but will provide a more accurate figure to assess risk and communicate with stakeholders. Further, DPE-Water should outline the current risk of LTAAEL exceedance and engage with stakeholders to transparently manage future LTAAEL compliance assessments.

As discussed in **Section 3.6**, establishing three extraction management units with three corresponding LTAAELs would improve management to account for spatial variation in risks and impacts. This includes the impact of variability and climate change which will be felt differently in the slopes and tablelands compared to the plains.

63 Note the 'take from a watercourse' BDL component excludes licenced farm dams.
64 Submission: Gwydir Valley Irrigators Association, received February 2022.
65 Submission: NSW ALC 21, received February 2022.

3.2 The LTAAEL is not based on a sustainability assessment

The current definition of the Plan's LTAAEL is not based on an assessment of sustainability. Instead, it is set to historic use averaged over the period 1 July 1993 to 30 June 1999 (plus basic landholder rights and plantation forestry take that existed on 30 June 2009). This level of extraction has not been assessed to consider if it meets the objects of the Act, including maintaining the health of water dependent ecosystems.

DPE-Water has not determined whether this limit maintains water-dependent ecosystems and the Commission is unaware of any study that indicates this. It is therefore unclear if the Act's water management principles and priorities are being given effect.[66] DPE-Water should determine sustainable levels of extraction based on the needs of water dependent ecosystems. This should use relevant work such as the water resource plan, *Gwydir Regional Water Strategy*, Water Reform Action Plan, updates to hydrologic models and best available information of the region's climate and potential impacts of climate change over the life of the Plan.

The Commission considers there are no material barriers, beyond potential resourcing issues, to establishing defined, numeric LTAAELs based on sustainable extraction levels for the remade Plan. The Commission understands this work may require additional resources to be directed to this issue by DPE-Water, and this should be considered a high priority by the NSW Government.

3.3 The LTAAEL does not consider climate change risks

The Plan's LTAAEL is fixed at a level of extraction during the 1990s. Using this period to define the LTAAEL is inadequate as it does not consider the full climate record or climate change projections of streamflow decreases in the next 10 years and beyond.[67] Over the last few years DPE-Water has significantly expanded its understanding of the area's climate – both historically via the paleoclimate dataset, and with respect to climate change.

Defining a sustainable LTAAEL must factor in the full suite of climate scenarios and recognise that the future climate is uncertain. The Plan maintains the water above the LTAAEL for the environment and basic landholder rights. However, as the LTAAEL is based on extraction from a period with greater water availability than is likely in the future, there is a risk that less water will be available for the environment and basic landholder rights.

DPE-Water's modelling predicts changing rainfall patterns, with annual average declines up to 13 percent, higher evapotranspiration, higher minimum and maximum temperatures and more hot days.[68] In the Gwydir, the historic runoff averages 37 millimeters per year but modelling predicts this will decrease, with seasonal variance increasing.[69] These changes in runoff will affect streamflow and therefore water availability for water users and the environment. By 2030, a projected 9 percent reduction in runoff in the Plan area was estimated to reduce water availability by 10 percent and end of system flows by 6 percent (assuming no new water storages or other development).[70]

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66 The water management principles as they relate to water sharing are established under Section 5(3) of the Act.

67 Australian Government (2019) *Bioregional Assessments – Gwydir Subregion – Climate*; DPE-Water (2020) *Draft Regional Water Strategy*

68 DPE-Water (2020) *Draft Regional Water Strategy*

69 Australian Government (2019) *Bioregional Assessments – Gwydir Subregion – Climate*

70 CSIRO (2007) *Water Availability in the Gwydir – A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*

These estimates indicate that for the period of the next water sharing plan there is a notable potential impact on rainfall, water availability and runoff.[71] This would be compounded by increased demand for extraction due to higher temperatures and evapotranspiration. If the Plan were to be managed to the current LTAAEL, the volume of water available to fulfill environmental and instream needs would therefore decrease over time.

Adaptive management will require that the Plans are able to be adjusted to ensure the impacts of climate change can be addressed without the need to switch off the Plan.

Without a mechanism to adjust for likely climate change trends, the Plan does not fulfil its requirements of prioritising the sharing of water to protect the water source and its dependent ecosystems, or adequately recognise variability.[72] The Plan must therefore address, and be adaptable to, the risk of reduction in water availability for the environment and water users and planned environmental water over the next ten years and beyond.

It is critical that DPE-Water determine a sustainable level of extraction that considers historic variability and risks from climate change and use this as the replacement Plan's LTAAEL(s) for each extraction management unit (see **Section 3.6**). DPE-Water has completed significant work on climate change and variability as part of the draft *Gwydir Regional Water Strategy,* which should be incorporated into the Plan review.

The Minister currently has the ability under Section 324 of the Act to implement temporary water restrictions to cope with water shortages in unregulated rivers. While this is one option to manage water during periods of drought, DPE-Water should expand rules for setting AWDs, allowing for more certainty and proactive management of water shortages based on best available evidence (see **Section 3.7**).

Existing Plan provisions, while not designed specifically to manage climate variability, may partially fulfil this function. For example, cease to pump thresholds restrict extraction and protect pools when flows stop. However, this may cause equity issues between water users, where upstream extractors are less affected by cease to pump rules than those downstream. The Plan includes an objective to 'manage these water sources to ensure equitable sharing between users'.[73] Reducing AWDs would share the reduced entitlements more equitably across all users, regardless of their relative position in each water source.

3.4 LTAAEL compliance assessment has not been undertaken

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. The Plan's audit found compliance with LTAAELs was not given effect to and the lack of implementation of clauses relating to LTAAEL assessment and compliance gives a very high likelihood that the Plan is not meeting its intended objectives.[74] This issue remains, and the Commission strongly recommends that DPE-Water undertakes and reports on LTAAEL assessments as an immediate priority.

The Commission has considered additional steps DPE-Water should take to adequately protect water sources, communities and basic landholder rights until sustainable, numeric LTAAELs are established and adhered to.

71 OEH (2014) *New England North West Climate Change Snapshot*
72 Section 5(3) of the Act.
73 Clause 10 (e) of the Plan.
74 Alluvium and Vista (2019) *Audit of the Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012*

LTAAEL assessment requires numeric LTAAELs (**Section 3.1**) and a reasonable estimate of actual annual extraction. A 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. As a principle of ecological sustainable development, DPE-Water should apply the precautionary principle, which states that lack of perfect information should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious or irreversible environmental damage. The precautionary principle is one of the principles of ecologically sustainable development which are committed to under Object 3 (a) of the Act.

DPE-Water reports to the MDBA each year on the Gwydir unregulated river water users' component compliance with Basin Plan's BDL extraction limits. However, each year DPE-Water report the same 1993-1999 'volumetric conversion' assessment figures.[75] In other words, the BDL reporting for unregulated water sources is based on incomplete estimates of the average extraction from 1993 to 1999 as estimated in 2002, rather than an actual assessment of annual extraction. This complete lack of LTAAEL and BDL compliance assessment is a serious risk to Plan outcomes for the environment and users' ongoing access.

DPE-Water has previously advised the Commission that it understands that LTAAEL assessment is a priority but has not provided clear timelines for completing this. DPE-Water have indicated it will not begin LTAAEL assessment until at least three years of metering data is available, which would be the end of 2024. 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 Water Metering Policy*.[76]

The Plan provides for extraction to be managed through reduced AWDs if LTAAELs are exceeded over a five-year averaging period.[77] Given the LTAAEL compliance period is five years, under this approach DPE-Water would not assess LTAAEL compliance until 2029, which is just three years before the expiration of the next Plan.

In the context of the extreme events that have been experienced over the life of the Plan and our current understanding about climate change, this timeframe is inadequate to assess or act on risk within the next Plan period. Waiting for metering data is also inconsistent with the precautionary principle. Stakeholders raised concerns regarding the limitations of the current approach to LTAAEL compliance assessment:

> '*The lack of publicly available usage data is a failure of Government to implement their responsibilities to ensure transparency and accountability of managing our water*.'[78]

Given the high risk of an LTAAEL exceedance, DPE-Water should immediately assess extraction based on best available information including estimates of unmetered extraction. This can be improved upon in future years as more metering data is available and should prevent the need for proactive AWDs as outlined in **Section 3.5**.

Gwydir Valley Irrigators Association may be able to assist with these data as it separately collects water use data from members that are currently metered, noting the priority of this action in its submission:

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75 *Ibid.*
76 DPIE (2021) *Non-urban metering - What water users need to know*, accessed 18 November 2021.
77 See clauses 27 to 31B of the Plan.
78 Submission: Gwydir Valley Irrigators Association, received February 2022.

> '*NSW Government [report] on actual water use information … as required by the Water Management Act. … [with] quality assurance by industry bodies given the gaps in current publicly available information', and to review 'active work approvals, to separate non-active work approvals … considered with historical water use information to establish clear understanding of risk to water sources, rather than using water licence information only'*.[79]

The Plan's assessment of LTAAEL compliance requires the calculation of average extraction over the preceding five years.[80] This is unusual, with most unregulated water sharing plans using a three-year compliance assessment period.[81]

A delay of five years before identifying an LTAAEL exceedance and over-extraction may result in significant impacts to the environment, downstream users and communities. A delay in LTAAEL compliance means, the impact on environmental outcomes of overextraction has already occurred, potentially over several years. The delayed reduction in AWD will disadvantage licensees who may have over-invested in the intervening time based on the understanding they would continue to receive 100 percent AWD. This may mean a stronger response and reduction in AWD is required, with the greatest potential for impact in the first year of LTAAEL compliance assessment. If the risk of adverse impacts is high, the compliance period needs to be shorter so timely responses can be implemented. For this reason, DPE-Water should estimate recent extraction to understand the risk of LTAAEL exceedance and help prepare users for any future action.

3.5 AWDs should be adjusted in the absence of LTAAEL assessment

Continuing to have water sharing plans that rely on an LTAAEL without adequately defining the LTAAEL or assessing compliance against it does not protect the Act's priorities of protecting the environment or basic landholder rights. As discussed in the previous sections, it is essential that DPE-Water rectifies these issues before remaking the Plan.

The Commission strongly recommends that DPE-Water undertakes LTAAEL assessments as required by the Plan as an immediate priority. Until this occurs, the Plan should require other mechanisms to provide accountability for protecting the environment, basic landholder, and town water requirements. Risks to the environment and other priority water users are exacerbated by the presence of significant entitlement above the estimated historic extraction on which the LTAAEL is based (see **Section 3.1**). Water users can legally use all water allocated to them subject to licence conditions. Risks to water sources are further compounded by the Plan having no visible flow rules in most water sources, no limits on daily take and generous account management rules (see **Section 3.8**, **Section 4.1** and **Section 6.2**).

The replacement Plan should therefore require a conservative approach to setting AWDs until DPE-Water implements LTAAEL compliance provisions. For water sources identified as high risk under the WRP risk assessment, using the precautionary principle, AWDs should be reduced to be equivalent to the ratio of the LTAAEL to entitlement. If that cannot be calculated, the AWD should be set at the ratio of the unregulated BDL to the unregulated river access entitlement. This would protect the Plan's planned environmental water and basic landholder rights from being extracted, implementing the Plan in line with

79 *Ibid.*
80 Clause 29(1) of the Plan.
81 For example, the Lachlan, Namoi, Murrumbidgee, Border Rivers and Macquarie-Bogan unregulated water sharing plans.

the requirements of the Act's water management principles. This would provide a tangible figure for stakeholders to highlight the risks of the current AWD approach to the Plan's water sources. It also provides an incentive to landholders to report their actual take and encourage the development of sustainable, numeric LTAAEL and conduct LTAAEL assessment in the Plan area.

The ratio of the Basin Plan's BDL component to unregulated river access entitlement is 15 percent.[82] Such a ratio should only be used where DPE-Water does not take steps to make a reasonable estimate of extraction and should not be required considering the data available from water users and implementation of metering reforms. Assessment of LTAAEL compliance does not require perfect information, but it will require resourcing. The Commission supports DPE-Water implementing a risk-based approach and using available data to estimate LTAAEL compliance until improved information, such as metering data, is available.

In the meantime, the risk that AWDs may need to be significantly reduced to comply with the LTAAEL under the current Plan is not transparent to users. DPE-Water must engage with licensees as soon as possible to communicate the risks of exceeding the current LTAAEL, and potential future reductions in AWDs. Engaging with stakeholders would allow DPE-Water to better understand potential impacts on licensees, areas of risk and may help develop more nuanced AWD adjustments to adequately protect the environment with the least impact on licensees. The conservative approach recommended as a Plan safeguard in case of DPE-Water's lack of LTAAEL assessment should only apply if DPE-Water does not make a reasonable estimate of extraction.

3.6 A single EMU does not allow management at the appropriate scale

The Plan area has highly variable extraction patterns and associated risks, driven by the region's variable geography, environmental values, industries and rainfall. Currently, the ability to manage different extraction risks in different areas in a targeted way is limited as LTAAEL compliance and AWDs are applied at the EMU-scale and there is currently only a single EMU covering the whole plan area. This issue is further compounded by other geographically complex provisions, that are not appropriately targeted to the scale of issues or intended Plan outcomes (see **Section 6.1** and **Section 9.2**).

Currently, the major consequence of a single EMU is that any future impacts from an LTAAEL exceedance would be spread across all licence holders, regardless of whether extraction exceedances are driven by localised activity (for example, from floodplain harvesting). This creates potential inequity between licensees. This was raised by some stakeholders, who observed that with '*the addition of unregulated floodplain harvesting licences, the impact of growth in extraction by either unregulated water users or unregulated floodplain users is socialised. This is unacceptable given that not all unregulated access licences are floodplain harvesters*'.[83]

In recent water sharing plan reviews undertaken by the Commission, some risks and equity issues are managed by having more than one EMU, for example, the NSW Border Rivers Unregulated and Murrumbidgee Unregulated Water Sharing Plans.[84] However, it should be noted these risk management approaches will only be effective where LTAAEL compliance

82 A reduced AWD should not be applied to local water utility or domestic and stock access licences.
83 Submission: Gwydir Valley Irrigators Association, received February 2022.
84 These water sharing plans have two (NSW Border Rivers unregulated) and four (Murrumbidgee unregulated) EMUs respectively.

assessments are in place. Having a single EMU also does not target actions addressing risks to the area where extraction impacts are occurring. There is a risk that local environmental and economic impacts of extraction can be hidden as LTAAEL compliance (when implemented) is assessed across such a large and varied area.

The Plan's current single EMU is a legacy from the 2003 water sharing plan for the Horton Valley.[85] When the current Plan was developed, the implications of a single EMU do not appear to have been fully considered. However, an amendment clause was included in this Plan to add, remove or modify an EMU, including the water sources to which it applies.[86] This provision has not been implemented. As part of the replacement Plan, DPE-Water should assess the benefits and risks of multiple EMUs. The Commission considers that areas with local risks that would benefit from being managed by discrete EMUs include:

- Thalaba Creek and Millie Creek water sources, which flow separately to the Barwon Darling
- the gazetted Gwydir floodplain (except Thalaba Creek and Millie Creek water sources)
- water sources above Copeton Dam
- water sources between Copeton Dam and the gazetted floodplain.

Splitting the Plan area into more than one EMU would reduce risks and improve equity and environmental outcomes, allowing accounting rules to consider geographic-specific objectives and extraction patterns. Establishing these EMUs would support the tailoring and implementation of other recommendations in this review, including improving the equity and effectiveness of account management (see **Section 6.2**) and trade rules (see **Section 8.2**) across the Plan area.

3.7 Future AWDs should be proactive

The Plan could be improved to ensure the efficient use of available water. The Commission considers current process of providing large allocation relative to LTAAEL then relying on temporary water restrictions under Section 324 of the Act is leading to poor outcomes across NSW. Managing to a numeric sustainable long term limit should allow for AWDs to vary between years based on a range of factors. To improve outcomes from the Plan a shift is required to move to proactive AWDs and timely compliance responses.

AWDs for the regulated rivers are proactive and based on considerations such as water held in storage, carryover, and estimated drought inflow sequences. The historical level of extraction the Plan's LTAAEL is based on was affected by both the level of activation and climate during that time. The LTAAEL and AWDs need to be able to accommodate different climatic conditions and levels of activation to address risk and support achievement of Plan outcomes.

At the start of each water year the following should be considered as part of the AWD announcements:

- **The level of activation:** Water can only be extracted from an access licence if it is attached to a work approval. The current risk assessments for access rules assume full activation. The Gwydir Valley Irrigators Association submission recommended a review of work approvals to separate out non active work approvals to understand the

85 NSW Government (2016) *Water Sharing Plan for the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source 2003*

86 Clause 68(1)(c) of the Plan.

true level of risk. There is a potential risk of full activation over the 10-year life of the Plan and therefore this recommendation is not supported.

However, the Commission would support the use of activation levels for shorter term decisions such as for AWDs. If the application of proactive AWDs the risk from daily extraction is reduced (the hydrologic stress is reduced during droughts) then this should be reflected in the access and trade rules.

- **The amount of carryover:** The regulated river AWDs consider carryover before allocating additional water. The current unregulated carryover rules have been applied across all NSW unregulated plans without consideration of climate variability and seasonality or risks and outcomes.

  Reduced AWDs as part of LTTAEL compliance would have a delayed effect on extraction when there are large amounts of carryover in water accounts. It can take many years for water held in accounts to be reduced before extraction drops to that required to meet the LTAAEL.

- **Historical and predicted climatic conditions:** The Plan requires the same volume is allocated irrespective of climatic conditions. The Plan states it recognises the effects of climate variability by having provisions that limit water availability on a long-term average basis.[87] Using a long-term average, which is a fixed number, does not recognise or adjust for climate variability between years. Having AWD that are based on the actual volume of water available is logical to recognise climate variability. The Plan also notes that other statutory tools are available to manage for climatic variability within a water source, for example, temporary water restrictions under Section 324 of the Act. The use of Section 324s and turning off the Plan's provisions to manage water scarcity is sub-optimal and not transparent.

  Comparing current and predicted climatic conditions to those experienced between 1993 and 1999 should highlight the duration and intensity of droughts that may occur and the Plan's ability to manage those droughts. Past climate and projections both indicate the likelihood of drier periods increasing in frequency, duration and scale. The paleoclimate work for the Regional Water Strategies has shown the climate has greater extremes, with longer periods of drought than recent recorded history.

DPE-Water should develop and implement a proactive AWD approach to address climate variability. Having a risk-based AWD process can be used to better manage variability and may be able to replace carryover. It should provide licensees adequate certainty to assess their inter-annual risks but be responsive to annual weather systems.

By year five of the Plan DPE-Water should, in consultation with stakeholders, develop and implement the use of proactive AWDs and revise account management rules (carryover and account limits) to support any AWD changes.

3.8 Account management rules create significant risks

Each water access licence holder has a water allocation account. The amount of water available to unregulated river access licence holders in any water year is based on crediting their accounts in accordance with accounting rules specified in the Plan. These were introduced when the water sharing plans commenced and include carryover rules[88] which allow unused allocation from previous years to be carried across up to the account limit (the maximum amount of water that can be taken in any year). **Table 4** summarises the account management rules for the Plan.

87 Clause 14(1) of the Plan.

88 The carryover limit in Clause 39(4) of the Plan limits the water allocation account to 1 ML plus the current year's allocation.

These rules were intended to allow water users flexibility to access more water during wetter periods in systems that tend to be 'boom or bust'. However, the Plan's carryover rules and account limits allow for considerable accumulation in users' accounts that can allow for water users to extract greater volumes in dry years when the rivers and their water dependent ecosystems are under maximum stress and when water extraction should be reduced. This is particularly concerning in this Plan as most water sources have 'no visible flow' access rules that allow pumping until the river stops flowing, meaning that the Plan provisions are not particularly effective for protecting environmentally significant low and base flows.

Most unregulated plans adopted the same two year carryover provisions regardless of specific risks in the Plan area. However, given that the Plan's entitlement is greater than the LTAAEL, there is a material risk of exceedance even without use of carryover in the Plan area. The account management rules further increase the risk of LTAAEL exceedance.

The Plan's 5-year LTAAEL compliance provisions mean that potential impacts from exceedance of the LTAAEL as a result of these account rules are not addressed in a timely way through AWD reductions. The impact on the environment and other users from exceedance can occur years before there is an AWD response when the risks may be lower. If accounts have again accumulated high allocations any reductions will be further delayed until the allocations are reduced.

The Plan allows for amendments to water account rules.[89] DPE-Water should review the risks that the Plan's carryover provisions pose to low flows and the risk of exceeding the LTAAEL to determine if the provisions support environmental, equitable and economic outcomes. If the risk is determined to be significant and to ensure the intent of carryover (greater extraction during wetter periods) is maintained in the Plan, provisions should be added to ensure that carryover is only applied to high flow licences in high-risk areas. This will require the Plan to be revised to establish high and low flow licence categories and multiple EMUs (as recommended in **Section 3.6**).

Carryover pose a greater risk in the slopes and tablelands, where there are limited off-river storages to allow licensees to make appropriate use of carryover provisions.

In addition to creating a significant risk of LTAAEL exceedance, the Plan's accounting rules also vary considerably between users (**Table 3**). This allows for users to accumulate water in their accounts at different rates, creating potential inequities. Further, these differences are not considered when applying reductions to ensure LTAAEL compliance. These issues are discussed in detail in **Section 6.2**.

[89] Clause 71 of the Plan, 'after year five of this Plan, Clause 39 may be amended to specify different individual account management rules, taking into account the results of any review of the rules undertaken or assessed as adequate by the Department including in relation to the variability of the unregulated system flows, usage data and any other relevant information, provided that before making an amendment pursuant to this paragraph, the Minister should consult with relevant stakeholders'.

Table 3: Account management rules for licences in the Plan area

	Unregulated river, domestic and stock and local water utility	Floodplain harvesting (unregulated river)
Carryover	Can carryover a maximum of 100 percent of their annual entitlement[90]	Must carryover any water allocations remaining in an account to the next water year[91]
Account limit	Can hold up to 2 ML per unit share in their account[92]	Can hold up to 3 ML per unit share in their account[93]
Extraction limit	Can extract a maximum of 3 ML per unit share over a rolling three-year period[94]	
Access licence entitlement	67,318 unit shares (unregulated river) plus 1,287 ML (domestic and stock and water utility)	10,579 unit shares
Maximum extraction potential in one year (extraction limit x entitlement)	137201 ML	31,737 ML
LTAAEL	Unspecified. For reference, the relevant BDL component is 11,200 ML of take from watercourses (excluding farm dam entitlement and basic landholder rights)[95]	Unspecified
LTAAEL compliance period	Five years[96]	Five years

3.9 Recommendations

R 2	To support sustainable extraction and improve transparency, as soon as possible in the next two years, DPE-Water should: a) assess the benefits and risks of establishing multiple EMUs for the Plan area and corresponding LTAAELs b) establish and include numeric values for LTAAEL(s) in the replacement Plan c) prioritise LTAAEL compliance assessment using best available estimates of extraction and make this publicly available d) review the impact of the Plan's carryover provision on the risk of exceeding LTAAEL(s) and risk to low flows. If the risk is considered significant, only apply carryover provisions to high flow access licences

90 Clause 39(4) of the Plan.
91 Clause 39(5) of the 2022 Amendments to the Plan
92 The carryover limit in Clause 39(4) of the Plan limits the water allocation account to 1 ML plus the current year's allocation.
93 Clause 39(5) of the 2022 Amendments to the Plan
94 Clause 39(3) of the Plan.
95 Australian Government (2012) *Basin Plan 2012*; MDBA (2019) *Sustainable Diversion Limits (SDLs) as at 1 July 2019 - surface water*
96 Clause 29(1) of the Plan.

