NSW GOVERNMENT

Natural Resources Commission

Final report

Review of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010

May 2020

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 Peel area, the Commission pays its respects to the Gomeroi (also identified as Kamilaroi, Gamilaraay, Gamilaroi and Kamilarai) Traditional Owners past, present and future, as well as other Aboriginal peoples for whom these waterways are significant. The Commission hopes that the involvement of Aboriginal peoples and Local Aboriginal Land Councils throughout the review process will help to shape collaborative water planning and sharing that is beneficial to Aboriginal peoples and their Country.

Enquiries

Enquiries about this report should be directed to:

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

Document No. D19/5337

ISBN: 978 1 925204 52 0

Acronyms and units of measurement

Act	the *Water Management Act 2000* (NSW)
AWD	Available water determination
CEWO	Commonwealth Environmental Water Office
Commission	the Natural Resources Commission
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DoI-Water	Former NSW Department