R 3	DPE-Water should ensure the replacement Plan includes requirements for: a) AWDs to be set conservatively if DPE-Water does not annually make and publish a reasonable estimate of extraction and assess compliance with the LTAAEL(s) b) proactive AWDs to support sustainable numeric LTAAEL(s) and revision to account management rules (carryover and account limits) to support any AWD changes. These proactive AWDs should be developed in consultation with stakeholders by Year 5 of the replacement Plan.
R 4	To support adaptive management during the next Plan period, the replacement Plan should include a provision requiring DPE-Water to: a) determine the sustainable level of extraction by Year 5 based on best available ecological requirements, hydrological and historical and projected climate information b) use these levels to define the Plan's LTAAEL(s) for each extraction management unit.
R 5	As a priority in the next two years, DPE-Water should complete a hydrological analysis to determine the impacts of the Plan's five-year LTAAEL compliance assessment rule compared to the more common three-year averaging approach. This should consider if there is a material difference between the two assessment time scales, and if the five-year time scale risks environmental or other outcomes. DPE-Water should use this analysis to inform the replacement Plan's provisions.

4 Strengthening environmental protections

The Gwydir catchment has significant environmental values, including the internationally and culturally significant Gwydir Wetlands,[97] which are situated in the lower catchment. The Gwydir Wetlands are the focus of targeted environmental watering, with 'held' and 'planned' environmental water originating from the regulated river delivered to the wetlands to support environmental values.

There is a high degree of interaction between unregulated and regulated river water sources in the Gwydir catchment, with inundation of the Gwydir Wetlands from the regulated Gwydir River. As a result, the regulated and unregulated water sources need to be managed as a whole to provide for connectivity within and between water sources, including with the Barwon River.

The Plan aims to protect the needs of the environment by setting and managing extraction against LTAAELs, use of AWDs, trade restrictions and daily access rules. However, there is limited evidence of the effectiveness of these Plan provisions in supporting environmental outcomes and no evidence of LTAAEL compliance assessments.[98] The Plan's environmental provisions and their implementation can be improved.

In 2020, the NSW Government took steps to protect water for the environment through adopting the active management mechanism. These rules commenced 1 December 2020. The Commission acknowledges this initiative and the benefits associated with protecting active environmental water, with further opportunities to improve the active management mechanism within the Plan area. The Plan was also amended to improve consistency with the Basin Plan, including updates to the Plan's objectives to be more specific.[99] Other than the active management mechanism, there were minimal changes to water sharing rules to achieve those objectives as the Plan was still within its ten-year term.

The draft *Gwydir Regional Water Strategy* identified a need to better manage water for the environment in some unregulated rivers to ensure that it achieves its intended purpose giving greater certainty to water users about how flow events will be managed and when water can or cannot be taken.[100] The *Gwydir Water Resource Plan*'s (WRP) risk assessment indicates that more can and should be done to protect key components of the flow regime across some of the Plan's water sources.

Significant work has been undertaken to better understand environmental water requirements since the Plan was developed, including the WRP risk assessment and DPE-EHG's *Gwydir Long Term Water Plan,* which include recommendations for improving Plan outcomes. Opportunities identified during water resource plan development should now be addressed to improve Plan outcomes.

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97 The Gwydir wetlands include four Ramsar sites including Windella, Crinolyn, Goddard's Lease and Big Leather.

98 Alluvium and Vista (2019) *Audit of the Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012*

99 For example, the original 2012 environmental objective of the Plan was to '*protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources*'. In 2020 this objective was changed to '*protect and contribute to the enhancement of the ecological condition of these water sources and their water-dependent ecosystems over the term of the Plan*' (Clause 10(1) of the Plan). Other specific objectives were included, such as '*to protect and contribute to the enhancement of … water quality within target ranges for these water sources to support water-dependent ecosystems and ecosystem functions*' and '*reserve a portion of flows to maintain hydrological connectivity between these water sources and other connected water sources including the Gwydir Regulated River Water Source*'.

100 DPIE (2020) *Draft Regional Water Strategy: Gwydir*

This chapter outlines key issues that should be addressed, including:

- daily access rules do not adequately protect environmental values in several water sources (**Section 4.1**)
- significant wetlands require greater protection and clarity regarding water delivery (**Section 4.2**)
- changes to the Gwydir raft and implications for flows down the Gingham Watercourse to Ramsar wetlands sites and where changes to Plan provisions may be warranted to protect water intended for the environment (**Section 4.3**)
- while active management has been introduced, it can be strengthened as a priority to better and more transparently protect planned environmental water and protect active water from floodplain harvesting (**Section 4.4**)
- while active management is a positive step for protecting active environmental water, recent Plan amendments to access rules have reduced environmental protections in the Lower Gingham Water Course when there is no active environmental water in the system (**Section 4.5**)
- Plan provisions do not adequately protect flows to the Barwon-Darling (**Section 4.6**).

Further details regarding how the Plan can better support connectivity are provided in **Chapter 5**.

4.1 Daily access rules do not adequately protect environmental values

Only four of the Plan's 28 water sources have daily access rules based on flow levels at gauging stations which allow a portion of flow to be reserved for the environment.[101] These include:

- Gingham Watercourse Water Source
- Gwydir Water Source
- Halls Creek Water Source
- Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source.[102]

The rest of the Plan's water sources use a default no visible flow rule, a decision that the Plan's background document attributes to a lack of gauging infrastructure in the Plan area[103] (see **Section 5.4**). This is one of the lowest ratios of water sources with flow thresholds above no visible flow of any of the unregulated water sharing plan reviewed by the Commission. These rules are not commensurate with the risk posed by extraction and do not reflect current knowledge regarding the risks to environmental water requirements.[104] Having a no visible flow access rule for most water sources does not adequately support the Plan's objective to '*reserve a portion of flows to partially mitigate alterations to natural flow regimes in these water sources*'.[105]

101 Limited cease-to-pump and commence-to-pump rules exist, with commence-to-pump rules only in place in the Lower Gwydir.
102 Based on clauses 42 and 43 of the Plan.
103 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
104 For example, those outlined in the *Gwydir Long-Term Water Plan*
105 Clause 10(3)(b) of the Plan.

The risk assessment undertaken as part of the development of the *Gwydir Surface Water Resource Plan* identifies 17 water sources[106] at high risk for different flow components, outlining how instream values are at risk from altered flow regimes, especially zero and low flow conditions.[107] This is high compared with other water sharing plan areas, such as the unregulated river water sources of the Border Rivers, where only four water sources are identified as being at high risk.

The *Gwydir Long-Term Water Plan* recommends reviewing cease to pump thresholds and implementing commence to pump thresholds to:

- reduce the length of cease to flow periods and protect low flows and baseflows, particularly in dry times or ecologically important months
- implementing commence to pump thresholds to break cease to flow periods and freshes at ecologically relevant times and break cease to flow periods with events of sufficient magnitude to avoid poor water quality incidents.

The Commission supports reviewing the Plan's daily access rules and strengthening protections in water sources of high environmental value. The following sections outline four water sources where the Commission considers there are particular risks associated with daily access rules.

Tycannah Creek Water Source

Tycannah Creek (a tributary of the Mehi River) is highly important for fish refugia, breeding and movement in the valley. The threatened southern purple spotted gudgeon, a Basin-wide Environmental Watering Strategy priority target key species for the Northern Basin and the Gwydir valley, has been observed in Tycannah Creek. However, Clause 43(3) of the Plan enables water users to extract until there is no visible flow at the pump site, placing threatened species including the southern purple spotted gudgeon at risk. DPE-Water's risk assessment for the water source indicates that there is an intolerably high risk of extraction impacting ecological values during base flow and no flow periods.[108] A river gauge is available on Tycannah Creek that could be referenced in the replacement Plan for more appropriate flow-based daily access rules.

There are also issues with inconsistencies in the conditions placed on licences in the Tycannah Creek Water Source. Eleven licences hold 2,768 unit shares in the water source, four of which have additional daily access conditions in Appendix 4 of the Plan (see also **Chapter 6**). Two of the smaller licences have first flush style conditions requiring a period of not less than 24 hours before extracting. As discussed in the equity chapter (**Chapter 6**), the Plan should not rely on exceptions to protect outcomes, as it is inequitable and risks not meeting environmental and socio-economic objectives. Such conditions should be reviewed for their effectiveness and then applied to all licences in the water source where protection of the first flush is considered important.

Halls Creek Water Source

Even in the Plan's water sources with flow classes, the thresholds may be inadequate to protect environmental values. For example, while Halls Creek Water Source has flow classes, it has a visible flow threshold for A Class licences and a no visible flow threshold for the very low flow class, which is not adequately protective of the environment. Appendix 4 of the Plan (see also **Chapter 6**) adds another layer of conditions for this water

106 Copeton Dam, Georges Creek, Gil Gil Creek, Gingham Water Course, Halls Creek, Keera Creek, Lower Horton, Millie Creek, Moredum Creek, Moree, and Myall, Roumalla, Tycanna, Upper Gwydir, Upper Horton, Warialda Creek and Gwydir water sources.
107 DPI-Water (2018) *Risk assessment for the Gwydir Surface Water Resource Plan Area (SW15): Part 1*
108 DPI-Water (2018) *Risk assessment for the Gwydir Surface Water Resource Plan Area (SW15): Part 1*

source, and includes five licences, preventing irrigation use unless there is a visible flow at the Bingara-Barraba Road Bridge.

The Plan's current Appendix 4 conditions for Halls Creek licences may be more restrictive than those proposed in a recent DPE-Water study, which recommends raising the cease to pump to 2 ML per day based on a gauge at Bingara.[109] This is because the road bridge is at the bottom of the water source whereas the gauging station is upstream and losses are incurred between the two sites.

Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source

In another example, changes to the cease to pump rules appear to have reduced environmental protection over time when the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source was merged into the Plan in 2016.

This water source is divided into 4 management zones:

1. Rocky Creek Management Zone
2. Cobbadah Management Zone
3. Upper Horton Management Zone
4. Lower Horton Management Zone.

In the 2003 water sharing plan for this water source had cease to pump thresholds of 2 ML per day for the Rocky Creek, Cobbabah, and Upper Horton Management Zones and 4 ML per day for the Lower Horton management zone at the downstream end of each zone.[110] The 2003 Plan relied on an announcement from the Minister and the installation of multiple gauging stations and setting a cease to pump level at Horton River at the Rider Gauge that would ensure 4 ML per day reached the end of that zone. The gauging stations were not installed as intended under the original plan, meaning the flow classes could not be activated.

In 2016 all three management zones without gauges were reduced to no visible flow at the pump site. The Commission understands visible flow is generally thought to be about 1 ML per day. The cease to pump threshold in the Lower Horton Management Zone in this water source was set at 4 ML per day measured at Horton River at the Rider Gauge which is upstream from the end of the management zone.[111] Extraction and losses between the gauge and the end of the management can result in less than 4 ML per day at end of the management zone.

Environmental protections should not have been eroded for these management zones with high instream values (including endangered eel tailed catfish).

Myall Creek Water Source

Another high value water source in the Plan area, Myall Creek, was included in the scope of DPE-Water's study of cease to pump conditions in the Gwydir unregulated river water sources published in 2020.[112] The current daily access rule for this water source is based on no visible flow at the pump site, rather than referencing a gauge. DPE-Water recommended increasing the cease to pump for Myall Creek to at least 2 ML per day with the intent of reducing the frequency and duration of cease to flow events, and to contribute to

109 DPIE-Water (2020) *Cease-to-pumps and macroinvertebrates*
110 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
111 Clause 42, Table B of the Plan.
112 DPIE Water (2020) *Cease-to-pumps and macroinvertebrates*

protecting macroinvertebrate communities. There is an active stream gauge in Myall Creek ('Molroy') with over 55 years of data that could be referenced. The socio-economic impacts of this proposed change are unclear and were not examined as part of the study.

Appropriate resourcing and effort should be applied to the Plan area when setting daily access rules given the high number of high value water sources at high-risk. To protect high value environmental assets DPE-Water should review daily access rules, including cease to pump and commence to pump thresholds, and amend them where required to protect low flows from extraction at a minimum. Existing gauge should be used where available and improvements to gauging made where necessary (see **Section 5.4**). When determining the cease to pump thresholds, DPE-Water should compare the existing conditions in Appendix 4, along with evidence in the *Gwydir Water Resource Plan*'s risk assessment and the *Gwydir Long Term Water Plan* and any other appropriate evidence.

4.2 Significant wetlands require greater protection

Several internationally and nationally significant wetlands and lagoons and other high value environmental assets are located in the Plan area. These include but are not limited to four Ramsar-listed wetlands: Big Leather (Old Dromana) on the Lower Gwydir Watercourse, and Goddard's Lease, Windella and Crinolyn on the Gingham Watercourse and the Upland wetlands of the drainage divide of the New England Tablelands Bioregion endangered ecological community. Many are listed by water source in schedules 4 and 5 of the Plan, although not the specific Ramsar site names.

The Plan includes two targeted environmental objectives that relate to wetlands in the Plan area, specifically in relation to the protection and contribution to the enhancement of:

- target ecological populations[113]
- the lagoons, waterholes, wetlands and swamps listed in the Plan's schedules.[114]

Connectivity and water quality objectives included in the Plan are also relevant to the condition of wetlands in the Plan area. The condition of the Plan area's water sources and their water-dependent environmental assets is highly dependent on flows which connect the instream benches, cut-off channels, anabranches, floodplains and wetlands.[115]

A note in the Plan states that '*Ramsar wetlands, and the associated ecological communities such as waterbirds and lignum shrublands, are primarily managed by the NSW Environmental Water Manager according to the rules of the Water Sharing Plan for the Gwydir Regulated River Water Source 2016*'.[116] While the Gwydir wetlands are dependent on flows from the regulated river, what happens in the unregulated river water sources (in terms of extraction and diversion of water) can also impact on their condition and ecological character. This should be recognised in the Plan, with corresponding provisions to manage risks to these significant wetlands.

Ecological character is described at the time of Ramsar listing. These ecological character descriptions provide a baseline for each wetland when they are listed[117] and are important

113 Clause 10(2)(a) of the Plan. Target ecological populations can include native fish and vegetation, high diversity hotspots and significant habitat for native water dependent animals, native vegetation and low flow macroinvertebrate communities.
114 Clause 10(2)(d) of the Plan which relates to lagoons, waterholes, wetlands and swamps specified in Schedules 4 and 5 to this Plan.
115 DPIE-EHG (2020) *Long Term Water Plan – Part A: Gwydir catchment*
116 Under Clause 10(2)(a) of the Plan.
117 At the time of listing as a wetland of international important.

for assessing changes in the ecological character of Ramsar sites.[118] The Australian and NSW governments have a responsibility to maintain the ecological character of Ramsar sites or take steps to remediate them if there is an adverse change in their ecological character in accordance with Ramsar Convention obligations.[119] The Plan does not currently recognise this commitment to maintain the ecological character of the Ramsar sites.

In 2011 an adaptive environmental management plan was published for the Gwydir wetlands. It included a section on water sharing and outlined the provisions in the *Water Sharing Plan for the Gwydir Regulated River Water Source* that aim to provide water for the environment (including the Gwydir wetlands).[120] This includes an environmental contingency allowance[121] and rules to protect a portion of natural inflows for the Gingham and Lower Gwydir wetlands (i.e. the '3T' or three tributaries rule).[122] The Commission will examine these rules in its review of the Gwydir Regulated River Plan but notes a recent paper on Ramsar wetlands in the Murray-Darling Basin rated the Gwydir Regulated Plan as having low compliance with Ramsar Convention obligations due to lack of specific reference to maintaining the ecological character of Ramsar listed sites.[123]

Appendix 4 of the Plan includes conditions for one licenced work in the Gingham Water Source (based on conditions under the former *Water Act 1912*) which state that water must not be taken for irrigation when the environmental allowance (planned environmental water) is being distributed to the Gingham Wetlands. This condition needs to be more broadly applied and embedded in the replacement Plan to protect planned environmental water from the regulated river when it enters unregulated river water sources to ensure that planned environmental water is consistently protected from extraction and achieves its intended purpose.

The Plan prevents the granting of a water supply work approval that can extract water from a lagoon, waterhole, wetland or swamp listed in Schedules 4 and 5.[124] However, the schedules do not include all significant environmental assets, omitting key assets that comprise the *Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion*, which were listed as an endangered ecological community in 2002. Only some of these are included in Schedule 5 of the Plan and therefore the whole community is not protected. For example, Barley Field Creek near Uralla is not listed in the Plan schedule. The Plan should refer to best available information regarding the comprehensive EEC listing, wetlands of national and regional significance and Ramsar listings. In addition, trade rules need to be updated to support trade out of significant wetlands and lagoons (**Chapter 8**).

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118 Department of the Environment, Water, Heritage and the Arts (2008) *National Framework and Guidance for Describing the Ecological Character of Australia's Ramsar Wetlands – Module 2*

119 Department of Agriculture, Water and the Environment (2012) *Wetlands in Australia – roles and responsibilities*

120 Department of Environment, Climate Change and Water NSW (2011) *Gwydir wetlands adaptive environmental management plan*

121 Note that Division 2 of Part 10 of the Water Sharing Plan for the Gwydir Regulated River Water Source 2016 now refers to the environmental contingency allowance as the environmental water allowance. Consistent terminology should be used in both the regulated and unregulated water sharing plans.

122 The *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* includes provisions for:
- delivery and protection of a minimum flow of up to 500ML per day to the Gwydir wetlands based on inflows from Horton River, Myall and Halls creeks ('3T') and spills and flood releases from Copeton Dam (Division 1, Part 10 of the Plan)
- an environmental water allowance up to 45,000 ML per year based on available water determination for regulated river (general security) licences with a maximum of 90,000 ML in the account (Division 2, Part 10 of the Plan).

123 Kirsch, E., Collier, M,J. and Pittock, J. (2021) 'Lacking character? A policy analysis of environmental watering of Ramsar wetlands in the Murray-Darling Basin, Australia'. *Marine and Freshwater Research.*

124 Clause 47 of the Plan.

Another important issue affecting flows to significant wetlands listed in Plan schedules is the lack of clarity regarding operating arrangements for structures that regulate flows into the wetlands located in unregulated river water sources. For example, Mallowa wetlands which are located in the Mallowa Creek Management Zone of the Mehi River Water Source rely largely on environmental water deliveries for inflows except under larger natural flooding events.[125] Mallowa Creek is now considered disconnected from most flow categories as a result of river regulation. The Commission heard that there are no clear operating rules for the Mallowa regulator which impacts on flows into Mallowa Creek and the Mallowa wetlands.[126] As a result there have been extended periods where the creek and wetlands have not been watered.

Lack of such rules is considered inconsistent with the Plan objectives and increases reliance on environmental water deliveries to meet the environmental water needs of these wetlands. Mallowa Creek at the regulator is actually part of the Gwydir Regulated River Plan. However, operating arrangements for the regulator would have implications for the environmental assets within the unregulated river water source. Therefore, the design of operating rules which would ideally be codified in the regulated river Plan would need to consider the desired outcomes for the Mallowa wetlands that are part of the unregulated river water source.

Another significant wetland in the Mehi River Water Source that requires greater protection is Mongyer Lagoon. This regionally significant wetland, which is listed in Schedule 4 of the Plan is located along Moomin Creek. Flows to Moomin Creek are regulated by Combadello Weir. This weir forms part of the Gwydir Regulated River. There is around 4,120 ML of entitlement along Moomin Creek.[127] Stakeholders informed the Commission that water users could not trade out of this water source due to trade restrictions. Restrictive trade rules need to be revisited to reduce pressure from water use on significant environmental assets including Moomin Creek and the wetlands along this water course (**Chapter 8**).

When replacing the Plan DPE-Water should, using best available evidence and in consultation with DPE-EHG, DPI-Fisheries and the CEWO:

- ensure the Plan objectives refer to Ramsar obligations including maintaining the ecological character of the Ramsar listed Gwydir wetlands sites
- ensure the Plan schedules are updated to include all significant wetlands including those listed as part of endangered ecological communities, internationally, nationally and regionally significant wetlands in the Plan area
- address risks of not meeting Plan objectives and Ramsar obligations and water management principles under the Act
- ensure that interdependencies between regulated and unregulated plans in relation to significant wetlands are addressed, for example, operating rules for structures regulating flows into significant wetlands are clearly articulated and the Plan cross-references the Gwydir Regulated River Plan.

125 Commonwealth of Australia (2019) *Commonwealth Environmental Water Portfolio Management Plan: Gwydir River Valley 2019–20*
126 Interview: DPE-EHG, 15 December 2022.
127 Based on Planning Unit information (PU16: Moomin Creek) included in the DPIE-EHG (2020) *Long Term Water Plan – Part B: Gwydir planning units*

4.3 Implications arising from changes to the Gwydir raft

The Gwydir raft is a unique feature of the Gwydir River that is characterised by an accumulation of woody debris and sediment that has developed since the 1870s.[128] The deposition rate has accelerated with changed land management practices since European colonisation.[129]

During the term of the Plan, there have been significant changes to the Gwydir raft. DPE EHG advised that recent large scale flood events have contributed to rapid upstream expansion of the raft of around 230 metres since 2017.[130] This has led to changes in the hydrology associated with the raft and impacted flows into the Gingham Watercourse. Less water can travel down the Gingham Watercourse at the raft; instead it is overbanking and entering a natural flow path to the north. These changes have significant implications for environmental water delivery and the achievement of environmental outcomes in the unregulated river water sources of the Plan area, as well as for delivery of water to landholders in the system.

Without intervention the hydrological changes associated with the expansion of the Gwydir raft risk a significant reduction in environmental water delivery and the ability to maintain the ecological character of the Gingham Watercourse including the Ramsar listed wetlands along the Gingham and environmental values associated with the Gwydir State Conservation Area. There is also a risk of siltation of drought refuges and waterbird breeding lagoons (open water bodies). The ability to support colonial waterbird breeding will be compromised and the ability to meet the environmental objectives of the Gwydir regulated and unregulated water sharing plans. The ecological objectives of the Gwydir Reconnecting Watercourse Country Program are also at risk.

Furthermore, the increased activation of the flow path to the north of the Gingham Watercourse creates other risks. These include the increased risk of take along this flow path, floodplain harvesting of water intended for the environment and property access issues.

While the Commission understands options are currently being considered by the NSW Government to ameliorate this issue and its impacts where possible, there may be rule changes warranted in the replacement Plan to mitigate the risk of increased take and floodplain harvesting. For example, the active management mechanism could be expanded to floodplain harvesting to mitigate the take of active environmental water (see **Section 4.4.3**). Any changes to Plan rules would need to be carefully considered in the context of which option the NSW Government pursues to manage this issue.

4.4 Protection of active environmental water can be strengthened

Inundation of the Gingham and Lower Gwydir wetlands and Mallowa wetlands which are situated in unregulated river water sources in the Plan area is highly dependent on flows from the regulated Gwydir River. A combination of 'planned'[131] and 'held' environmental

128 Pietsch, T. J. (2006) Fluvial geomorphology and late quaternary geomorphology of the Gwydir fan-plain, PhD thesis, School of Earth and Environmental Sciences, University of Wollongong, 2006.

129 Pietsch, T. J. (2006) Fluvial geomorphology and late quaternary geomorphology of the Gwydir fan-plain, PhD thesis, School of Earth and Environmental Sciences, University of Wollongong, 2006.

130 Personal communications: NSW EHG, 21 April 2023.

131 The *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* contains provisions to:
- protect unregulated tributary flows from the Horton River, Myall Creek and Halls Creek into the Gwydir River plus spills and flood mitigation releases from Copeton Dam protected up to 500 ML/day through to the Gwydir Wetlands (provisions specified in Division 1 of Part 10, known as the Gwydir "3T" rule)

water originating from the regulated river is used for watering the wetlands. The *Gwydir Long-Term Water Plan* sets out the volume, frequency, and duration of watering to support these important environmental assets.[132]

In July 2020, the Plan was amended to include provisions for the active management mechanism[133] and align the Plan with the *Active Management in Unregulated Rivers Policy,*[134] with these rules taking effect on 1 December 2020. The policy was developed by the NSW Government in response to its commitment to better manage water for the environment as part of its *Water Reform Action Plan*.[135] The intent of the Action Plan was to reduce reliance on temporary water restrictions to protect environmental flows. The primary objective of the active management mechanism is to protect held environmental water (HEW) from extraction by unregulated river access licence holders in selected catchments. It also provides for the protection of certain types of planned environmental water (in the Macquarie catchment).[136] The current policy does not apply to the protection of planned environmental water in the Gwydir unregulated river water sources.

The *Active Management Procedures Manual for the Gwydir Unregulated Rivers Water Source*[137] was also developed in accordance with Clause 45A of the Plan to support implementation of the active management mechanism.

At present the active management mechanism applies to the protection of held environmental water in the following three management zones when active environmental water is announced:

- Upper Gingham Watercourse Management Zone
- Lower Gingham Watercourse Management Zone
- Mallow Creek Management Zone.

An evaluation of the active management of 2020-21 events, which included the Gwydir Plan area in its scope, was published in October 2022.[138] However, there were no actively managed events in the Gwydir for the reporting period. According to this evaluation, DPE-Water has given WaterNSW permission not to issue access announcements for the Mallowa Creek Management Zone based on their understanding that there are currently no unregulated river access licences along Mallowa Creek, only stock and domestic.[139]

- provide an environmental water allowance of 45,00 ML with water accredited to the EWA based on the AWD for regulated river (general security) access licences. The amount of water in the account must not exceed 90,000 ML (provisions specified in Division 2 of Part 10 of this plan).

132 DPIE-Water (2020) *Long-Term Water Plan – Part A: Gwydir catchment*
133 Clause 43A of the Plan.
134 NSW Government (2021) *Active Management in Unregulated Rivers Policy*
135 DoI (2017) *Securing Our Water: NSW Government Water Reform Action Plan*
136 NSW Government (2021) *Active Management in Unregulated Rivers Policy*
137 DPE-Water (2020) *Active Management Procedures Manual for the Gwydir Unregulated Rivers Water Source*
138 DPE-Water (2022) *2021-21 Active management annual evaluation and review*
139 *Ibid.*

There are three key issues with the active management mechanism that should be resolved as part of Plan replacement:

- under current policy, planned environmental water originating from the regulated Gwydir River that enters the Gwydir unregulated river water sources is not protected by the active management mechanism – held environmental water is protected (**Section 4.4.1**)
- the active management mechanism does not yet apply to the Lower Gwydir Water Source, which is targeted for delivery of environmental water (**Section 4.4.2**)
- the active management mechanism does not apply to floodplain harvesting licences (**Section 4.4.3**).

It is anticipated that some of these issues will require policy changes in addition to changes to Plan provisions and the active management procedures manual for the Gwydir unregulated river water sources.

4.4.1 Planned environmental water is not protected by active management

Planned environmental water originating from the regulated Gwydir River (ECA water and water from the Gwydir '3T' rule) is not currently protected by the active management mechanism in the Gwydir's unregulated river water sources.[140] Unlike the Gwydir, the *Water Sharing Plan for the Macquarie-Bogan Unregulated River Water Sources 2012* and associated active management procedures manual provide some protection of planned environmental water from the regulated river into the unregulated river water sources, specifically EWA2 (active sub-account water) releases made under clause 14 (22) of the *Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016*. The Commission understands that the EWA2 is protected under the active management in the Macquarie-Bogan as arrangements for its protection predate the introduction of active management.

The active management procedures manual for the Gwydir Unregulated River Water Sources indicates that the '*water arising from releases of the Gwydir Environmental Contingency Allowance does not meet the definition of AEW in the Gwydir Unregulated River Water Sources and therefore will not be protected under active management*'.[141] However, as noted in **Section 4.2** there is evidence based on licence conditions in the Plan's Appendix 4 that provides a precedence for the protection of the ECA.

Furthermore, the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* includes a note that indicates that the planned environmental is intended for environmental outcomes in downstream water sources in the unregulated Plan area:[142]

> *'The provisions in Part 10 ensure a portion of tributary flows are protected for the Gwydir wetlands and provide for an environmental water allowance to be used to support environmental assets and environmental functions within and downstream of the water source.'*

Current access rules would provide some protection of this planned environmental water from the regulated river, but this would depend on the event. Several benefits would arise if the ECA and flows associated with the Gwydir '3T' rule were protected through active management, including environmental benefits as intended by these plan provisions.

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140 Note that the ECA water can be used in conjunction with Gwydir "3T" water deliveries or other flows that exceed unregulated licence conditions, including withheld environmental water.

141 DPE-Water (2020) *Active Management Procedures Manual for the Gwydir Unregulated Rivers Water Source*

142 Note under Clause 17 in Part 4 of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*

Such changes would also assist in addressing equity issues for licence holders and provide further clarity regarding when they should not pump to protect water for the environment. These changes would also provide the NSW Environmental Water Manager with greater confidence in the use of planned environmental water and associated outcomes in unregulated river water sources.

4.4.2 Active management does not yet apply to the Lower Gwydir Water Source

Both NSW and Commonwealth held environmental water is delivered to the Lower Gwydir Water Source to support Ramsar listed wetlands. However, active management does not currently apply to this water source. Daily access rules afford some protection of held environmental water if it is below 250 ML per day at Millewa Gauge. Lack of protection above this threshold could impact the environmental benefits associated with environmental water deliveries to the Lower Gwydir.

This issue needs to be addressed as part of Plan replacement. Arrangements also need to be put in place for the NSW Environmental Water Manager to have procedures in place to work with WaterNSW to announce these events. Addressing this issue will likely require changes to the Plan as well as the Gwydir active management procedures manual.

4.4.3 Active management does not yet apply to floodplain harvesting

The active management policy, Plan and active management procedures manuals have a loophole because they do not include provisions to protect active environmental water from floodplain harvesting. This water could be legally extracted under floodplain harvesting.

DPE-EHG advised that addressing this issue is critical to improve environmental outcomes, for meeting Plan objectives and would be consistent with the intent of the Gwydir Reconnecting Watercourse Country Program. The Commission understands that DPE EHG and DPE Water were negotiating changes to the Plan to extend active management to floodplain harvesting. These changes are not currently in the Plan.

As part of the NSW Floodplain Harvesting Action Plan[143] released in September 2019, DPE-Water indicated it would:

> *'Publish a guideline detailing how it will adaptively manage floodplain harvesting over time. In its work on active management of environmental water as part of the delivery of the NSW Water Reform Action Plan, the department will consider the risks and opportunities to protect held environmental water delivery from floodplain harvesting.' Quarter 3 or 4, 2019.'*

The Commission is not aware of the status of these guidelines but notes that DPE-Water did engage with stakeholders on applying active management to floodplain harvesting access licences as part of its consultation on floodplain harvesting rules for the Gwydir.[144] Plan amendment provisions do not appear to foreshadow changes to active management to protect active environmental water from floodplain harvesting. Current amendment provisions (Clause 77(8) only seem to refer to amending access rules for unregulated river access licences. This needs to be addressed as well as the lack of protection of both 'planned' and held' environmental water from this form of take.

143 NSW Government (2019) *NSW Floodplain Harvesting Action Plan*
144 NSW Government (2021) *Proposed floodplain harvesting rules for the Gwydir Valley: submissions from public consultation*

4.5 Lower Gingham Water Course protections may have been reduced

Although the active management mechanism is a positive step for protecting active environmental water, recent Plan amendments to access rules have reduced environmental protections in the Lower Gingham Water Course when there is no active environmental water in the system.

Plan amendments in 2020 introduced changes to the daily access conditions for the Lower Gingham Water Course, with further changes introduced in the 2022 amendments (**Table 4**). The Commission considers that these changes reduced the level of protection for the environment and downstream outcomes, including flows to the Gwydir Wetlands, the Balone Creek and the Barwon River upstream of Collarenebri.

The 2020 amendment changed the daily flow threshold at Gingham Bridge Gauge to an annual flow threshold, reducing downstream flow protection (see the summary of Plan amendments for the very low flow class in **Table 4)**. It is assumed that this was an error as the low flow threshold was amended again in 2022, bringing the intent back to the original (pre-2020) Plan. However, an additional (assumed) error was introduced to the A class threshold at this point. A Class thresholds usually reflect the language in the very low flows; however, the changes to the Plan have altered this:

- **pre-2020 and 2020 versions of the Plan:** *all* the low flow class thresholds had to be exceeded to enable A Class extraction
- **the current Plan (2022):** *only one* of low flow class thresholds has to be exceeded to enable A class extraction, lowering environmental and downstream protections (see Plan amendments for A Class in **Table 4**, summarising the shift in language from '*and*' to '*or*').

DPE-Water should immediately amend the Lower Gingham Watercourse Management Zone A Class cease to pump thresholds to return the intended meaning to the pre-2020 Plan, albeit with a flow rather than gauge height and recognition that the annual measure (4,000 ML per year) must occur over the previous 12 months.

Table 4: Summary of amendments to the flow class thresholds for the Lower Gingham Watercourse Management Zone, with the critical changes shown in red[145]

Version	Very low flow class	A Class
Pre-2020	Less than or equal to the minimal flow depth of 1.0 metre on the Gingham Bridge gauge (418079) or less than or equal to 4000 ML/year at the Gingham Bridge gauge or no visible flow at the Gingham Watercourse at Morialta Road	More than the minimal flow depth of 1.0 metre on the Gingham Bridge gauge and more than 4000 ML/year at the Gingham Bridge gauge and a visible flow at the Gingham Watercourse at Morialta Road
2020-2022	A flow of less than 175 ML/day at the Gingham Bridge gauge (418079) within the previous 12 months, or Less than 4000 ML/year at the Gingham Bridge gauge over the previous 12 months, or	A flow equal to or more than 175 ML/day at the Gingham Bridge gauge within the previous 12 months, and Equal to or more than 4000 ML/year at the Gingham Bridge gauge over the previous 12 months, and

145 Current and historic versions of Table B, Clause 42 of the Plan and 2022 amendments.

Version	Very low flow class	A Class
	No visible flow in the Gingham Watercourse at the Morialta Road	A visible flow in the Gingham Watercourse at the Morialta Road
2022	Less than 175 ML/day at the Gingham Bridge gauge (418079) at any time, or Less than a total of 4000 ML/year at the Gingham Bridge gauge within the previous 12 months, or No visible flow in the Gingham Watercourse at Morialta Road Note. Previous 12 months means a rolling period of 12 months before the day that water was taken.	Equal to or more than 175 ML/day at the Gingham Bridge gauge within the previous 12 months, or Equal to or more than a total of 4000 ML/year at the Gingham Bridge gauge over the previous 12 months, or A visible flow in the Gingham Watercourse at Morialta Road Note. Previous 12 months means a rolling period of 12 months before the day that water was taken.

4.6 Flows to Barwon-Darling are at risk under current Plan rules

Although the regulated and unregulated water sources of the Gwydir have separate planning instruments, their highly connected nature warrants consideration where consistency and coordination in the protection of flows will help to achieve environmental outcomes in the Gwydir catchment, but also downstream. At present the Plan's rules do not effectively provide for or protect connecting flows to the Barwon River.

Water sharing rules for the Gwydir largely focus on the Gwydir wetlands given they are terminal wetlands and significant environmental assets. However, water sources in the Gwydir can also play an important role in contributing flows to the Barwon-Darling. For example, the Gwydir Regulated River water sharing plan includes provisions that are intended to restrict access to uncontrolled flows (supplementary water) 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*.[146] However, restrictions on access to these connecting flows in connected unregulated river water sources are limited.

The Gwydir Long Term Water Plan identifies unregulated river access licences in the Thalaba Creek Water Source as having the potential to reduce connectivity with the Barwon River.[147] Rules that protect connecting flows along Thalaba Creek but also other streams that flow directly to the Barwon River are critical and require attention. Protection of these connecting flows is considered by the Commission as important to ensure consistency with the connectivity objectives recently included in the Plan.

Further details regarding the limited contribution of the Plan to its connectivity objective are provided in **Chapter 5**.

146 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*

147 DPIE-Water (2020) *Gwydir Long Term Water Plan, Part B: Gwydir planning units*

4.7 Recommendations

R 6	As part of the Plan replacement, to strengthen daily access rules, DPE-Water should: a) review the current hydrometric network to identify where the Plan can reference operational gauges for establishing flow classes and flow-based access rules for water sources that currently have a 'no visible' flow rule, and make improvements to gauging where necessary to prioritise high value water sources b) review daily access rules and amend them where required, prioritising the 17 high-value water sources at high risk from extraction – this should be informed by existing conditions in Appendix 4, the *Gwydir Water Resource Plan*'s risk assessment, the *Gwydir Long Term Water Plan* (the Gwydir Regulated Plan) and any other appropriate evidence c) amend the Lower Gingham Watercourse Management Zone A Class cease to pump thresholds to return the intended meaning to the pre-2020 Plan, with a flow rather than gauge height and recognition that the annual measure (4,000 ML per year) must occur over the previous 12 months.
R 7	As part of Plan replacement, to protect significant wetlands and clarify operating rules for structures involved in delivering water to significant wetlands, DPE-Water should: a) refer to Ramsar obligations in the Plan objectives, including to maintain the ecological character of the Ramsar listed Gwydir wetlands sites b) update the Plan schedules to include all significant wetlands including those listed as part of endangered ecological communities, internationally, nationally and regionally significant wetlands in the Plan area c) address risks of not meeting Plan objectives and Ramsar obligations and water management principles under the Act. This should include consideration of where changes to Plan rules are warranted to manage risks associated with changes to the Gwydir raft to ensure that environmental water is protected from extraction and can achieve its intended purpose. d) ensure that interdependencies between regulated and unregulated water sharing plans in relation to significant wetlands are addressed, for example, operating rules for structures regulating flows into significant wetlands are clearly articulated and the Plan cross-references the Gwydir Regulated River Plan.
R 8	As part of Plan replacement, to improve the protection of active environmental water in the Gwydir via the active management mechanism, DPE Water should: a) in line with the intent of existing licence conditions to protect planned environmental water from the regulated river into the unregulated water sources, review the definition of active environmental water for the Gwydir b) extend the list of water sources where active management applies to include the Lower Gwydir Water Source c) extend active management mechanism to protect active environmental water from floodplain harvesting.
R 9	As part of the Plan replacement, ensure that the Plan's rules effectively provide for and protect connecting flows to the Barwon River to align with the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*'s contribution to downstream flow targets.

5 Supporting connectivity objectives

The Gwydir's unregulated water sources are highly connected to the regulated water sources and to alluvial groundwater. To date, water resource development across the Gwydir region has not adequately recognised this connectivity, contributing to fragmented riverine and floodplain environments, and impacting on downstream flows and the management of floodplain wetlands and lagoons.[148]

The *Gwydir Long Term Water Plan* highlighted that '*restoring lateral and longitudinal connectivity throughout the catchment is fundamental to supporting many of the priority ecosystem functions in the Gwydir*'.[149] The Plan's objectives and strategies were changed in 2020 to be more specific than the previous version,[150] including an objective to provide for '*the longitudinal and lateral connectivity within and between water sources to support targeted ecological processes*'.[151] However, no changes have been made to date to Plan provisions to support this objective.

This chapter outlines opportunities to improve the management of connectivity. Key issues to address are:

- the Plan's provisions do not adequately support connectivity. Daily access rules are insufficient to allow a percentage of outflows from the Plan area to pass through to the Barwon-Darling to support the environment, security of supply for basic landholder rights and towns. The boundaries between the Plan and the Barwon-Darling Plan need to be clear so that daily access conditions can be effective (**Section 5.1**)
- the Plan does not protect replenishment flows from the Gwydir Regulated Plan to meet their intended purpose such as maintenance of water quality and supply for basic landholder rights (**Section 5.3**)
- there is inadequate protection of low flows, with the Plan relying heavily on no visible flow cease to pump rules. This could be improved by using rules based on flows at gauging stations (**Section 5.4**).
- the Plan does not consider connectivity at different levels of flow **(Section 5.5**)
- extraction from unmapped alluvial deposits will impact on the Plan's unregulated water sources (**Section 5.6**).

There are also several environmental issues related to connectivity that are covered in more detail in **Chapter 4**.

148 Thoms, M. C., Southwell, M. and Mcginness, H. M. (2005) 'Floodplain–river ecosystems: Fragmentation and water resources development', *Geomorphology*, 71, 126-138.
149 DPIE-Water (2020) *Long Term Water Plan – Part A: Gwydir catchment*
150 For example, 'to protect and contribute to the enhancement of … water quality within target ranges for these water sources to support water-dependent ecosystems and ecosystem functions' and 'reserve a portion of flows to maintain hydrological connectivity between these water sources and other connected water sources including the Gwydir Regulated River Water Source'.
151 Clause 10(2)(b) of the Plan.

5.1 Plan does not manage connectivity with the Barwon-Darling

Both the regulated and unregulated Gwydir water sharing plans should contribute flows downstream to the Barwon-Darling Plan area. However, rules recognising this connectivity to protect downstream flows have only been applied to the Gwydir regulated river. The importance of recognising and managing for connectivity between the Plan area and the downstream Barwon-Darling was acknowledged by stakeholders during this review.[152]

Flows into the Barwon-Darling from the Plan area include a mixture of:

- local runoff, particularly from Thalabah Creek
- residual flows from water diverted from the regulated river for specific purposes
- overland flow from the regulated river.

Connectivity between the Barwon-Darling and its tributaries is particularly important to allow recovery of native fish communities across the northern Basin.[153] Historically, low flows would have seeped through the Gwydir Wetlands to provide base flows downstream. Baseflows from local runoff and residual flows are important to support ecologically significant low flows in the Barwon-Darling.[154] The Plan's unregulated rivers such as Thalabah Creek, which flow into the Barwon River upstream of Walgett, are also an important contributor to water security for towns along the Barwon-Darling.[155]

As part of its water reform package, the NSW Government released information on possible measures to help improve environmental water management and outcomes. One of the measures is the '*use of downstream environmental requirements as a trigger to manage upstream access*'.[156] 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 Gwydir Regulated Plan includes rules to restrict access to natural flow events and help deliver flows to the Barwon River via the Mehi River and Carole Creek.[157] However, the contribution of flows from unregulated rivers and interactions between regulated and unregulated rivers do not seem to have been adequately considered as part of the Plan, including how flows through unregulated water sources contribute to meeting downstream flow requirements.

The Plan's access rules are insufficient to protect a percentage of outflows from the Gwydir through to the Barwon-Darling to support security of supply for towns and basic rights downstream, as well as environmental outcomes (see **Section 4.6**). DPE-Water should define the flows from the Plan water sources required to support downstream outcomes and assess whether Plan provisions support these outcomes.

152 Interview: Australian Floodplain Association, 7 June 2022.
153 Commonwealth of Australia (2020) *Commonwealth Environmental Water Office Water Management Plan 2020-21*
154 DPIE-Water (2020) *Long-Term Water Plan – Part A: Gwydir catchment*
155 For example, see Commonwealth Environmental Water Office (2019) *Commonwealth Environmental Water Portfolio Management Plan: Gwydir River Valley 2019–20*
156 DPI (2018) *NSW Water reform Action Plan – Better management of environmental water consultation paper*
157 DPIE (2020) *Draft Regional Water Strategy: Gwydir*

5.2 Plan boundaries with the Barwon-Darling need clarification

There is a lack of clarity around the Plan's boundary with the Barwon-Darling Plan. This may impact the effectiveness of the Plan.[158] Until July 2020, the Plan had a schedule[159] excluding six watercourses within the Plan area. These are near the Barwon-Darling and include Ballone Creek, Collymongle Lagoon (both in the Barwon Water Source) and the lower reach of Thalaba Creek (in the Thalaba Creek Water Source).[160] Flows from the regulated Gingham and Gwydir Rivers pass through Ballone and Collymongle Lagoon before reaching the Barwon River (see **Figure 1**).

The schedule was repealed in the Plan's 2020 amendments, meaning these watercourses should now be covered by the Plan. However, the status of any licences in these reaches is unclear, as the *Water Sharing Plan for the Barwon-Darling Unregulated River Water Source 2012* still includes these watercourses. This creates a lack of clarity around the rules assigned to these licensees, with the potential for licensees to extract using rules in either plan, which may impact downstream flows.

DPE-Water should determine the connectivity requirements for the unregulated rivers to the Barwon River, including what flows need to be protected to support improved downstream outcomes. As a priority, DPE-Water should clarify plan boundaries and confirm the status of the six watercourses originally included in the Plan's Schedule 1 and amend either the Plan or the Barwon-Darling Plan as soon as possible. Following this, DPE-Water should confirm the assignment of these licences. To understand the cumulative impact the risk assessment for these watercourses should be based on the total entitlement including the excluded sections (see also **Section 7.2**).

Further, the Barwon Water Source – which includes most of the waterways discussed above – includes effluents of the Barwon River rather than tributaries of the Gwydir waterways. Floodplain extraction works for this area are included in the *Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017,* rather than the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016* (see also **Section 7.1**). Water regulation in this area is therefore particularly confusing for stakeholders with the potential application of four water management plans. As part of the Plan review process, DPE-Water should consider whether the entire Barwon Water Source and any entitlement should be included in the *Water Sharing Plan for the Barwon-Darling Unregulated River Water Source 2012*. This would better align with the floodplain management plan boundaries.

5.3 Gwydir Regulated Plan replenishment flows are not protected

The Gwydir Regulated Plan includes provisions allowing for replenishment flows, which can be released into the unregulated Plan area. While the volumes allowed for under the replenishment flows are specified within the Gwydir Regulated Plan the outcomes occur within this Plan.

158 The Commission cannot assess the scale of this risk. The NSW Water Register indicates there are no licences in the Barwon Water Source (noting the question around its boundaries and which plan any licence would be assigned to), however the Plan records 3,240 unit shares of unregulated access licences and about 40 ML of domestic and stock basic landholder rights.

159 Schedule 1 of the Plan.

160 Until the July 2020 amendments when Schedule 1 was repealed, the Plan stated that it does not include the 'section from the junction with Pagan Creek to the junction with the second crossing with a public road within Lot 2, DP 752231, between Ivanhoe crossing Rd and Mercadool Rd'.

Replenishment flows may be "*provided to refill pools and water holes in effluent river systems downstream of the water source and provide water for household and town use and stock*".

These serve economic, social and environmental functions. Prior to 2022 the Gwydir Regulated Plan required water to be held in reserve in Copeton Dam for replenishment flows to the Plan's water sources, specifically for:

> '*(a) up to 6,000 ML year to the Gingham Watercourse,*
> *(b) up to 4,000 megalitres per water year to the Gwydir River downstream of the regulated river,*
> *(c) up to 6,000 megalitres per water year to Mallowa Creek,*
> *(d) up to 4,000 megalitres per water year to Thalaba Creek, and*
> *(e) up to 1,000 megalitres per water year to Ballinboora Creek*'.[161]

After July 2022 the plan changed to only require replenishment flows for Mallowa and Thalabah Creek.[162]

The release of replenishment flows from Copeton Dam are subject to operator discretion. The Gwydir Regulated Plan specifies replenishment flows are to be provided to Thalaba Creek, which is in the unregulated Plan area, unless the operator determines otherwise,[163] but is silent on the other releases. The Commission's audit of the Gwydir Regulated Plan found the operator's decision-making process for delivery volumes of replenishment flow requirements were not documented and it was unclear how all the requirements for replenishment flows[164] are considered.[165] The audit recommended that WaterNSW deliver replenishment flows unless directed otherwise in writing by the Minister. While the discretion around releasing replenishment flows is a matter for the review of the Gwydir Regulated Plan, the water is intended to benefit outcomes in the unregulated Plan area.

The Commonwealth Environmental Water Office reported that replenishment flows helped to partially meet environmental demands of some creeks in 2017-18,[166] while in its 2019-20 Portfolio Management Plan, CEWO outlines how it targeted Mallowa Wetlands for environmental flows after the operator stopped stock and domestic replenishment flows as part of water efficiency and recovery projects.[167] This shifts the water being held by the operator for environmental, social and economic outcomes,[168] across 5 water sources to held environmental water with specific environmental objectives in two water sources.

As part of this Plan remake, DPE-Water should develop the replenishment flow requirements for the unregulated water sources, including timing of releases in consultation with DPE-EHG and DPI-Fisheries. These should then be considered as part of the Gwydir Regulated Plan review and remake process.

If replenishment flows are released under the Gwydir Regulated Plan, once they reach the unregulated waterways the Plan does not recognise or protect these flows to allow them to

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161 Clause 58 of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* prior to the 2022 amendments.
162 Clause 66-67 of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*
163 Clause 66 of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*
164 As per the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*'s dictionary – for pools and water holes in effluent river systems, household, town use and stock.
165 Natural Resources Commission (2022) *Final Report – Audit of the implementation of the Namoi, Gwydir and Macquarie regulated water sharing plans*
166 Commonwealth Environmental Water Office (2019) *Portfolio management plan: Gwydir Valley 2018-19*
167 *Ibid.*
168 As per the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*'s dictionary – for pools and water holes in effluent river systems, household, town use and stock.

reach their intended purpose except through pre-existing conditions listed in Appendix 4. Other unregulated water sharing plans – such as the *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012* – protect replenishment flows and require that water must not be taken under an access licence other than a domestic and stock access licence.[169]

DPE-Water should include provisions in the replacement Plan preventing extraction of replenishment flows by access licences other than a domestic and stock access licence. Further, to improve transparency and certainty replenishment flows should be made based on conditions in the receiving watercourses and not subject to operators' discretion.

The Commission will review the benefit of such provisions as part of the Gwydir Regulated Plan review. The adequacy of the volumes allowed for under the replenishment flows also falls within the scope of the Gwydir Regulated Plan review, rather than this review.

5.4 The gauging network can be used to improve connectivity outcomes

Most of the Plan's daily access rules do not adequately support connectivity necessary to protect or maintain downstream environmental, economic and social outcomes. This is despite the availability of gauging in some areas that is not currently used. Adequate gauging is critical to implement appropriate rules; however, the Plan refers to only three gauging stations.[170] DPE-Water should use all available gauging and, where essential for implementing needed flow rules, install additional gauges.

As discussed in **Section 4.1** the Plan relies heavily on no visible flow rules, which do not sufficiently protect high value instream values. Water passing a particular location will serve multiple downstream requirements such as basic landholder rights and town water supply, as well as environmental needs. Only four[171] of the 28 water sources have flow classes. The remaining water sources have cease to pump thresholds of no visible flow, with licences with higher thresholds listed in Appendix 4 or Clause 43(9)[172] (see **Section 4.1**). By only requiring visible flow for 24 of the water sources, the Plan does not adequately address connectivity and downstream requirements or '*reserve a portion of flows to partially mitigate alterations to natural flow regimes in these water sources*', which is one of its objectives.[173] The right to access water by downstream water users, especially basic rights, should be recognised when setting and implementing daily access rules and DPE-Water should ensure there is adequate gauging to implement effective rules to protect water necessary for downstream outcomes. Improved gauging would also support regulation of cease to pump thresholds and compliance monitoring.[174]

169 For example, Clause 53 (26) of the *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012*

170 418079 Gingham Channel at Gingham Bridge and 418076 Gingham Channel at Tillaroo, both in the Gingham Water Source and 418066 Gwydir River at Millewa in the Gwydir Water Source.

171 Gingham Watercourse Water Source, Gwydir Water Source, Halls Creek Water Source, Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source.

172 Clause 43(9) of the Plan requires that: 'Water must not be taken under an access licence from an in-river dam pool or a runoff harvesting dam created by a structure authorised by a water supply work approval when flows or storage levels in that pool or dam are at or less than a cease to take condition that was specified on the Water Act 1912 entitlement that the access licence replaces'.

173 Clause 10(3)(b) of the Plan

174 DPIE-Water (2020) *Long-Term Water Plan – Part A: Gwydir catchment*

The Plan's background document attributes the adoption of the no visible flow rule to a lack of river gauges that can be used as a reference for cease to pump conditions.[175] However, there are additional gauges in the Plan that can be referenced to establish flow classes.[176] For example, the Halls Creek gauging station would need to be stabilised to be effectively used to implement a cease to pump threshold, as its measurements fluctuate by about 1 ML per day.

The existing gauging network should be assessed for suitability for implementing flow-based cease to pump rules that can support connectivity. The Commission notes that the boundaries of the water sources and management zones are currently not well aligned to the available gauges. For example, the Gwydir River at Bundarra (418008) in the Moredun Creek Water Source is immediately upstream of most of the water licenced entitlement in the Copeton Dam Water Source. Basing access on flow at Bundara gauge may be more appropriate for these licences and could be achieved by changing the section in the Copeton Dam to be a separate management zone or transferring that section to the Moredun Creek Water Source.

To support better implementation of daily access rules and protect the full range of downstream outcomes, DPE-Water should review the stream gauging network in the context of establishing flow-based cease to pump rules, with priority given to high-risk water sources (as identified in the water resource planning process). This should include identifying the most appropriate existing gauging stations and upgrading or establishing new stations as required. The Commission recognises that changing the gauging stations used to implement rules may require changes to water source boundaries or management zones.

5.5 The Plan needs to consider connectivity at different flow levels

The Plan currently does not adequately consider the varying connectivity across the flow regime or the cumulative impact of extraction across water sources as required under the principles of the Act.

The Gwydir Valley Irrigator Association submission highlights that information about connectivity between water sources was one of the main constraints during the Plan's development. While water sources may not be connected at low flow they may be connected at higher flows. As the river flow increases, both the area contributing to the flow increases and the number of licences extracting from that area increases. Water source boundaries, access and trading rules only consider low flow connectivity.

However, much of the connectivity occurs at high flow. Irrigators have argued that at high flows there are considerably different inflows and increased access should be allowed. While this is true, there is also increased take during high flow. DPE-Water needs to assess the cumulative take across the area during high flow and ensure that the rules adequately allow for connectivity at both high and low flows.

175 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*

176 For example, the Gil Gil Creek at Boolataroo, Slaughter at Biniguy, Station Tycannah Creek at Bellare Gwydir River at Bundarra (418008) gauging stations.

Thalaba Creek and Millie Creek water sources demonstrate this varied connectivity. The waterways in these water sources behave differently in different flows:

- at very low flows, the water sources are disconnected except for replenishment flows (see **Section 5.3**) via the regulated Moomin Creek to provide for basic landholder rights[177]
- at low flow there remains no connection between Millie Creek and Thalaba Creek water sources
- at higher flow, the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016* shows water from Millie Creek flows into Thalaba Creek water source
- in overbank flows, Millie Creek joins with floodwater from the Gwydir Regulated River and flows into Thalaba Creek Water Source.[178]

Combined these water sources have about 19 percent of the Plan's unregulated river access licence entitlement, and 23 percent of the Plan's entitlement when unregulated floodplain harvesting is included.[179] This is more entitlement than all the water sources upstream of Copeton Dam. Thalaba Creek Water Source has just over half (55 percent) of the Plan's floodplain harvesting (unregulated access) licences, while Millie Creek Water Source has none, although the water source is in the gazetted floodplain.

Low flow connectivity is therefore determined by the local catchment runoff, replenishment flows and cease to pump rules, while high flow connectivity is dependent on a larger catchment, overbank flows and high flow extraction.

The Plan's provisions must consider the cumulative extraction from the regulated and unregulated plans, and the interrelationship between flows and catchment connectivity across the floodplain at different flow levels.

Low flows are determined by smaller catchments with lesser connectivity whereas overbank flows are dependent on a larger portion of a highly connected catchment. When remaking the Plan, DPE-Water should use best available information to describe varying connectivity across the flow regime and use this to assess cumulative extraction risks. The replacement Plan should provide for connectivity across the flow regime, considering these cumulative extraction risks (see also **Section 7.2**). This aligns with the *Gwydir Long Term Water Plan*'s recommendation to monitor for changes in floodplain harvesting and water demand, and to review access rules if current use is high or pattern changes.[180]

5.6 Extraction in connected groundwater systems may impact on unregulated rivers

As noted in previous water sharing plan reviews, there is considerable merit in managing highly connected surface and groundwater systems as a single water resource. When the Plan was developed, it included the Upper Gwydir Alluvial Groundwater Source, which was removed from the Plan as part of 2020 amendments. This removal would have had minimal impact on the Plan's ability to manage connectivity as the mapped groundwater source is highly connected to the Gwydir Regulated River and only indirectly impacts the unregulated rivers.

177 The *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* provides for replenishment flows from the regulated river under Clause 51(1), *'The following replenishment flows shall be provided, if required (d) up to 4,000 megalitres per water year to Thalaba Creek'*. See also DPIE-Water (2019) *Gwydir Surface WRP – Modelling – Baseline Diversion Limit Scenario Report (update)*

178 NSW Government (2016) *Floodplain Management Plan for the Gwydir Valley Floodplain 2016*

179 WaterNSW (2023) *NSW Water Register*

180 DPIE-Water (2020) *Long-Term Water Plan – Part A: Gwydir catchment*

The alluvial systems connected with the unregulated water sources are unmapped and therefore have defaulted to being managed under the:

- *Water Sharing Plan for the Gwydir Alluvial Groundwater Sources Order 2020* – does not include alluvial sediments along the unregulated watercourses, particularly those upstream of Biniguy or in the outer floodplain
- *Water Sharing Plan for the NSW Great Artesian Basin Shallow Groundwater Sources 2020*[181]
- *Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2020*[182]
- *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020.*[183]

There is currently no recognition or management of potential impacts on the Plan's unregulated rivers from extraction in connected alluvial systems.

While combining alluvial and other aquifers outside the Gwydir Regulated Plan area simplified Plan development by removing the need to map all the alluvial sediments, it ignores potential impacts of extraction on both river flows, and aquifer recharge. For example, DPE-Water recently carried out work in Halls Creek, which currently has no mapped or included alluvials in the Gwydir Alluvial Plan. This found that the river flow and groundwater extraction are linked as increased access to the alluvial aquifers is the most likely cause of a cease to flow event in Halls Creek.[184] This study was intended to protect macroinvertebrates and improve protection for the endangered purple spotted gudgeon[185] and demonstrates how linked rules between plans are needed to support outcomes.

Further, the Lower Gwydir Groundwater Source in the Gwydir Alluvial Plan plays an important role in supporting terrestrial and aquatic ecosystems. The dominant recharge is leakage from rivers and watercourses including the unregulated rivers.[186] This connection should be recognised in the Plan and Gwydir Alluvial Plan, and DPE-Water should assess the need for linked rules to protect and maintain water dependent ecosystems.

DPE-Water should use best available evidence to map alluvial systems associated with the unregulated waterways during Plan replacement and include them in this Plan or the Gwydir Alluvial Plan. DPE-Water should include linked rules in the Gwydir Alluvial Plan and remade Plan to manage risks from these connected systems.

It is worth noting that the *Water Sharing Plan for the Gwydir Alluvial Groundwater Sources 2020* covers water sources which until 2020, were included in this Plan. As they were

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181 Clause 3 of the *Water Sharing Plan for the NSW Great Artesian Basin Shallow Groundwater Sources 2020*: '*The waters in the groundwater sources comprise all water contained within (a) all geological formations to a depth of 60 metres below the surface of the ground, and (b) all alluvial sediments at any depth below the surface of the ground, within the boundaries of the groundwater sources shown on the Plan Map.*'

182 Clause 3 of the *Water Sharing Plan for the NSW Great Artesian Basin Shallow Groundwater Sources 2020*: '*Subject to subclause (5), the waters in the Southern Recharge Groundwater Source and the Eastern Recharge Groundwater Source comprise all water contained within (a) all rocks of Cretaceous, Jurassic and Cenozoic age, and (b) all unconsolidated alluvial sediments below the surface of the ground within the boundaries of the Southern Recharge Groundwater Source and the Eastern Recharge Groundwater Source shown on the Plan Map.*'

183 Clause 4 of the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources Order 2020* for example, subclause (4): '*Subject to subclause (14), the waters in the Inverell Basalt Groundwater Source comprise all water contained within (a) all basalt and sediments of Tertiary age, and (b) all alluvial sediments, within the boundaries of the Inverell Basalt Groundwater Source shown on the Plan Map*'.

184 DPIE-Water (2020) *Cease-to-pumps and macroinvertebrates*

185 *Ibid.*

186 DPIE-Water (2020) *Long-Term Water Plan – Part A: Gwydir catchment*

removed before the Commission's review, the rules managing them are not required to be reviewed under the Commission's role under s43A of the Act until after 2025 (and before 2030) – a minimum of 13 years after implementation.

5.7 Recommendations

R 10	To inform the replacement Plan and ensure downstream flows are maintained to the Barwon-Darling, DPE-Water should: a) define the flows from the Plan water sources required to support downstream outcomes and assess whether Plan provisions support these outcomes b) assess the boundary between the Plan and the Water Sharing Plan for the Barwon-Darling Unregulated River Water Source 2012 (the Barwon-Darling Plan). This should include confirming the status of the six watercourses originally included in the Plan's Schedule 1 -Watercourses to which this plan does not apply c) ensure the risk profile for the water source is based on full entitlement, as well as considering transfer of the Barwon Water Source to the Barwon-Darling Plan to align with floodplain management plan boundaries.

6 Supporting equitable water sharing

Equitable sharing of water is required by the Act[187] and is a critical component of water sharing plans to support community trust and cohesion, effective water market operation and the fair distribution of benefits and cost from water sharing rules. Equitable sharing does not mean equal amounts of water supplied for all uses, rather:

- a fair distribution of available water consistent with the priorities and principles under the Act
- consistent application of access rules for licences in the same licence category and the same water source or management zone
- fair and transparent consideration of relative reductions to meet extraction limits.

The Commission has identified significant issues with the extent to which the plan supports these elements. Broadly these relate to:

- inconsistent application of access rules between and within licence types, management units and plans (**Section 6.1**)
- differences in carryover and account limits, and the inequitable application in relative reductions (**Section 6.2**).

Addressing these issues is critical to achieve environmental, economic and social outcomes within and downstream of the Plan area. In addition, the Plan does not include foundational elements reflecting the importance of equity, including clear equity objectives, strategies and performance indicators to transparently outline how it manages equitable sharing of water between and within licence categories (**Section 6.2.3**).

Some of the critical equity issues can be addressed splitting the Plan into multiple EMUs that align with distinct geographies and extraction patterns, which is discussed elsewhere in this report (**Section 3.6**).

6.1 Access rules are inconsistently applied

Water access licences include an extraction component that specifies the times, circumstances, and rates at which water can be taken.[188] These access 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.

There are several issues related to the inconsistent application of access rules, including:

- access conditions for when water can be extracted are not equitable within the same category of licence within the same water source or management zone (**Section 6.1.1**)
- risks from placement of access conditions on works approval may be compounded with trade (**Section 6.1.2**)

6.1.1 Access conditions for when water can be extracted are not equitable

The placement of cease to pump conditions on licences and works approvals rather than in the Plan has resulted in different access conditions for licensees in the same water sources or management zones. This is inequitable. The Plan should establish consistent cease to

187 Section 3(e) of the NSW *Water Management Act 2000*.
188 DPIE-Water (n.d.) *Water access licences*

pump conditions for all users based on first considering environmental and basic landholder needs.

To extract water, a licensee requires both an access licence (specifying times, circumstances, and rates at which water can be taken) and works approval (allowing for the installation and operation of a pump, dam, bore, water supply or flood works).[189] When *Water Act 1912* licences were converted to licences under the current Act, they were divided into access licences works and water use approvals. In most water sharing plans, licensees of the same category and water source receive the same general access conditions (with the addition of location specific conditions where required). Higher priority categories – such as local water utility access licences – may then receive greater access in terms of when they can extract through less restrictive cease to pump rules.

Uniform application of conditions within a licence category is important for equity, trade, and the protection of the environment and basic rights. Access conditions should reflect the environmental, social, and economic dependency in a particular water source or management zone. The Plan should specify cease to pump thresholds for all licensed users within a licence category and water source or management zone to equitably share water.[190]

The Plan does not specify adequate cease to pump thresholds for most of the water sources in the Plan, instead relying on conditions on licences and works approvals. This results in a range of different cease to pump thresholds within the same water sources, creating inequity, an inefficient water market and ecological and economic risks.

The Commission analysed cease to pump thresholds on a selection of licences across the Plan and found there is considerable variation in access licence and work approval conditions for the same licence category in the same water source or management zone.

The Plan sets a standard default cease to pump threshold of no visible flow across 24 of the 28 water sources.[191] In the water sources with the default no visible flow rule, some licences that were established under the *Water Act 1912* had pre-Plan conditions more stringent than no visible flow. In these 24 water sources, this has resulted in two groups of licensees with different cease to pump thresholds:

- licences (and associated works approvals) with the Plan's default no visible flow threshold[192]
- former *Water Act 1912* licences that were required to have their conditions carried into Appendix 4 of the Plan and their new licences and/or works approvals (see also **Section 6.1.2**).[193]

Some access licences with the default no visible flow threshold have more stringent conditions attached to the work approvals. For example, four works approvals in Tycannah Creek water source specify a visible flow at the Tycannah Creek Bridge on the Newell Highway. These were brought over from *Water Act 1912* licences where an in-river dam was

189 WaterNSW (n.d.) *Water access licences*
190 There may be certain circumstances where individual licensees have additional conditions to account for site specific issues, these are not the focus of this concern.
191 The more stringent cease to pump thresholds for the remaining four water sources or management zones are set out in Table B of the Plan.
192 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'.
193 Clause 44(3) of the Plan, which also refers to Schedule 1A.

used.[194] This creates confusions for licence holders and could make compliance action more difficult.

There is also potential for another group of licences with conditions permitting pumping from pools below full capacity (but currently no licences with these conditions listed).[195] While there are currently no licences with these conditions listed, the Plan can be amended[196] to add or remove access licences to this schedule. This would give any listed licences more access than the default rule that requires extraction to stop when the pool is below full capacity.[197] The Commission considers that licences should not be permitted to extract from pools below full capacity. The replacement Plan should not include rules that potentially exempt users from extraction below full pool capacity.

Cease to pump thresholds should be based on a consistent assessment of environmental and basic landholder rights requirements in each water source or management zone. As part of cease to pump revisions (**Section 4.1**), DPE-Water should include the appropriate thresholds in the Plan and apply them to all licensees within each water source or management zone. In this way all licensees in a licence category would be subject to the same minimum thresholds and WaterNSW could to apply site specific conditions to licences where necessary in addition to minimum requirements.

6.1.2 Risks from placement of access conditions on works approvals may be compounded with trade

As discussed in **Section 6.1.1**, the placement of cease to pump conditions on licences and works approvals rather than in the Plan has resulted in different access conditions for licensees in the same water sources or management zones. Some licensees have more stringent rules to protect environmental and social values, while others have the Plan's default 'no visible flow' rules.

When licences are traded, cease to pump conditions on works approvals or licences are not carried across to the new licence if there is a permanent trade.[198] Some examples of the risks this raises can be seen for licences listed in Appendix 4 of the Plan with cease to pump conditions on the access licence:

- in the Moredun Creek Water Source, licences have restrictions on them to protect Barraba's water supply. However, if an access licence is traded into or within the water source, the Commission understands that it would receive the Plan's default 'no visible flow' condition, even if it traded from a work approval or access licence with stricter conditions. This would diminish protections for the town water supply.
- there are several access licences across the Plan area with large entitlements that have 'no visible flow' conditions but are attached to works approvals with cease to pump conditions specifying downstream flow requirements. However, the Commission understands that if traded, these access conditions would not follow the traded entitlement and the new water user would receive the default Plan conditions of 'no visible flow'.

194 Clause 43(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.
195 These licences must be listed in Schedule 1A of the Plan.
196 Under Clause 76(1A) and (1B).
197 Clause 43(5) of the Plan, which also refers to Schedule 1A.
198 Under Plan Clause 43(7) (7), the cease to take condition are transferred after section 71S or 71W dealings.

- four licences in the Mallowa Creek Management Zone of the Mehi River Water Source have conditions from Appendix 4 of the Plan which use terminology 18 years out of date, referring to surplus flow and off-allocation water when they should refer to supplementary water.[199] Management of this area which includes the significant and high value Mallowa Wetlands, should not rely on discretionary actions and the interpretation of outdated terminology on licence conditions.

In these examples, the protective impact of higher cease to pump thresholds may be lost, creating risks for other water users and the environment. It also creates further variation of access conditions within the same management units, compounding inequity with existing users.

Water sharing plans are intended to be the instrument that ensures equity and adequate protection of the environment and basic landholder needs. The Plan's current approach relinquishes the Plan's authority for cease to pump conditions to works approvals, which is not common practice and adds complexity when assessing access conditions and protecting values. It reduces transparency around the risks and impacts of extraction on flows and creates confusion for stakeholders as conditions vary within water sources. There are also environmental and social impacts if there is trade as protections may be reduced. For DPE Water and WaterNSW it increases risks that water management principles may not be given effect because there is not an overarching provision in the Plan and giving effect to principles is at risk from individual licensing and approval condition decisions.

The Commission supports the freeing up of trade restrictions, in line with stakeholder submissions, the National Water Initiative, and good practice (see **Chapter 8**). However, before trade barriers can be removed, it is critical that robust, consistent access conditions are included in the Plan, carried through to licences and works approvals and that these conditions adequately protect environmental and social values. As outlined in **Section 4.1** and **Section 6.1.1**, DPE-Water should ensure cease to pump provisions are defined in the new Plan, that they are consistently applied to all licence holders in a water source with the same licence type and that they are adequately protective of the environment and basic landholder rights. Further access conditions should be mandatory conditions on all licences. This would be transparent for anyone considering trades, will maintain equity, and apply even if a licence is traded.

6.2 Account management and AWD reduction rules create inequities

Water sharing plan provisions must support equitable water sharing, particularly where the level of entitlement exceeds the LTAAEL. The Plan requires that if the LTAAEL or long-term average sustainable diversion limit are exceeded, the Minister is to make AWDs of less than 1 ML per unit share for unregulated river access licences and floodplain harvesting (unregulated river) access licences.[200] The Commission identified two key issues related to the Plan's account management provisions (introduced in **Section 3.8**) and relative AWD reductions between licence categories:

- Unregulated access licences and unregulated floodplain harvesting licences have different carryover, account limits, and patterns of extraction, which means that users in the same water source can accumulate water in their accounts and potentially contribute to LTAAEL exceedance at different rates. However, there is no consideration of these differences when applying reductions to ensure LTAAEL

199 This terminology predates the 2004 *Water Sharing Plan for the Gwydir Regulated River Water Source*
200 Clauses 35 and 31B of the Plan.

compliance, meaning growth within one category may be offset by an inequitable reduction in the other category (**Section 6.2.1**).

- Within the same licence category, while carryover and account limits are the same, these provisions have different impacts and benefits for different users. These differences are also not considered when applying reductions, meaning an opportunistic extraction pattern by one industry can result in reductions to another (**Section 6.2.2**).

6.2.1 Inequities between licence categories

The 2022 Plan amendments introduced new carryover rules and account limits for unregulated floodplain harvesting licences. As summarised in **Table 3** in **Chapter 3**, these rules are different to unregulated access licences and regulated floodplain harvesting that occurs in the same geographic area (see **Section 7.1)** for discussion on floodplain harvesting classification).

Despite this, the Plan requires AWDs for floodplain harvesting (unregulated river) and unregulated river access licences to be reduced equally if the LTAAEL is exceeded and compliance action is required.[201] This is inequitable as licence categories are able to accumulate water in their accounts at different rates and have different extraction profiles and timing of extraction (see **Table 3** in **Section 3.8**).

For example, floodplain harvesting licensees can accumulate water in their account at a higher rate compared to unregulated river access licensees. Floodplain harvesters should be opportunistically extracting during periods of higher flow and storing water for later use, while unregulated river access licensees can require regular extraction (such as for permanent plantings or feedlots) and may not have the infrastructure to store large volumes of water.

Due to these behaviours and generous accounting rules, some licensees can have a greater contribution to LTAAEL exceedance in wetter periods, which may result in compliance action in drier periods that disproportionately impacts other licensees that have had a less significant contribution to the exceedance.

This issue has also been raised by stakeholders who recommended amending the Plan[202] to reduce AWD for categories where growth has been identified.[203] While the Plan requires licences to be reduced equally if the LTAAEL is exceeded, DPE-Water's guidance on its website under the NSW Floodplain Harvesting Policy states that '*new rules … will be included in water sharing plans to ensure that if there is growth in floodplain harvesting, it does not impact on other categories of licence and vice versa… growth above the LTAAEL that is attributable to floodplain harvesting will result in reductions to floodplain harvesting licences only*.[204]

Combining unregulated river access licences and floodplain harvesting (unregulated river) licences together to reduce total extraction below the LTAAEL disadvantages those users who require greater long-term consistency of access and are therefore less reliant on carryover provisions. DPE-Water has indicated that they are aware of this issue and is

201 Clause 31B (1A) of the 2022 amendments to the Plan - Insert after subclause 31B (1) — (1A) The reduction under subclause (1) is to be applied equally to unregulated river access licences and floodplain harvesting (unregulated river) access licences.
202 Clause 31(B) of the Plan.
203 Submission: Gwydir Valley Irrigators Association, received February 2022.
204 DoI (2013) *NSW Floodplain Harvesting Policy*

considering options to address equity concerns, which would be applied to all relevant water sharing plans.

The impact of this provision and the relative effects on unregulated river and floodplain harvesting (unregulated river) access licences cannot be quantified without a numeric LTAAEL (see **Section 3.1**) and modelling. However, it is likely that it will cause inequality between categories of licence.

The Commission supports the approach outlined in the NSW Floodplain Harvesting Policy. However, this approach is not reflected in the Plan. The Commission notes that DPE-Water implemented this approach in the Gwydir Regulated Plan, which separates out the regulated river (general security) and floodplain harvesting (regulated river) access licences AWD reductions if the LTAAEL is exceeded.[205] When remaking the Plan, DPE-Water should separate AWD reductions for each licence category to enable targeted compliance action if the LTAAEL is exceeded.

6.2.2 Inequities within licence categories

Carryover provisions were intended to allow users flexibility to access to their long-term average extractions in systems that tend to be 'boom or bust'. However, carryover provisions can allow licensees to extract greater volumes in dry years when the rivers are under maximum stress and water access should be reduced.

Use of significant carryover may create inequities. Given that the Plan's entitlement is greater than the LTAAEL, there is a material risk of exceedance and AWD reduction action even without use of carryover (see **Section 3.8**). The relatively generous account management rules increase the risk of LTAAEL exceedance.

Carryover provisions can create inequities between licence holders with different extraction patterns. For example, those with large on-farm and access to other water sources and those totally dependent on the unregulated river access. While the intent of carryover provisions was to provide more flexibility for users to manage extraction in under variable wet and dry periods, the usefulness of these provisions varies depending on the extraction profile of the industry using the water. For example, these provisions are more beneficial to industries that can pump and store water, and those that opportunistically use water and are not reliant on consistent volumes year to year. Conversely, there are some industries that require greater consistency of access and may not have the infrastructure to take advantage of carryover provisions.

These differences mean that there is potential for some licensees to have a greater contribution to any LTAAEL exceedance through use of carryover. Despite this, if there is an LTAAEL exceedance, all unregulated access licences are reduced through an AWD in subsequent years. Pooling of all unregulated access licences together to reduce total extraction below the LTAAEL disadvantages those users who require greater long-term consistency of access and are therefore less reliant on carryover provisions.

The impact of LTAAEL exceedance and reductions in AWD would be disproportionately borne by those licensees that require ongoing access to water, and those who do not have large onsite storage as they are not likely to have caused the exceedance. If LTAAEL exceedance is significant, or due to the five-year assessment period is not acted upon swiftly, impacts will also be felt by the environment, domestic and stock users, and downstream systems due to extraction above the LTAAEL. This could be largely resolved by implementation of multiple EMUs and LTAAELs as described in **Section 3.6**.

[205] Clause 34(1) of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*

6.2.3 Licencing of farm dams if AWD is reduced

WaterNSW's licensing staff also highlighted the impact of the current Plan's trade restrictions on the water market's ability to accommodate farm dams which exceed harvestable rights. Licensed farm dams must currently downsize their capacity or acquire additional entitlement through the trading market if AWDs were reduced. This has not been an issue under the life of the Plan as 100 percent AWDs have been allocated each year. This is a state-wide issue and DPE-Water should consider mechanisms to address this concern.

6.3 The Plan does not have clear equity objectives

The Act creates a clear expectation that water sharing plans should '*provide for the orderly, efficient and equitable sharing of water'* and seek to minimise cumulative impacts on water sources.[206] When the Plan was created in 2012, it included an objective to '*manage these water sources to ensure equitable sharing between users'*.[207]

The 2020 amendments removed reference to equity, with the vision currently stating the Plan is to provide for:

> *'(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.'*[208]

The replacement Plan should include explicit equity objectives, strategies and performance indicators to transparently outline how it manages equitable sharing of water between and within licence categories. Without these, the Plan's effectiveness and alignment with the Act cannot be assessed and the Plan's treatment of different licence holders is not transparent.

6.4 Recommendations

R 11	As part of the replacement Plan, to ensure access is equitable within the Plan area and downstream of the Plan, DPE-Water should: a) include appropriate minimum cease to pump thresholds (as based on Recommendation 6b) in the body of the Plan for application to all licences in that water source or management zone, and specify that daily access conditions are mandatory conditions on access licences b) review licences in Plan schedule to ensure they are exempt in accordance with Clause 43(13) to extract below full pool capacity c) revise the AWD provisions to require reduction for the licence category which causes LTAAEL exceedance, consistent with the rules in the Gwydir Regulated Water Sharing Plan

206 Section 3(e) and Clause 2(d) of Section 5 of the Act.
207 Clauses 10(d) of the 2012 Plan and 11(e) of the Water Sharing Plan for the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source 2003.
208 Clause 9 of the Plan.

	d) include explicit equity objectives, strategies and performance indicators.
R 12	To improve the delivery and protection of replenishment flows from the regulated Gwydir River into unregulated river water sources, DPE-Water should: a) review the adequacy and appropriateness of existing replenishment flow requirements for unregulated river water sources given projected climate change b) clearly stipulate the conditions under which replenishment flows are to be provided based on climate variability, domestic and stock and environmental needs c) ensure that the replacement Plan includes provisions that clarify how replenishment flows will be announced and protected from extraction by access licence other than a domestic and stock access licences and under basic rights.

7 Managing floodplain harvesting impacts

The NSW Government and DPE-Water have been working to licence floodplain harvesting extraction in NSW, prioritising valleys of the northern Basin where this practice is considered more prevalent. The provisions for floodplain harvesting licences were included in the Plan on 29 July 2022 while the Commission was undertaking its review, and the licensing framework was implemented from 15 August 2022.[209] On 21 September 2022, the Legislative Council disallowed the *Water Management (General) Amendment (Floodplain Harvesting Access Licences) Regulation 2022*, which defined the process for issuing floodplain harvesting licences. This does not affect requirements to measure and manage floodplain harvesting but prevents new licensing.[210]

Floodplain harvesting is focused on the take of overbank flows. Flows that spill out onto the floodplain 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.[211] They are also important for floodplain specialists including the threatened southern purple spotted gudgeon and olive perchlet that inhabit off-channel environments and require access to the river channel. Bankfull and overbank flows have been identified as at risk and particularly important to maintain across the floodplain water sources.[212] Floodplain harvesting therefore poses a risk to these environmental values.

When floodplain harvesting access licences were created, both regulated and unregulated floodplain access licences were assigned in the Plan area. The difference between these licences is administrative given the floodplains are effectively water flowing in the unregulated river water sources. The Amendment Orders included:

- 89,000 unit shares of floodplain harvesting (regulated river) access licences assigned to licensees with existing regulated river licences[213]
- 10,579 unit shares of floodplain harvesting (unregulated river) access licences assigned to licensees with existing groundwater or unregulated river access licences across four water sources.[214]

Surface water extraction in the gazetted floodplain includes extraction from unregulated river access licences, floodplain harvesting (unregulated river) access licences and floodplain harvesting (regulated river) access licences.

The amendments also included provisions for AWDs and individual account management rules, summarised in **Section 6.2**. Cease to pump thresholds were not included for unregulated floodplain harvesting but the amendments include a requirement that all floodplain harvesting licenses must have the condition that the licensee only take water from overland flow in the Gwydir Valley Floodplain.[215]

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209 DPE-Water (2022) *Floodplain harvesting licence rules in the water sharing plans for Gwydir valley*
210 *Ibid.*
211 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.
212 DPIE-Water (2020) *Long-Term Water Plan – Part A: Gwydir catchment*
213 Clause 25 of the *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*
214 With 5,831 unit shares in Thalaba Creek, 3,348 in Gingham Watercourse, 907 in Slaughterhouse Creek and 493 in Mehi River water sources. The Carole Creek, Gwydir, Gil Gil Creek, Barwon, Moree, Tycannah Creek, Gurley and Millie Creek water sources are also in the gazetted floodplain but have no floodplain harvesting (unregulated river) access licences.
215 Clause 64(6) of the 2022 Amendments to the Plan

These Plan amendments do not adequately address the potential impacts of floodplain harvesting or recognise the cumulative impact of floodplain harvesting across the unregulated and regulated plans and downstream. They also do not protect environmental water where it spills out onto the floodplain (see **Section 4.3**).

To better manage the impacts of floodplain harvesting, there are several issues DPE-Water should address:

- current Plan boundaries do not align with the gazetted floodplain, making it difficult to quantify extraction across the area and manage it equitably (**Section 7.1**)
- the cumulative impact of extraction across plans has not been assessed or managed (**Section 7.2**)
- daily access rules (specifically cease to pump thresholds) are not commensurate with risks from floodplain harvesting extraction (**Section 7.3**)
- floodplain harvesting daily access rules are not aligned across the Plan and Gwydir Regulated Plan (**Section 7.4**).

Account management rules and carryover provisions, including those for floodplain harvesting licences, also create significant risks of LTAAEL exceedance. This issue is discussed in **Section 3.8**.

7.1 Plan boundaries do not align with the gazetted floodplain area

Floodplain harvesting (unregulated and regulated) access licences are only granted within the gazetted floodplain area (see **Figure 5**). Floodplain harvesting extraction in the Gwydir is categorised under three different instruments, each using different boundaries:

- the Plan's water source and water management zone boundaries
- the Floodplain Management Plan for the Gwydir Valley Floodplain 2016 (A to D)
- the Gwydir Regulated River Plan management zones[216] (**Figure 5**).

The Plan's water source boundaries were designed based on within bank flows and do not reflect connectivity within and between water sources because of overbank flows when floodplain harvesting occurs (see **Section 5.5**). As such, management zone boundaries in the Plan, as well as the Gwydir Regulated Plan, do not align with each other.

The gazetted floodplain overlaps entirely with five Plan water sources,[217] as well as the lower portion of seven[218] water sources in the western half of the Plan. While the management zones created during amendments to the Gwydir Regulated Plan[219] align with the boundary of the gazetted floodplain, they do not align with the Plan's water sources or management zones. Some examples include:

- the Plan's Thalaba Creek Water Source and parts of the Millie, Gurley, Tycannah and Moree water sources are combined in the Gwydir Regulated River's Thalaba Creek Management Zone.
- the western (lower) half of the Plan's Slaughterhouse Creek Water Source is in the gazetted floodplain while the upper half is not. There is only one licence in the water source, a floodplain harvesting (unregulated river) access licence. There are no unregulated access licences in this water source. Altering the water source's

216 Schedule 1 of the *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*
217 Carole Creek, Gingham Watercourse, Gwydir, Thalaba Creek and Barwon water sources.
218 Slaughterhouse, Gil Gil Creek, Moree, Mehi River, Tycannah Creek, Gurley and Millie Creek water sources.
219 *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*

boundary to separate the gazetted floodplain from the upper area would require minimal administration effort but would allow access rules to appropriately address the risks associated with floodplain harvesting.

- the Plan's Gingham Watercourse water source is divided into two management zones with access rules for each zone. The Gwydir Regulated Plan has one management zone covering this area.

Misaligned boundaries make it difficult to distinguish extraction from the floodplain from extraction from the rivers, which limits accurate estimates and equitable management of extraction across the Plan area. The floodplain management units for the Plan, the Gwydir Regulated Plan and the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016* should be aligned to implement equitable access rules and manage any growth in extraction. As part of the replacement process, DPE-Water should align management units between these plans to:

- quantify total extraction in each unit
- assess the cumulative impacts of unregulated and regulated floodplain harvesting extraction across the Gwydir Valley
- and develop access rules to manage the cumulative risks.

As discussed in **Section 3.6**, extraction could be more effectively managed if the Plan included more than one EMU and LTAAEL. As part of the work investigating this change, DPE-Water should consider the most appropriate boundary between EMUs and if one should align with the gazetted floodplain. This would recognise that floodplain harvesting has a unique extraction profile compared to river extraction and allow appropriate access and account management provisions to be applied across the Plan area. The Commission notes that the Gwydir Valley Irrigators Association have suggested that the floodplain be managed separately to the rest of the Plan area.[220]

[220] Submission: Gwydir Valley Irrigators Association, received February 2022.

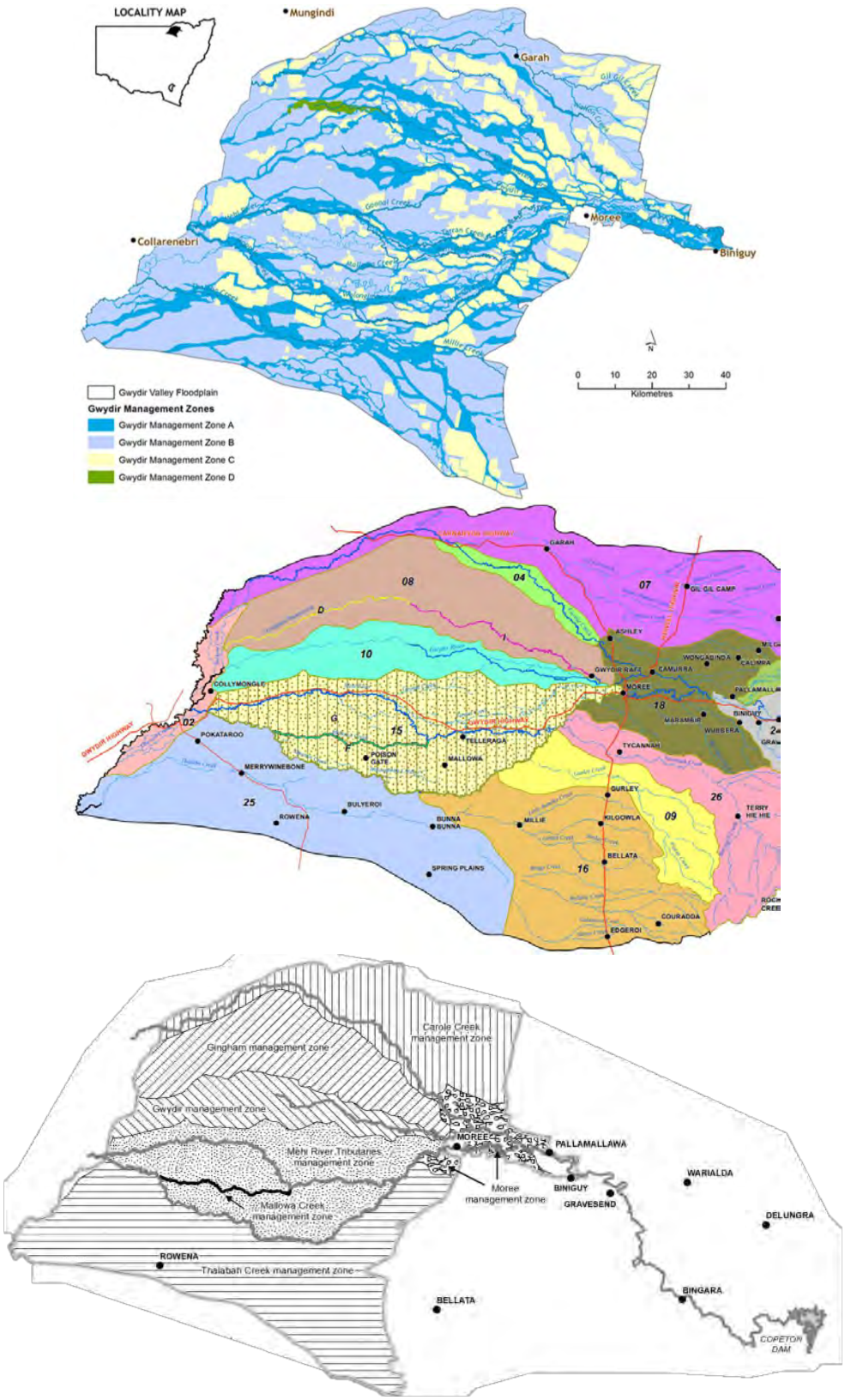

Figure 3: Gazetted floodplain (top),[221] excerpt showing Plan boundaries (middle), and Gwydir Regulated Plan management zones (bottom)[222]

221 Management Zones Map in the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016*

222 NSW Government (2022) *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*

7.2 Cumulative downstream impacts of floodplain harvesting on unregulated rivers are not assessed

In 2018, DPE published a risk assessment undertaken to inform the development of the Gwydir Surface Water Resource Plan.[223] Assessment of the impacts associated with floodplain harvesting was not part of this risk assessment.

Understanding the risks of extraction in each flow class, including overbank flows, on water sources and downstream outcomes is important when defining daily access provisions (see **Section 4.1**) and trade rules (see **Section 9.2**). The Act's principles require the consideration and minimisation of the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems.[224]

Floodplain harvesting (regulated river) entitlement is significant in the Plan's unregulated river water sources adjoining the regulated river (**Table 2**). The risk of this entitlement to unregulated river water sources is not clearly articulated in published reports but is likely significant. Modelling for regulated rivers also does not address the risk to unregulated rivers.

To assess the risk from annual extraction requires consideration of the total possible extraction. As discussed in **Section 6.2**, accounting rules, LTAAEL compliance and the timing of compliance varies across unregulated licence categories. This is further complicated when the maximum possible Regulated River floodplain harvesting and LTAAEL compliance is included (**Table 5**).

Without the alignment of the accounting rules, LTAAEL compliance and the timing of compliance for unregulated and regulated river floodplain harvesting (see **Section 6.2.1**), there is a risk that reduction in one licence category is offset by an increase in extraction in another. DPE-Water need to assess the cumulative impact of all extraction when setting account rules for a particular licence category.

In addition to the cumulative impact across the Plan area the impact on specific water sources needs to be considered. For example, assessment of flows at the end of Thalaba Creek where it meets the Barwon River upstream of Walgett needs to consider the cumulative impacts of extraction across the Plan area on downstream environments and outcomes. DPE-Water should assess flows and extraction from Millie Creek Water Source, Thalaba Creek Water Source, and the Gwydir Regulated Plan.

From a risk assessment perspective, aligning the accounting rules, LTAAEL compliance, as well as the timing of compliance for unregulated and regulated river floodplain harvesting and their compliance periods would assist with assessing and addressing any impacts from cumulative impacts. It would also assist in improving consistency and clarity for licence holders.

223 NSW Department of Industry (2018) *Risk assessment for the Gwydir Surface Water Resource Plan Area (SW15): Part 1*

224 Section 5(2)(d) of the Act.

Table 2: Account management rules and extraction limits for licences in the Plan area

	Unregulated river, domestic and stock and local water utility	Floodplain harvesting (unregulated river)	Floodplain harvesting (regulated river)
Carryover	Can carryover a maximum of 100 percent of their annual entitlement[225]	Must carryover any water allocations remaining in an account to the next water year[226]	Must carryover any water allocations remaining in an account to the next water year[227]
Account limit	Can hold up to 2 ML per unit share in their account[228]	Can hold up to 3 ML per unit share in their account[229]	Can hold up to 5 ML per unit share in their account[230]
Extraction limit	Can extract a maximum of 3 ML per unit share over a rolling three-year period[231]		No extraction limit (meaning in a single three-year period, a maximum of 7 ML per unit share could be extracted)[232]
Access licence entitlement	67,318 unit shares (unregulated river) plus 1,287 ML (domestic and stock and water utility)	10,579 unit shares	89,000 unit shares
Maximum extraction potential in one year (extraction limit x entitlement)	137210 ML	31,737 ML	445,000 ML (plus exempt rainfall runoff harvesting)
LTAAEL	Unspecified For reference, the relevant BDL component is 11,200 ML of take from watercourses (excluding farm dam entitlement and basic landholder rights)[233]	Unspecified.	91,700 overbank flow harvesting 12,6500 non-exempt rainfall runoff harvesting 32,900 exempt rainfall runoff harvesting
LTAAEL compliance period	Five years[234]	Five years	Three years[235]

225 Clause 39(4) of the Plan.
226 Clause 39(5) of the 2022 Amendments to the Plan
227 Clause 45(3) of the *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*
228 The carryover limit in Clause 39(4) of the Plan limits the water allocation account to 1 ML plus the current year's allocation.
229 Clause 39(5) of the 2022 Amendments to the Plan
230 Clause 45(1) of the *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*
231 Clause 39(3) of the Plan.
232 5 ML in year one, 1ML in year 2, 1ML in year 3.
233 Australian Government (2012) *Basin Plan 2012* and MDBA (2019) *Sustainable Diversion Limits (SDLs) as at 1 July 2019 - surface water*
234 Clause 29(1) of the Plan.
235 Clause 31(2)(b) of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*

7.3 Daily access rules do not address floodplain harvesting risks

Currently, access rules for floodplain harvesting licences have the same default of no visible flow as unregulated river access licences, although under a mandatory condition applied to their licence they can only extract from overland flows within the Gwydir Valley Floodplain.[236] Applying rules consistent with unregulated river access licences does not address the unique issues and risks associated with floodplain harvesting and could lead to unintended consequences for different parts of the flow regime.

DPE-Water's website states that the 'process for determining entitlements of floodplain harvesting (unregulated river) access licences and unregulated river access licences is the same. Accordingly, it is proposed to apply the same rules to floodplain harvesting (unregulated river) access licences as currently exist for unregulated river access licences in the relevant water source and/or management zone, where appropriate'.[237] While the process for determining entitlement (by conversion of area irrigated to volume of entitlement) was the same, floodplain harvesting is a fundamentally different form of extraction, and its cumulative and unique risks must be addressed.

Further, the Plan did not provide the same account management rules for floodplain harvesting (unregulated river) access licences as for unregulated river access licences (see **Section 6.2**). The carryover provisions and account limits for floodplain harvesting are more generous compared to unregulated river access, and increase the likelihood that licensees have full accounts and are able to extract more in a given year (pending water availability).

Rolling over Plan rules based on low flow protection and a lower level of entitlement is not appropriate considering the risks from extraction within the Plan area, and downstream. DPE-Water should assess the cumulative impact of floodplain harvesting from regulated and unregulated licences in the Plan area as described in **Section 7.2**. Considering this, the remade Plan should include appropriate high flow cease to pump provisions for floodplain harvesting to adequately protect the water sources, their dependent ecosystems and downstream outcomes. The *Gwydir Long Term Water Plan* provides guidance on environmental flow requirements to support floodplain environmental assets. DPE-Water should consider how to provide these requirements as part of the replacement Plan.

7.4 Unregulated and regulated conditions are not aligned for the same form of extraction, flows and geographic area

Floodplain harvesting licences were divided between the Plan and the Gwydir Regulated Plan based on their other licences. Those without a regulated river licences received a floodplain harvesting (unregulated river) access licence. However, both regulated and unregulated floodplain harvesting licensees are extracting overbank events with the same downstream impacts. It is therefore logical and equitable for daily access provisions for the floodplain harvesting (unregulated river) access licences to be consistent with the rules for floodplain harvesting (regulated river) access licences.

However, while most of the current cease to pump thresholds for the Plan's water sources with floodplain harvesting are based on visible flow (except for the Gingham Watercourse Water Source and Gwydir Water Source), the Gwydir Regulated Plan has more varied and higher cease to pump thresholds.

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236 Clause 64(6) of the 2022 Amendments to the Plan

237 DPE-Water (2022), *Floodplain harvesting licence rules in the water sharing plans for Gwydir valley: Floodplain harvesting (unregulated river) access licences – rule summary*

Table 3 summarises the unregulated and regulated floodplain harvesting conditions. The Plan's thresholds do not align with its own objectives to protect environmental outcomes by '*reserv[ing] a portion of flows to partially mitigate alterations to natural flow regimes in these water sources*'.[238] Having different thresholds between the plans for the same form of extraction, from the same flows, in the same geographic area poses clear equity issues (see also **Section 6.1**).

Both the Plan and the Gwydir Regulated Plan allow for the addition, modification or removal of provisions relating to floodplain harvesting in response to:

- 'the need to protect overbank flow for environmental purposes,
- monitoring, evaluation and reporting outcomes,
- an improved understanding of the influence of floodplain harvesting on downstream flows,
- a review that assesses the potential benefits and impacts of new access provisions for floodplain harvesting (unregulated river) access licences.'[239]

As discussed in **Section 4.1**, DPE-Water should revise these thresholds in the replacement Plan to align with the impacts of extraction on the flow regime. Once appropriate thresholds have been defined, daily access rules for floodplain harvesting access licences should be aligned between the Plan and the Gwydir Regulated Plan for each water source or management zone to improve equity between licensees who may be accessing the same overland flows.

Table 3: Comparison of Regulated River Floodplain and Unregulated River Access Conditions

Unregulated Plan water source		**Gwydir Regulated Plan management zone**[240]	
Water source and FPH entitlement[241]	**Cease to pump threshold**	**Management zone**	**Cease to pump threshold**[242]
Carole Creek Gil Gil	No visible flow	Carole Creek	550 ML/day in Gil Gil Creek at Galloway gauge (416052)
Gingham Watercourse (3,348 unit shares)	Upper Gingham Watercourse Management Zone - A Class - More than 250 ML/day[243] *Lower Gingham Watercourse Management Zone* - A Class - Equal to or more than 175 ML/day at the Gingham Bridge gauge within the previous 12 months, or	Gingham	250 ML/day in Gingham Channel at Teralba gauge (418074)

238 Clause 10(3)(b) of the Plan
239 Clause 77(1)(a) of the 2022 Amendments to the Plan and Clause 80(1) of the *Water Sharing Plan for the Gwydir Regulated River Water Source Amendment Order 2022*
240 As described in Section 7.1, the water source and management zone boundaries do not directly align.
241 Clause 23A of the 2022 Amendments to the Plan
242 Clause 51(4) of the 2022 amendments to the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*
243 Clause 42 Table B of the 2022 Amendments to the Plan

Unregulated Plan water source		Gwydir Regulated Plan management zone[240]	
	Equal to or more than a total of 4000 ML/year at the Gingham Bridge gauge over the previous 12 months, or A visible flow in the Gingham Watercourse at Morialta Road[244]		
Slaughterhouse Creek (907 unit shares)	No visible flow	Moree	250 ML/day in the Gwydir River (South Arm) at d/s Tyreel Offtake Regulator (418063)
Moree	No visible flow		
Gwydir	A Class - more than 250 ML/day at the Gwydir River at Millewa gauge (418066)	Gwydir	250 ML/day in the Gwydir River (South Arm) at d/s Tyreel Offtake Regulator (418063)
Mallowa	Conditions listed in Appendix 4 of the Plan	Mallowa Creek	1,200 ML/day in the Mehi River at Near Collarenebri gauge (418055)
Mehi (493 unit shares)	No visible flow	Mehi River Tributaries	1,200 ML/day in the Mehi River at Near Collarenebri gauge (418055)
Thalaba Creek (5,831 unit shares)		Thalabah Creek	300 ML/day in the Thalaba Creek Belarre gauge (418091)
Millie			
Gurley			
Tycannah			

244 *Ibid.*

7.5 Recommendations

R 13	As part of the replacement Plan, to improve the management of floodplain harvesting, DPE-Water should: a) align management units between the Gwydir Regulated Plan, the Floodplain Management Plan for the Gwydir Valley Floodplain and the Plan to: i. quantify total extraction in each unit ii. assess the cumulative impacts of unregulated and regulated floodplain harvesting extraction across the Gwydir Valley iii. develop access rules to manage the cumulative risks. b) determine the cumulative impact of the total surface water extraction across the Plan and the Gwydir Regulated Plan area and revise Plan rules to reflect the risk of extraction across the flow profiles and adequately protect the water sources c) include in the replacement Plan appropriate high flow cease to pump provisions for floodplain harvesting to adequately protect the water sources, their dependent ecosystems and downstream outcomes d) once appropriate thresholds have been defined, align daily access rules for floodplain harvesting access licences between the Plan and the Gwydir Regulated Plan for each water source or management zone to improve equity between licensees who may be accessing the same overland flows.

8 Improving outcomes through trade

'*The lack of development in the unregulated water market is the greatest shortcoming of the plan and must be addressed to realise the full potential of social and economic benefits possible'*.[245]

The Plan includes an economic objective 'to maintain, and where possible improve, water trading opportunities for surface water-dependent businesses',[246] with the associated strategy to 'provide for trade of water allocations and share components subject to environmental constraints'.[247] There is clear demand for the Plan to adapt and support socio-economic outcomes, and a need to optimise water use – potentially through the use of trades – given increasing water needs and predicted reductions in water availability.

Under the Plan, water trades include water allocation assignments (generally known as 'temporary trades') and share assignments (or 'permanent trades'). Trading in the Plan is currently highly restricted to protect environmental outcomes and third-party impacts. DPE-Water advised that there has been no commercial trading under the Plan. The Plan prohibits:

- assignment of rights dealings between management zones and water sources within the same water management area (dealings under Section 71Q of the Act)[248]
- amendment of share component dealings - change of water source (dealings under Section 71R of the Act).[249]

These restrictions stemmed from an assumption when the Plan was developed that hydrologic stress in all water sources was 'high'.[250] The Commission acknowledges that trade limits remain an important mechanism to protect environmental outcomes. As discussed in **Section 4.3**, the Plan does not adequately protect environmental water to the end of its system and trade restrictions help prevent increased impacts. Changes to trade provisions should only occur if recommendations to improve protection of environmental water are implemented first.

However, this review identified opportunities to reduce trade restrictions and improve economic outcomes, provided environmental, Aboriginal cultural and other instream values remain protected. Implementing the recommendations of this chapter will better align Plan provisions with its economic objectives, as well as 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.[251]

Based on submissions and interviews for this review, there is clear demand from licensees and stakeholders for increasing trade, but the potential environmental risks were also highlighted. The Commission believes the Plan's provisions inhibit trade and the water market's ability to:

- shift water use to higher value industries

245 Submission: Gwydir Valley Irrigators Association, received February 2022.
246 Clause 11(2)(a) of the Plan.
247 Clause 11(3)(a) of the Plan.
248 Clause 57 of the Plan.
249 Clause 58 of the Plan.
250 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
251 Australian Government Department of Agriculture, Water and the Environment (n.d.) *National Water Initiative*

- be an important and cost-effective part of a suite of climate change adaptation strategies[252]
- redistribute entitlement to support adjustment after possible AWD reductions
- reduce stress on the river at low flow and move extraction away from areas with high instream values
- enable water users to seek additional entitlement where their floodplain harvesting entitlements are less than recent extraction levels.

The Commission considers there are opportunities to improve trade while protecting or enhancing environmental outcomes.

8.1 Introducing a high flow category may improve outcomes

As with recent previous reviews, the Commission recommends introducing a high flow licence category and allowing trade into high flows where appropriate to improve economic outcomes while maintaining environmental outcomes.[253] The use of high flow conversions provides particular opportunity in the Plan area given the pressures on the Gwydir system from climate change and water demand.

Trades out of lower flows into high flow are intended to reduce hydrological stress and the environmental impacts of extraction by reducing competition for water between users and the environment in critical lower flows. They can also increase the pool of licences available for trade and the opportunities for how and where water is used. Introducing a high flow category where appropriate is consistent with the Plan's amendment provision that is intended to provide for dealing 'over a range of flows'.[254] Addition of high flow categories should be applied at the appropriate scale and only be undertaken following analysis of where such provisions could improve economic outcomes while maintaining environmental outcomes.

The use of high flow trades was not a consideration in the macro planning approach to Plan development, and the Plan currently prevents conversion of access licences to a new category such as high flow.[255] This clause should be reviewed in the replacement Plan.

The Commission understands that DPE-Water is reviewing high flow conversions, including barriers to their uptake. As part of this, DPE-Water should assess their potential in the Plan area using best available information to inform suitability, risks and conditions, including potential impacts of high flow conversions on the flow regime and environmental and Aboriginal cultural values. For water sources deemed able to accommodate greater extraction in higher flows and with hydrological stress in low flows, DPE-Water should amend the Plan to permit conversions. The Commission notes that trade into high flows relies on licensees having storages to hold water for later use.

The Commission does not recommend increasing the ability for low flow trades beyond current Plan provisions. Rather, DPE-Water should define high flow classes across the Plan

252 Productivity Commission (2020) *National Water Reform 2020 Inquiry Report*; and 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.

253 Including the reviews of the *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012*, and the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011*

254 Clause 73(a)(i) of the Plan.

255 Clause 56 of the Plan.

area (**Section 4.1**). DPE-Water should define thresholds for high flow classes to prevent increased hydrological stress while allowing a set volume of trade. If high flow cease to pump thresholds are included in the replacement Plan and high flow access licences created, trades into high flow categories could be permitted within appropriate water source groupings, subject to best available information and local environmental limits.[256] Plan provisions could be similar to other unregulated plans such as the *Water Sharing Plan for the Murray Unregulated River Water Sources 2011* or the *Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012,*[257] which limit trade at low flows due to high hydrologic stress and high ecological values but facilitate trade into high flow. The following section outlines specific recommendations on how high flow trading could be implemented in the Plan.

8.2 More targeted trade restrictions could improve outcomes

The Plan includes seven trading zones, 10 management zones, and 28 water sources. The Plan's use of trading zones adds complexity but does not adequately support trade and should be scaled up with local restrictions to protect outcomes. '*Many water users are finding the system too complex to navigate and are making the choice to exit the industry, where they can successfully trade their entitlement or sell both their land and water assets, which has cumulative impacts on communities*'.[258]

As previously mentioned, current trade rules are highly restrictive, based on all water sources having high hydrologic stress. This has meant that trade between water sources and trading zones – and sometimes within licence categories – has been prohibited. However, since the Plan was developed, additional research and mapping has resulted in an improved understanding of ecological values and hydrologic needs across the sub-catchments. New evidence may support a more granular understanding of risks and benefits associated with trade, which could be used to refine trade rules and expand the circumstances where trade is permitted in low-risk settings, while still protecting environmental, Aboriginal cultural and other instream values.

DPE-Water is encouraged to review the trading rules to identify if there are opportunities to enhance trade. Water sources can be grouped into sub-catchments for trade as has occurred in the Namoi without compromising environmental outcomes. Revised trade provisions should:

- be supported by latest information on entitlement, connectivity, hydrological stress, HEVAE mapping and local assets including cultural assets and values requiring protection as well as any potential trade impacts
- be clear and specific on what they are facilitating, and what they intend to protect
- be designed at the appropriate geographic scale to allow for trade within environmental and system constraints, for example allowing trade to occur within sub-catchments but with high quality, localised restrictions to protect outcomes and high value assets.

256 For example, environmental and cultural assets or values, or practical limits such as the Commission understands that trading is not permitted in Carole Creek and Mehi River water sources because of channel constraints and the volumes of existing entitlements.
257 Clause 73 of the *Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012*
258 Submission: Gwydir Valley Irrigators Association, received February 2022.

As input to this review, stakeholders requested:

> '*1) A clear criterion to establish interim improvements to trade arrangements until such time as a formal trade review is finalised, to enable case-by-case trade proposals to be assessed, where artificial barriers are identified.*
> *2) A trade review is undertaken to remove artificial barriers to trade and reflect improved knowledge on hydrologic connectivity of streams and the floodplains, to reflect that unregulated access licences can be used to access overland flow as well as water within a stream. This maybe best represented by grouping the sub-catchments that are on the floodplain, separate to those outside the floodplain.*'[259]

While trade rules should be revised as soon as possible, and no later than in the replacement Plan, the Commission does not support interim case-by-case trade arrangements. These would require the suspension of the Plan's dealing provisions and the development of individual assessment criteria, which would take the focus from developing revised Plan rules and may have inequitable outcomes.

The Plan already allows for amendments to trade rules.[260] The Commission is supportive of reviewing trade rules, but notes that there is a provision allowing for '*the identification of water sources which have hydrological connectivity and where dealing limits are not needed'*.[261] This provision should not be enacted upon or retained in the replacement Plan. Unlimited trade is unlikely to be consistent with the requirements of the Act and its water management principles and could result in adverse outcomes.

Trade restrictions should be based on revised management units, as recommended in **Section 3.6**. The following sections outline some of the potential sub-catchment areas that DPE-Water could consider as part of the trade study, including:

- watercourses in the tablelands above Copeton Dam
- the Regulated River Plan's '3T (i.e. three tributaries)' rule water sources
- watercourses in the slopes and upper floodplain (excluding the '3T' water sources)
- unregulated watercourses adjacent to the regulated Gwydir River
- waterways below the regulated Gwydir River
- effluents of the Barwon Darling.

8.2.1 Tablelands above Copeton Dam

The water sources above Copeton Dam[262] should be considered for a single trading zone. This area includes about 10 percent of the Plan's entitlement across nine water sources and an additional five trading zones, heavily restricting trade. The Plan's cease to pump thresholds are uniformly 'no visible flow' in this area.

An example of the need for trade between water sources, is to allow for increased domestic or town water supply without increasing entitlement in the dam's catchment. The Rocky River Water Source includes Invergowrie, a rural subdivision 15 kilometres west of Armidale with a population of about 775. Invergowrie residents rely on BLR, the town does not have a reticulated water supply and during the drought community members had to

259 *Ibid.*
260 Clause 73 of the Plan.
261 Clause 73(a)(iii) of the Plan.
262 Bakers Creek, Boorolong, Copeton Dam, Georges Creek, Laura Creek, Moredun, Roumalla, Rocky River and Upper Gwydir River water sources.

seek water at the Armidale filling station daily.[263] If this water were to be sourced locally to enable residents to upsize their harvestable rights dams, there are only four unregulated river access licences in the water source, with 28 unit shares. Improving drought security for domestic town water supply, stock and domestic purposes or commercial farm stays will require trading into this water source.

Reducing low flow extraction through trade in these water sources may benefit instream values (for example, upland wetlands of the New England Tablelands Bioregion Endangered Ecological Community).[264] However, localised restrictions should be considered in this area to protect high value environmental assets.

While there is a demand for trading within these water sources, it is important that entitlement in the catchment above Copeton Dam does not increase, and trade should not be permitted from below Copeton Dam to above it. Regulated river management assumes no growth in extraction or variation in extraction patterns within the unregulated rivers above Copeton Dam.[265] However, the distribution of unregulated licences and their pattern of use affects inflows into the dam and regulated river. The Plan's entitlement above Copeton Dam of about 6,837 unit shares is significant when compared to the Regulated River Plan's management to a budgeted minimum inflow into the dam of 9,300 ML over one year and 52,600 ML over two years.[266] Increased extraction during drought affects reliability of supply for the regulated users downstream, specifically higher priority users,[267] including Inverell's town water supply.[268] In March 2021, during the most recent drought, Inverell was predicted to run out of water.[269] This highlights the need to prevent any increase in extraction above the dam during drought, and the potential benefit of reducing low flow extraction. Carryover rules for the unregulated rivers above Copeton Dam further increase this risk (**Section 3.8** and **Section 6.2**).

8.2.2 Gwydir wetlands inflow (3T) water sources

The flows in the three '3T' water sources[270] are gauged and used to quantify the flows passing through the regulated river to the Gwydir wetlands, up to 500 ML per day.[271] Trading out of lower flows (below 500 ML per day) in these water sources would therefore increase inflows into the Gwydir wetlands. Trade out of Rocky Creek, Cobbadah, Upper Horton and Lower Horton water sources may also locally benefit the threatened eel-tailed catfish and Lower Darling Aquatic Endangered Ecological Community.[272] Any changes to

263 Interview: Uralla Shire Council, June 2022.
264 These are listed in Schedule 5 of the Plan.
265 Water Allocation Methodology - Gwydir Regulated River - November 2021 Operators (WaterNSW) and the model assumes a minimal inflow sequence into Copeton Dam, this is based on historic flows with historical extraction.
266 Table 1 in DPIE-Water (n.d.) *Water Allocation Methodology Gwydir Regulated River Water Source*
267 Priority is given to domestic and stock and local water utility users ahead of other licence categories typically used for commercial purposes such as irrigation and other industries as per Clause 36(6) of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*
268 Clause 35(1) of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* states that the water supply system shall be managed so that available water determinations for local water utility access licences of 100% of share components can be maintained through a repeat of the worst period of low inflows into this water source (based on historical flow information held by the Department when this Plan commenced).
269 Karp, P. (2019) 'Critical: parts of regional NSW set to run out of water by November', *The Guardian*, 15 September.
270 This trading zone could include Myall Creek, Halls Creek, and Rocky Creek, Cobbadah, Upper Horton and Lower Horton water sources.
271 Clause 13(c) of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*
272 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*

trade in this area should aim to reduce pressure on the 3T catchments and improve low flows into the wetlands.

When assessing these changes, DPE-Water should consider the socio-economic interrelationship between the benefits of increased trading in this Plan with impacts of potential reduced extraction in the regulated river, noting the full range of economic benefits. A submission to this review highlighted how flows over 500 ML per day from these water sources are:

> '*shared 50:50 between irrigation and environmental uses …. This benefits wetland grazing enterprises; waterbirds like ibis that in turn have economic benefits for rural producers both locally and far away; tourism. There are many other economic benefits from all the natural flows in or from unregulated streams, such as from the survival and replenishment of fish populations, fishing, tourism and not having to buy every meal; and even from flooding, such as replenishing evaporation-free groundwater stores and distributing soil nutrients'*.[273]

During Plan development, these water sources were identified as having high hydrological stress in low flows, with high potential demand for extraction.[274] Trading out of low flows and into high flows would produce a net environmental benefit. DPE-Water should assess the potential to permit licensees to trade out of low flows in these water sources, potentially into neighbouring water sources. No trade should be permitted into these water sources and there should be no expansion in low flow trade within the water sources.

8.2.3 Slopes and upper floodplain

These water sources[275] include about 11 percent of the Plan's unregulated access entitlement but distribution of entitlement between them is uneven. There is one floodplain harvesting (unregulated river) licence in Slaughterhouse Creek Water Source for 907 unit shares, but no other unregulated river licenced entitlement.

Enabling limited trading from low to high flows within these water sources and into these water sources from the 3T water sources described above may have environmental and socio-economic benefits. For example, Warialda Creek Water Source in this sub-catchment only has six licences for 542 unit shares while Rocky Creek, Cobbadah, Upper Horton And Lower Horton Water Source (a 3T water source) has 66 licences totalling 5,623 unit shares.

Facilitating trade between these water sources could include valuable benefits for connectivity and river health in Tycannah Creek, which provides habitat for the endangered southern purple-spotted gudgeon. However, any changes in these sub-catchments must consider the potential impacts of increased high flow extraction on the Gwydir wetlands. The potential environmental benefits and impacts at the different flow thresholds should be considered as part of a trade review.

Trading into high flows between water sources in this area may affect the volume and distribution of supplementary flows into the Gwydir Regulated Plan. The volume of water available to general security access licences may increase with reduced pressure on low flows, but the increased extraction of high flows may decrease supplementary flows.[276] If

273 Submission: Inland Rivers Network, received 21 February 2022.
274 Department of Primary Industries (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
275 Tycannah Creek, Mosquito Creek, Slaughterhouse Creek, Warialda Creek, Gurley and Moree water sources.
276 When supplementary events are announced, water additional to dam releases is made available to downstream, hydrologically connected licensees in the regulated river.

unregulated river extraction shifts between water sources, the spatial extent of supplementary events will also shift between water sources. The interrelationships between the unregulated and regulated plans should be taken into consideration when trade restrictions are reviewed.

The lower extents of some of these water sources intersect with the gazetted floodplain and have floodplain harvesting (unregulated river) access licences. The 2022 Plan amendments allow for these licences to have comparable trade provisions to unregulated river access licences (with restrictions on trading works in the Gwydir Floodplain Management Plan management zones A and D).[277] Floodplain harvesting licence extraction impacts a different portion of the flow regime and may require unique trade provisions. The cumulative impacts of floodplain harvesting (both regulated and unregulated) and trade of unregulated access licences on high flows must be assessed. DPE-Water should consider the impacts and benefits of separate trade provisions for these licence categories.

8.2.4 Unregulated watercourses adjacent to the regulated rivers

These floodplain areas could be managed as two zones, with the Mehi River Water Source as one trading zone, and the Millie Creek and Thalaba Creek Water Sources (with about 18 percent of unregulated access licenced entitlement and 55 percent of the floodplain harvesting (unregulated river) access) as another.

The Commission understands that there is demand for movement of licences in this area, along with the rest of the gazetted floodplain.[278] As part of the process to bring floodplain harvesting in line with other forms of extraction, those interested in floodplain harvesting licenses had to register their interest and have their eligibility determined before works approvals and then floodplain harvesting access licences were issued.[279] Not all applications for floodplain harvesting licences in the Plan area were successful.

The shortfall between applications for floodplain harvesting (unregulated) access licence and entitlement granted is not publicly available. Floodplain harvesting (regulated river) access licences had a 28,8000 ML per year shortfall in what had been recently captured and the volumes licensed.[280] For both regulated and unregulated floodplain harvesters seeking additional entitlement, the only source is from this Plan. Landholders who missed out on licences and wishing to maintain their current level of floodplain harvesting in the Plan area (or those seeking additional access) may therefore be seeking entitlement through trade from unregulated river access licences. This would increase the risk of LTAAEL exceedance impacting on environmental and downstream outcomes.

DPE-Water should carefully consider reducing restrictions in these areas to facilitate trade and move extraction out of sensitive environmental areas such as Mallowa Creek. As highlighted in a submission, the Mallowa Creek Trading Zone in the Mehi restricts water trading out of that area as well as within and adjusting provisions could facilitate the movement of entitlement out of the area and into the broader Mehi River Water Source.[281] Enhancing trade to high flows would recognise the connectivity of these waterways during floods. Adjusting trade rules could improve environmental outcomes in sensitive areas.

277 DPE-Water (n.d.) *Floodplain harvesting licence rules in the water sharing plans for Gwydir valley*.
278 Note that the floodplain as commonly described in the area is broader than the gazetted floodplain which is regulated by the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016*
279 DPIE-Water (2018) *Floodplain Harvesting Policy*
280 Floodplain harvesting entitlements for the Gwydir Valley regulated river system - Model scenarios - May 2022 Table 8 Predicted long term (1895 to 2009) average diversions (GL/year) under the Plan Limit (WSP) Scenario and Current Conditions Scenarios to determine growth in use. (Plan limit overbank flow harvesting 91,800 ML per year – Current conditions scenario 121,600 ML per year)
281 Submission: Gwydir Valley Irrigators Association, received February 2022.

As observed by the Gwydir Valley Irrigators Association Inc, the Gwydir becomes '*a series of branching channels that distribute their flows across large areas especially during flood times*'.[282]

DPE-Water's trade assessment should specifically look at high flow and floodplain harvesting trading and should use best available evidence regarding hydrological connectivity across the floodplain.

8.2.5 Below the regulated Gwydir River

This area includes the lower lengths of the Gingham and Gwydir water sources, with about 19 percent of the Plan's unregulated entitlement and an additional 3,348 unit shares of unregulated floodplain harvesting. It contains the Ramsar wetland and directly links to the Barwon-Darling River. The waterways are at high hydrological stress throughout the flow profile and any changes to trading must improve environmental outcomes both instream and downstream.

DPE-Water could assess outward trading, subject to the limits of other water sources. Any trading into these water sources from upstream sources would reduce downstream flows, including to the Barwon-Darling River. Trade into these water sources would also increase capacity constraints within upstream watercourses. DPE-Water must carefully consider the various local risks and potential benefits of changing trade in this area.

NRAR have highlighted the issue of regulated water being released from the regulated river for extraction in the unregulated river.[283] If river transmission losses are not considered these losses are socialised by the downstream unregulated river and eventually the Barwon-Darling. The Active Management Procedures Manual[284] for the Gwydir Unregulated River Water Sources states that active management relies on forecasting flows entering and travelling along the Gingham Watercourse Water Source and Mallowa Creek Management Zone and this is only required if Active Environmental Water is likely to be present in these management zones.

There is also a potential issue around licensees with both regulated and unregulated licences ordering from the regulated river and extracting from the unregulated river which should be addressed. Reduction factors similar to the Water Sharing Plan for the Macquarie Bogan Unregulated Rivers should be considered for application to all licences.[285]

282 *Ibid.*
283 Interview: NRAR, 7 April 2022.
284 NSW Government (2020) *Water Sharing Plan Implementation – Active Management Procedures Manual for the Gwydir Unregulated River Water Sources*
285 Clauses 53(11), (12) and (13) of the *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers 2012*

8.3 Recommendations

R 14	To inform the replacement Plan, DPE-Water should complete a trade analysis assessing the use of water source groupings as the basis for trading rules. This should include but not be limited to: a) the potential for daily access thresholds for high flow access licences which allow a set volume of trade (this requires establishment of low and high flow access licences) b) trade into high flows in various water source groupings while managing LTAAEL exceedance and protecting the environment, cultural values and basic landholder rights c) potential impacts on all flow categories including high flow dependent environmental values and cultural values d) regulated and unregulated floodplain harvesting to assess hydrological stress and consider separate trade rules for these licence categories e) the latest information on connectivity, hydrological stress, HEVAE mapping and cultural assets and values f) interrelationships between the unregulated and regulated plans.
R 15	DPE-Water should remove Clause 73(a)(iii) in the current Plan to mitigate the risk of unlimited trade and all water sources should contain high and low flow trading limits.

9 Restoring Aboriginal water rights, values and uses

The Commission acknowledges that the Gomeroi/Kamilaroi/Gamilaraay, the Yuwaalaraay and Anaiwan people have an intrinsic connection with the lands and water sources of the Plan area. The landscape and its waters provide First Nations people with important links to their history and help them maintain and practice their traditional culture and lifestyle.

This was highlighted in an oral history project undertaken as part of the NSW Wetlands Recovery Program.[286] This project, which include the Gwydir Wetlands, found that:

> *'It is clear that the wetlands are not viewed by Aboriginal community members in isolation but are seen as part of a wider ecological and cultural landscape.'*

The Commission's scope to engage with local Aboriginal stakeholders for this review was challenged by Covid-19, followed by flooding in the Plan area preventing site visits. Acknowledging limitations in engagement for this review, the Commission has identified key issues from available information that will require further engagement during DPE-Water's replacement Plan process.

The Commission continues to identify critical state-wide issues in water sharing plans relating to Native Title, Aboriginal water rights, and the protection of cultural values. Engagement with Aboriginal peoples as part of the draft *Regional Water Strategy* found that:

- DPE-Water needs to better recognise and deliver on cultural water rights
- having the ability to access cultural sites and waterways is important for connection to Country and community wellbeing.
- more culturally appropriate information and education is needed on how governments manage water
- Aboriginal people want more opportunities to manage land and water using their traditional cultural knowledge'.[287]

The Commission acknowledges that DPE-Water has been engaging with Aboriginal stakeholders across multiple aspects of water management in the Plan area, including most recently for the *Gwydir Regional Water Strategy* and water resource plan work. However, as noted in previous reviews, Aboriginal engagement in water planning, monitoring and management has been inconsistent and historically inadequate across NSW, limiting knowledge and support of Aboriginal water values and uses and preventing genuine co-design approaches.[288]

DPE-Water should implement meaningful, culturally appropriate and integrated processes for Aboriginal peoples with relevant knowledge of water management to have input at all levels and stages of water planning, management and monitoring. This could consider existing relationships between other government departments such as Local Land Services with local Aboriginal bodies including Local Aboriginal Land Councils.

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286 NSW Department of Environment, Climate Change and Water (2011) *Aboriginal cultural values of the Macquarie Marshes and Gwydir Wetlands: oral history component*

287 DPIE (2020) *Draft Regional Water Strategy: Gwydir*

288 The Commission notes that DPE-Water had initially been working with key Aboriginal stakeholders as part of a state-wide Aboriginal Water Coalition to develop the Aboriginal Water Strategy and to improve engagement across NSW. However, there were delays and significant barriers, and the group has been disbanded.

The Plan's vision includes to provide for '*the spiritual, social, customary and economic benefits of surface water to Aboriginal communities*'.[289] While the Plan includes updated objectives,[290] strategies and performance indicators relating to Aboriginal cultural outcomes,[291] the provisions do not provide mechanisms to achieve these goals. Key issues for Aboriginal water in the Plan area that should be explored further and addressed in the replacement Plan include:

- there are inconsistencies with the NSW Water Strategy and commitments under the strategy should be a priority (**Section 9.1**)
- the Plan does not proactively consider the cultural and spiritual connections of Native title claimants (**Section 9.1**)
- existing plan provisions have had limited benefits for Aboriginal people and constrain economic outcomes (**Section 9.3**)
- Aboriginal water cultural assets are not adequately identified and protected, and watering needs are not provided for under current water sharing plan provisions (**Section 9.4**)
- controlled water allocations do not currently prioritise Aboriginal rights and uses (**Section 9.5**).

The Commission notes that key barriers to Aboriginal water rights and interests are systemic and institutional and require state-wide legislative, policy and practice change, significant increases in Aboriginal staff and resourcing – as acknowledged in the *NSW Water Strategy*.

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

The Commission's recent water sharing plan reviews have acknowledged DPE-Water's commitments to improve stakeholder engagement with Aboriginal peoples and progress under the *NSW Water Strategy* to address inequality in Aboriginal water rights and access. 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:[292]

- strengthening the role of Aboriginal peoples in water planning and management
- developing a state-wide Aboriginal water strategy and a separate groundwater strategy
- providing Aboriginal ownership of and access to water for cultural and economic purposes
- working with Aboriginal peoples to improve shared water knowledge
- working 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

289 Clause 9(c) of the Plan.
290 Amended in July 2020 as part of the water resource plan process.
291 For example, see Clause 12 of the Plan, which includes an 'objective…to contribute to the maintenance of water quality within target ranges to ensure suitability of water for Aboriginal cultural use' and strategy to 'provide for water associated with Aboriginal cultural values and uses'.
292 DPIE-Water (2021) *NSW State Water Strategy*

signatory to the United Nations Declaration on the Rights of Indigenous People,[293] and contribute to Closing the Gap targets.

However, the NSW Aboriginal Lands Council indicates that the Plan is not consistent with the *NSW Water Strategy*:

> *'The current Plan, at Part 2, 12 Aboriginal cultural objectives, attempts to reflect DPIE's commitment to work with Aboriginal communities however does not reflect DPIE's priority in the NSW Water Strategy to 'Recognise First Nations/Aboriginal People's rights and values and increase access to and ownership of water for cultural and economic purposes', particularly regarding ownership of water.'* [294]

The NSW Aboriginal Lands Council recommends aligning the Plan with the strategy by updating the Plan objectives to include increasing Aboriginal ownership of water for cultural and economic purposes (only 31 ML of water in the Gwydir catchment is held by Traditional owners[295]). The Commission supports these changes but also acknowledges the need to ensure that Plan provisions can give effect to these objectives and Closing the Gap targets.

Details on the timelines and processes for implementing the Aboriginal water strategy and its associated actions are now required – this needs to be co-designed with key Aboriginal stakeholders and with increased Aboriginal staff involvement and leadership. The Commission acknowledges that DPE-Water has recently initiated a Cultural Watering Plans pilot project to inform the department's review of existing policy frameworks and identify opportunities for greater Aboriginal access and ownership of water.[296]

9.2 Native title and connections to Aboriginal cultural and spiritual values

The Plan includes an objective, strategy and performance indicators regarding the availability of water for native title requirements.[297] In line with other updated inland water sharing plans, the Plan includes a requirement to provide water to satisfy Native Title rights where a determination or ILUA is made.[298]

There is a registered native title claim for the Gomeroi people, which was registered in January 2012 before the Plan commenced. The registered native title claim covers a significant part of the Plan area which also has a large and strongly connected Aboriginal population.[299] When the claim was accepted, the Registrar noted that '*there is also an important spiritual element to the claim group members' connection to the natural waterways and water resources within the application area'*.[300]

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293 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*

294 Submission: NSW Aboriginal Land Council, received 22 February 2022.

295 Murray Lower Darling Rivers Indigenous Nations (MLDRIN) and Northern Basin Aboriginal Nations (NBAN) (2021) *Research into how much water is held by First Nations in and Traditional Owner Organisations in the Murray-Darling Basin in 2020: A First Nations Summary*

296 DPE-Water (n.d.) *About Cultural Watering Plans*

297 Clauses 8(c), 9(b),10(f) and 10(h) of the Plan.

298 Clauses 20 of the Plan.

299 Tribunal file NC2011/006.

300 National Native Title Tribunal (2012) *Registration test decision*

The replacement Plan process should recognise the connection of Gomeroi People to Country through culturally appropriate and meaningful engagement and collaboration. Without doing so, the Plan cannot achieve its objectives. As claimants, the Gomeroi have asserted a right to speak for Country and need to be engaged further, including as part of the Plan replacement process, to restore Aboriginal cultural values and uses.

Claimants should be proactively engaged during Plan replacement to identify cultural values and ensure that Plan provisions adequately protect and support these values. Under the claim registration test, registered native title claimants have proven their connection to Country to an extent where government departments must consult with them on certain acts.[301] There are also determinations immediately adjacent to the Plan, whose determinants may have water dependent assets or values linked to the Plan area.

In the development of any new Plan, DPE-Water should draw on native title claims and indigenous land use agreements to inform the identification of cultural assets and plan provisions, as they are often the best available information for a Plan area and can support the achievement of the Plan's cultural objectives. However, some of this information may be culturally sensitive and this must be considered and respected when informing the replacement Plan.

DPE-Water should proactively engage with Traditional Owners and other Aboriginal knowledge holders to identify cultural values and provisions to protect and support these values. Engagement should then continue through Plan development and implementation in line with actions under Priority 2 of the *NSW Water Strategy*.[302]

9.3 Existing provisions have had limited Aboriginal benefits

The Plan includes an 'Aboriginal cultural' licence category to provide access to water but it can only be used for traditional cultural purposes (not commercial or trading activities)[303] and allocations are capped at up to 10 ML per licence per year.[304] At the time of this review no water is assigned for native title and no Aboriginal cultural licences have been issued under the Plan. This is despite aspirations for cultural water in the Plan area that predate the Plan:

> *'There is strong community aspiration for a dedicated cultural allocation of water for the Gwydir Wetlands.'*[305]

Further, there is no allowance for issuing 'Aboriginal community development' licences under this Plan.

There is a long history of trade and sharing of resources as a cultural practice which saw Aboriginal people grow resources on their Country and often venture outside of their own

301 Federal Court of Australia (2022) *Native Title - What is the process for a determination?*
302 Priority 2 is to 'Recognise First Nations/Aboriginal People's rights and values and increase access to and ownership of water for cultural and economic purposes' (see DPE-Water (2021) *NSW Water Strategy*)
303 Clause 37(3) of the Plan states that 'water must be used only for any personal, domestic or communal purpose, including drinking, food preparation, washing, manufacturing traditional artefacts, watering domestic gardens, cultural teaching, hunting, fishing, gathering and for recreational, cultural and ceremonial purposes.'
304 Clause 37(1) of the Plan.
305 NSW Department of Environment, Climate Change and Water (2011*) Gwydir Wetlands Adaptive Environmental Management Plan: a synthesis of information projects and actions*, p.59.

Country for trade and ceremony.[306, 307] However, trade is not recognised in the purpose for which cultural access licences may be granted. A review process needs to consider how to better balance economic opportunity (including those provided under a basic landholder right - stock watering) with that of a cultural purpose.

The Commission has highlighted in previous reports[308] that the limitations associated with Aboriginal cultural licences are inequitable, including that they are highly restrictive, inherently limiting by excluding economic uses[309] and unable to be easily accessed and applied for. These concerns were reflected in stakeholder submissions to this review.

> *'We note that Water Sharing Plans may provide for Aboriginal Cultural Access Licences, Aboriginal Community Development Water Access Licenses, and Aboriginal commercial licences however with a range of constraining parameters. We ask that the NSW Government remove constraints on these licences and provide support to Aboriginal communities and Aboriginal Land Councils to access these licences. These provisions must be improved to better meet the needs of Aboriginal water users, ensure the health of our communities, and protect our cultural sites.'*[310]

Clause 12 (2)(d) of the Plan requires that the Plan contribute to the maintenance of water quality within target ranges to ensure suitability of water for Aboriginal cultural uses. However, the Plan has no clear provisions to specifically protect water quality for this purpose. The Commission recognises that the Aboriginal Water Strategy may consider these issues. However, it remains unpublished with benefits for Aboriginal people delayed.

As part of Plan replacement DPE-Water needs to co-design Plan provisions with Aboriginal people to protect cultural values and ensure that Plan objectives (including economic opportunities) and Closing the Gap targets[311] are realised. Co-design will further ensure plan objectives are aligned with current aspirations and needs (contemporary and traditional).

9.4 Aboriginal cultural assets and values are not protected

The Plan area contains many cultural sites and values that are important to the Aboriginal community and Australia's heritage more broadly.[312] Aboriginal cultural water-dependent sites are recognised throughout the Gwydir region but are not identified in the Plan.[313]

Of note are the Gwydir Wetlands, which are culturally significant for the Gomeroi nation. They support plants such as nardoo, cumbungi, river cooba, coolabah and river red gum. Scar trees, dreaming sites, burial sites and artefacts are also found within the wetlands.[314] Providing water to the wetlands supports Aboriginal people in their custodial roles.

306 Kerwin, D. (2010) Aboriginal dreaming paths and trade routes. Aboriginal. Sussex Academic Press, Eastbourne, U.K.
307 Robert S. Fuller, Michelle Trudgett, Ray P. Norris, Michael G. Anderson (2014) *Star Maps and Travelling to Ceremonies -- the Euahlayi People and Their Use of the Night Sky*
308 See previous reports at Natural Resources Commission (n.d.) *Water Sharing Plan Reviews*
309 Part 2, Section 12(1) of the Plan.
310 Submission: NSW Aboriginal Land Council, received 22 February 2022.
311 Clause 87(b) of the *National Agreement on Closing the Gap*
312 DPIE (2015) *Background Document to the Floodplain Management Plan for the Gwydir Valley Floodplain 2015*
313 DPIE (2020) *Draft Regional Water Strategy: Gwydir*
314 *Ibid.*

Protecting the wetlands and other water-dependent sites across the region is important to Aboriginal people.[315]

Registered cultural assets recognised in the *Gwydir Long Term Water Plan* include Aboriginal ceremony and dreaming sites in Laura Creek Water Source, burial sites in Keera Creek Water Source, Millie Creek and Tycannah Creek, ceremonial grounds/ring in the Lower Gwydir, resources and gathering sites in Gwydir and Barwon water sources, and modified trees across many of the water sources.[316]

In addition, there are a range of other examples of Aboriginal management of lands and waters in the Plan area that should be recognised in the Plan, including:

- Terry Hie Hie Corroboree Ground and Grinding Grooves (an Aboriginal Place) and Terry Hie Hie Aboriginal Area, both under the *National Parks and Wildlife Act 1974*[317]
- State Heritage Inventory sites, including Myall Creek Massacre and Memorial Site, Area near Windsor (site of the Myall Creek Massacre) and Waterloo Creek Massacre Site[318]
- Tarriwa Kurrukun Indigenous Protected Area.[319]

While WaterNSW checks the register for Aboriginal heritage sites when approving works approval applications, the replacement Plan can better recognise and protect key assets. There are no Aboriginal water-dependent cultural sites recognised in the Plan.

The Plan includes a provision allowing amendments to protect identified water-dependent Aboriginal cultural assets after Year 5, including by identifying assets in a schedule.[320] The Commission assumes this timing was provided to allow time for DPE-Water to work with Aboriginal stakeholders to identify assets. However, the Plan provisions were not updated over the ten years of the Plan despite significant work with Gomeroi stakeholders. DPE-Water should continue to engage with Aboriginal Traditional Owners, native title claimants, other groups and knowledge holders in the Plan area to identify and protect water-dependent cultural assets through suitable Plan provisions.

9.5 Aboriginal water rights should be prioritised when delivering controlled allocations

Controlled allocations can occur where a water source is not fully committed and there is unassigned water.[321] The Commission understands that this can occur in circumstances where a licence holder surrenders their licence or entitlement to the Minister for Water, such as where they no longer intend to use the water for irrigation. The licence or entitlement may be cancelled or held by the Minister. Licences that are retained can be reissued to other licence holders via controlled allocation. However, before this occurs risks associated with this action and a prioritisation of needs must be considered, consistent with the principles of the Act.[322]

315 *Ibid.*
316 DPIE-Water (2020) *Gwydir Long Term Water Plan, Part B: Gwydir planning units*
317 DPE (2022) *State Heritage Inventory*
318 *Ibid.*
319 National Indigenous Australians Agency (n.d.) *Tarriwa Kurrukun IPA and Rangers*
320 Clause 77(5) of the Plan.
321 DPE-Water (2022) *Controlled allocations*
322 Section 5 of the Act.

In previous reviews, the Commission has recommended that DPE-Water considers Aboriginal water access and use opportunities before announcing controlled allocations.[323] While no controlled allocations have been announced for unregulated water sources in the Plan area during the term of the Plan, it is unclear if and how Aboriginal water rights and values would be considered when making a controlled allocation order. The Minister is encouraged to codify this process and ensure there is greater transparency around what is considered as part of the risk assessment and assessment of high priority needs before making any future controlled allocations during the term of the replacement Plan.

The process of making controlled allocations needs to be bought into line with the *Water Management Act 2000* where Native Title is prioritised.

9.6 Recommendations

R 16	To better achieve the Plan's Aboriginal water objectives, DPE-Water should continue its current related work, address state-wide issues identified in the Commission's water sharing plan reviews and: a) ensure Plan objectives and corresponding provisions are consistent with the *NSW Water Strategy* relating to Aboriginal peoples' rights and values and increase access to, and ownership of, water for cultural and economic purposes b) consult with Aboriginal stakeholders to accommodate any future native title determinations, and other water access rights for a range of desired uses, including cultural and economic uses c) protect high value water dependent cultural assets in the replacement Plan area, by: i) undertaking detailed engagement with Traditional Owners, native title claimants and other Aboriginal groups and knowledge holders to identify high value water dependent cultural assets in the Plan area and co-design provisions to protect and support these assets ii) reviewing existing provisions to consider if they provide appropriate protection, and revise if appropriate. d) include provisions in the replacement Plan to protect water dependent cultural assets identified in R 16(c)(i), consistent with the existing amendment provision e) prioritise Aboriginal cultural rights and interest when making controlled allocations and codify this process in relevant guidelines and policies.

[323] NSW Natural Resources Commission (2021) *Review of water sharing plans for the Bega and Brogo Rivers Area, Murrah-Wallaga Area, and Towamba River water sources*

10 Protecting town water supply and basic landholder rights

Water sources in the Plan area provide town water supply to several populations. This review identified some areas of improvement and future risks that should be managed in the replacement Plan, including:

- the Plan does not clearly specify protections for town water supplies, which will face continued pressures from population growth and climate change (**Section 10.1**)
- entitlement and basic landholder rights volumes have changed since the Plan was made, with discrepancies potentially impacting on the water source, the environment and water users (**Section 10.210.1**).

10.1 Town water supplies are not adequately protected

About 40 percent of the region's population source their domestic and drinking water from unregulated water sources or water tanks.[324] There are three town water supplies reliant on the Plan's water sources:

- **Uralla:** (population 2,400) Uralla Shire Council manage a 621 ML per year licence for the Rocky River Water Source,[325] drawn from a 500 ML on-stream weir on Kentucky Creek. Current extraction of raw water for Uralla varies from 230 ML to 350 ML per year.[326]
- **Bundarra:** (population 400) Uralla Shire Council manage a 94 ML per year licence for the Moredun Creek Water Source. It is drawn from a pump well adjacent to an 83 ML depression in the Gwydir River, known as Taylors Pond. Average demand is about 47 ML per year.[327]
- **Garah:** Moree Plains Shire Council manage a 43 ML per year licence for the Gil Gil Creek Water Source.[328] Raw water is stored in a 50 ML sedimentation pond off Gil Gil Creek. Residents' drinking water must be sourced from private bores or rainwater tanks.[329]

The Plan does not specify protection of these town water supplies. In comparison, the Water Sharing Plan for the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source 2003, which was merged into this Plan in 2016, recognised protection of town water supplies in its performance indicators.[330] As with other priorities and as raised in previous Commission reviews, the Plan should be specific about the location, required volumes, intended protection of town water supplies and mechanisms to achieve those outcomes.

There is an existing need to improve the security of the Uralla water supply, as well the Bundarra water supply if there is growth in demand or climate change conditions occur.[331] Uralla has been identified as supporting emerging boutique food and tourism-based retail

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324 DPIE (2020) *Draft Regional Water Strategy: Gwydir*
325 DPI (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
326 Uralla Shire Council (2019) *Drought Management Plan*
327 *Ibid.*
328 DPI (2012, updated in 2016) *Water Sharing Plan for the Gwydir Unregulated and Alluvial Water Sources 2012 – Background document*
329 Moree Plains Shire Council (2009) *Drought Management Plan*
330 *Water Sharing Plan for the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Sources 2003*
331 Uralla Shire Council (2019) *Drought Management Plan*

enterprises, and risks to water supply threaten business and investor confidence and tourism appeal.[332]

The 2018 to 2020 drought was the worst on record in the area and saw Uralla's sole water supply dam on Kentucky Creek fall below 25 percent of capacity with arsenic levels above Australian Drinking Water Guidelines.[333] The community was supplied with bottled water until the water treatment plant was modified, and rainfall improved to increase Kentucky Dam's storage levels.[334] In response to this, the NSW Government provided Uralla Shire Council with a $1.5 million grant to investigate and develop an alternative water supply source, initially from groundwater. Uralla's town water supply access rules should be specified in the Plan, and risks from other water users' extraction addressed.

Bundarra – at the junction of Moredun Creek and the Gwydir River – receives flows from eight of the current nine water sources above Copeton Dam. The Commission considers the intent of the Plan's conditions on licences with stricter access rules than the Plan's default 'no visible flow' thresholds (see also **Chapter 6**) are to protect Bundarra's town water supplies through conditions on specific licences in Appendix 4. For Moredun Creek, eight of the 17 unregulated access licences in the appendix have a rule requiring visible flow at Emu Crossing on the Gwydir River. Emu Crossing is upstream of both the town water supply and where Moredun Creek enters the Gwydir River (**Figure 4**). These rules are insufficient to protect town water supply downstream.

Further, the river gauging station Gwydir River at Bundarra is immediately downstream of the town water supply and is the most appropriate gauge for setting access rules but was not used for this purpose. The Commission notes that the Drought Management Plan for Bundarra requires landholders extracting from the same pool as the town water supply to 'stop irrigating when Taylors Pond level falls to 74 percent' capacity.[335] The Commission considers that the Plan should specify legal requirements for access based on downstream gauging, not the Drought Management Plan.

DPE-Water should engage with both Uralla and Moree Plains shire councils to assess risks to any other town water supplies. In particular, it is important that DPE-Water work with Uralla Shire Council to include specific provisions to protect Bundarra's town water supplies in the revised Plan, using the most appropriate gauging stations, and require application to all relevant licences.

332 DPIE (2020) *Draft Regional Water Strategy: Gwydir*
333 Uralla Shire Council (2022) *Uralla Groundwater Project*
334 *Ibid.*
335 Uralla Shire Council (2019) *Drought Management Plan*

Figure 4: Location of Emu Crossing on the Gwydir River showing how Moredun Creek is downstream of the crossing, which is the Plan's cease to pump reference point, rather than the gauging station downstream of Bundarra

10.2 Estimated basic landholder rights have increased

The Plan's LTAAEL definition includes the volume of basic landholder rights extraction at the time of Plan commencement,[336] plus extraction by licences (1990s average), floodplain harvesting (1990s average) and plantation forestry interception as at 2009) meaning any increase in basic landholder rights extraction increases the risk of the LTAAEL being exceeded.

Under the work carried out for the water resource planning process, 10 water sources[337] were categorised as having high risk to water available for the environment from growth in domestic and stock basic landholder rights, with a further five uncategorised due to a lack of data.[338] This excludes growth in harvestable rights, which may be significant, and the Native Title claim from the Gomeroi People (NSD37/2019) that, if determined, would affect basic landholder rights entitlement.

Entitlement shares and basic landholder rights volumes have changed since the Plan was made. The Commission continues to hold the view that DPE-Water should update the Plan's

336 Basic landholder rights for the original Plan's water sources when the Plan commenced in 2012, plus basic landholder rights from the Rocky Creek Water Source, Cobbadah Water Source, the Upper Horton Water Source and the Lower Horton Water Source at the 2003 commencement of the *Water Sharing Plan for the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source 2003*

337 Booroolong Creek, Georges Creek, Gurley Creek, Laura Creek, Millie Creek, Slaughterhouse Creek, Thalaba Creek, Tycannah Creek and Upper Horton water sources.

338 DoI (2018) *Risk assessment for the Gwydir Surface Water Resource Plan Area (SW15): Part 1, Schedule D*

estimated entitlement shares and basic landholder rights whenever the Plan provisions are reviewed and updated.

Updating these figures are important to:

- provide transparency and clarity to licence holders, including valuable information as to the potential risk of future water allocation reductions once the department has established numeric LTAAELs and undertakes appropriate LTAAEL compliance assessments
- indicate if there are emerging risks in a water source that need to be reviewed and assessed
- provide a trigger that could be used by DPE-Water to initiate future Plan reviews.

If actual entitlement shares and basic landholder rights volumes are higher than what is currently included in the Plan, there is risk that Plan provisions may be inadequate to protect environmental values of these water sources and basic landholder rights. Although there are several possible reasons for the difference between the Plan's statement of requirements for water for extraction (share components) and entitlement under the NSW Water Register, including expiration or cancellation of licences, past Plan amendments have provided DPE-Water with opportunities to update the level of entitlements in each water source.

When undertaking the annual LTAAEL compliance assessment, DPE-Water should review the Plan's entitlement and estimated basic landholder rights volume. If the Plan is amended for any reason, the Plan should be updated with the most recent figures. DPE-Water should also complete a risk assessment if the entitlement and basic landholder rights volume changes by over 5 percent in any water source to determine if Plan provisions remain adequate to protect the water source, the environment and basic landholder rights.

10.3 Recommendations

R 17	DPE-Water should work with councils to inform the replacement Plan regarding specific provisions to protect town water supplies, using the most appropriate gauging stations. Relevant provisions included in the replacement Plan should be applied to all relevant licences/works approvals.
R 18	DPE-Water should: a) annually review the Plan's entitlement shares and estimated basic landholder rights volume and update these figures whenever the Plan is being reviewed or amended b) undertake a risk assessment if the entitlement and basic landholder rights estimate changes by more than 5 percent in any water source to determine whether Plan provisions remain adequate to protect the water source, the environment and basic landholder rights.

11 Monitoring, evaluation and reporting

A lack of monitoring, evaluation and reporting (MER) is a consistent theme raised in the Commission's reviews of water sharing plans. This is largely due to a lack of water sharing 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 in the Plan area, and how environmental assets respond to changes in flow (**Section 11.1**).

The Commission also recognises that DPE-Water is working to improve MER arrangements for water resource plans and water sharing plans (**Section 11.2**). It has prepared the *Gwydir Surface Water Monitoring, Evaluation and Reporting Plan*[339] as part of its work for the Gwydir Surface Water Resource Plan. In addition, the Commission welcomes DPE-Water's work on a NSW Water Sharing Plan Evaluation Framework including the development of methods statements that are being piloted.

The Commission notes the *NSW Water Strategy* includes an action under Priority 3 to '*invest in long term and effective monitoring, evaluation, reporting and research*.'[340] However, the Commission notes the lack of clarity around long-term future funding that will be available for water sharing plan monitoring and evaluation actions.

The Commission considers it is critical that DPE-Water receives (or reallocates) adequate funding to undertake this function as a priority. Funding should be commensurate with the importance of MER for assessing water sharing plan effectiveness and will support adaptive management The Commission understands that funding for water sharing plan MER activities is predominantly allocated from the Independent Pricing and Regulatory Tribunal NSW final determination of charges that the Water Administration Ministerial Corporation can levy on licence holders for its water management services over the period of 4 years. The current determination was handed down in 2021 and expires on 30 June 2025.

Section 11.3 outlines key knowledge gaps that should be addressed.

11.1 Existing monitoring programs in the Plan area

Although there is a lack of monitoring and reporting against the Plan's performance indicators, there are other existing monitoring programs that provide some insight into environmental condition and outcomes being achieved in the Gwydir catchment. However, they cannot be directly attributed to the Plan provisions given they are largely associated with the use of environmental water holdings and environmental water allocations from the regulated river. Nonetheless, the Commission recognised that provisions that are intended to protect these environmental releases can contribute to realising these outcomes.

Much of the monitoring that has occurred to date has focused on the regulated Gwydir River and sites that are the recipients of environmental water releases from the regulated river, such as the Gwydir wetlands in the Plan area. This includes:

339 NSW DPE (2019) *Gwydir Surface Water Monitoring, Evaluation and Reporting Plan*
340 DPIE-Water (2021) *NSW Water Strategy*

- programs funded by the Australian Government such as the Flow-MER Program (which continues the Long Term Intervention Monitoring (LTIM) Project for the Gwydir River system)[341]
- field surveys undertaken by DPE EHG staff, including annual waterbird, frog and vegetation surveys[342]
- aerial waterbird surveys.

In addition, LLS advised that it is working with the University of New England to generate EcoHealth report cards.[343] Three of four years of sampling is complete with sites upstream of the Copeton Dam wall (upper Gwydir). The intent is to publish the report cards online.

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. In addition, DPE Water studied cease-to-pump rules and macroinvertebrates at sites in Halls Creek, Myall Creek, Rocky Creek and the Horton River which the Commission has referred to in its water sharing plan review (see **Chapter 4**).

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

11.2 Pathways towards improved MER

11.2.1 Water sharing plans

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

- updating water sharing plan objectives as part of Plan amendments in 2020 to make them measurable and more meaningful
- establishing a Water Planning Implementation unit in DPE-Water including a Water Evaluation and Reporting team that is focused on improving MER through the development of DPE-Water's NSW Water Sharing Plan Evaluation Framework which intends to inform future water sharing plan reviews
- establishing a NSW Water Sharing Plan Implementation Program that will track and report on progress of implementation of water sharing plan MER activities
- investing 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.

341 Commonwealth Environmental Water Office (2021) *FLOW Monitoring, Evaluation and Research: Selected Area: Gwydir*
342 NSW DPI (2018) *Gwydir surface water resource plan: Gwydir surface water monitoring, evaluation and reporting plan - Schedule J*
343 Interview: Northern Tablelands Local Land Services, 3 May 2022.

11.2.1 Water resource plan

In addition to strengthening water sharing plan MER, DPE-Water has also developed a Water Resource Plan MER Framework and customised environmental MER plans as part of the development of water resource plans. These seek to integrate MER activities across agencies and map out monitoring efforts by research theme.

The Commission has considered the *Gwydir Surface Water Resource Plan*'s MER plan, which was designed to meet Basin Plan reporting requirements.[344] The environmental MER plan is based on program logic developed for the water sharing plan objectives, but also objectives from the *Gwydir 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 can be used to infer areas for further research.[345] The MER plan also maps out existing monitoring programs by research theme.

11.2.2 Areas for improving MER

There is room for improvement of water sharing plan MER:

- while the amended Plan includes clearer, measurable objectives, important 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
- improved real-time gauging and water level monitoring is required to support MER
- there do not appear to be clear roles and responsibilities or adequate resources for overseeing and undertaking water sharing plan MER, which generates risks to implementation.

Given limited resources, it will be critical for DPE-Water to continue to identify efficiencies, focus on the most critical water sharing plan MER needs and continue to work collaboratively with other government agencies and academic institutions to coordinate monitoring activities that support water sharing plan evaluation. MER activities should be prioritised based on value and risk. Water source prioritisation and transferability studies currently underway by DPE-Water will help to target MER effort and resourcing.

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. It is preferable that public reporting of available MER occurs at regular intervals and in line with the NSW Water Sharing Plan Evaluation framework which currently in development.

There is also a need to report on extreme events that occur during the term of a water sharing plan. These have already been observed during the term of the current Plan that is the subject of this review. Specifically, there should be greater visibility regarding water management arrangements during extreme events and how they influence Plan outcomes.

11.3 Knowledge gaps

Submissions to this review clearly highlight the industry and community demand for adequate MER:

344 NSW DPI (2018) *Gwydir surface water resource plan: Gwydir surface water monitoring, evaluation and reporting plan - Schedule J*

345 *Ibid.*

> '*The plan, including its implementation and enforcement have had significant but seriously limited success in this regard [to achieving environmental outcomes]. The full extent of these limitations cannot be gauged without access to comprehensive monitoring data.*'[346]
>
> '*As with previous WSP reviews or WRP development programs, the ability for industry, any community groups or individuals to effectively review the plan and provide solutions, remains hampered by two key barriers;*
> *1. The poorly defined objectives and performance measures of the original plans prior to their update in 2020; and*
> *2. The lack of publicly available data which could be interrogated to build a case for or against the success, of these measures.*
> *The lack of investment in measurement and monitoring in unregulated systems compared with well-developed and managed regulated or groundwater water sources, effectively undermines this review. In many cases, no monitoring was undertaken at all*'.[347]

Given limited resources, it is critical that DPE-Water continues identifying efficiencies and works collaboratively with other government agencies and academic institutions to coordinate monitoring activities. MER activities should be prioritised based on value and risk, and public reporting of MER findings should be prioritised to improve transparency and public awareness around Plan outcomes.

Further monitoring and research of the unregulated river water sources is required to improve system knowledge, refine Plan provisions and support whole of catchment planning. They include, but are not limited to:

- quantifying historic levels of extraction and estimating current levels of extraction (where not metered or measured), including for LTAAEL compliance assessment (**Chapter 3**). As highlighted in a submission to this review, '*if we are to have an informed debate about what worked well and discussions around areas of improvement, we need rather basic but more accurate information on water usage… This issue is not new, and we did raise this during the development of this Plan in 2011*'.[348]
- connectivity between water sources at different levels of flow
- cumulative impacts of extraction including floodplain harvesting on unregulated river water sources and their water dependent ecosystems
- the location of high-quality drought refugia, and impacts of climate change and extended droughts on waterhole persistence, as well as their connectivity to and dependence on regulated river flows
- water-dependent Aboriginal cultural values in the Plan area and their flow needs (noting that DPE Water has recently commenced a project and called for expression of interest to develop cultural watering plans)
- the importance of connectivity between water sources for carbon and nutrient pathways and options for Plan rules to reflect and protect connectivity,[349] in accordance with the water management principles of the Act and the objectives of the Plan

346 Submission: Inland Rivers Network, 18 February 2022.
347 Submission: Gwydir Valley Irrigators Association, February 2022.
348 *Ibid.*
349 NSW DPI (2018) *Gwydir surface water resource plan: Gwydir surface water monitoring, evaluation and reporting plan - Schedule J*

- review of gauging requirements and utilisation of existing gauges to increase application of numeric flow-based access classes (Commence to pump) in high value or high-risk water sources, so as to better support the water sharing principles in protection of water dependent ecosystems and basic landholder rights.

11.4 Recommendations

R 19	By June 2025, to improve Plan-specific MER, DPE-Water should: a) expedite the finalisation and publication of DPE-Water's water sharing plan evaluation framework and methods manuals and ensure there is multi-agency support and oversight of their implementation b) identify feasible and appropriate resourcing to support ongoing MER activities as outlined in the NSW Water Strategy c) specify timely reporting and publication requirements of the results of MER activities to support transparency and adaptive management d) identify and address critical knowledge gaps to support adaptive management e) use the recently developed prioritisation framework to prioritise MER activities based on values and risk.

12 Compensation implications of recommendations

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. The Commission notes that Section 87AA indicates for instance that compensation is not payable due to a reduction in water allocation if *'the reduction in water allocations is for the purpose of restoring water to the environment because of natural reductions in inflow to the water source, including but not limited to changes resulting from climate change, drought or bushfires*.' However, the Commission considers that compensation might be payable under Section 87AA in relation to some recommendations listed in **Table 7**.

Table 4: Recommendations that may trigger compensation

Establishing sustainable extraction	
R 2	To support sustainable extraction and improve transparency, as soon as possible in the next two years, DPE-Water should: e) review the impact of the Plan's carryover provision on the risk of exceeding LTAAEL(s) and risk to low flows. If the risk is considered significant, only apply carryover provisions to high flow access licences.
R 4	To support adaptive management during the next Plan period, the replacement Plan should include a provision requiring DPE-Water to: a) determine the sustainable level of extraction by Year 5 based on best available ecological requirements, hydrological and historical and projected climate information b) use these levels to define the Plan's LTAAEL(s) for each extraction management unit.

R 5	As a priority in the next two years, DPE-Water should complete a hydrological analysis to determine the impacts of the Plan's five-year LTAAEL compliance assessment rule compared to the more common three-year averaging approach. This should consider if there is a material difference between the two assessment time scales, and if the five-year time scale risks environmental or other outcomes. DPE-Water should use this analysis to inform the replacement Plan's provisions.
R 9	As part of the Plan replacement, ensure that the Plan's rules effectively provide for and protect connecting flows to the Barwon River to align with the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*'s contribution to downstream flow targets.
Supporting connectivity objectives	
R 10	To inform the replacement Plan and ensure downstream flows are maintained to the Barwon-Darling, DPE-Water should: a) define the flows from the Plan water sources required to support downstream outcomes and assess whether Plan provisions support these outcomes.
Supporting equitable water sharing	
R 11	As part of the replacement Plan, to ensure access is equitable within the Plan area and downstream of the Plan, DPE-Water should: a) include appropriate minimum cease to pump thresholds (as based on Recommendation 6b) in the body of the Plan for application to all licences in that water source or management zone, and specify that daily access conditions are mandatory conditions on access licences.

These recommendations 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. However, these changes would also be necessary in part due to natural reductions in inflows due to climate change, which is not compensable. DPE-Water would need to undertake further analysis to determine compensation implications during Plan replacement.

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. These include the ability to:

- add, remove or modify an extraction management unit, including the water sources to which an extraction management unit applies
- amend existing flow classes, establish new or additional flow classes or amend the flow reference point in order to establish TDELs and IDELs, excluding the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Source
- to specify different dealing rules, taking into account any review that may be conducted
- include rules to facilitate active management to share flows, including requiring the taking of water to be carried out in accordance with Ministerial notices or announcements or to require licence holders to express interest in accessing their entitlement during an event

- to add, modify or remove provisions relating to floodplain harvesting (unregulated river) access licences

In particular, the Commission acknowledges that **Recommendation 3a** may well lead to a reduction to current AWDs. 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.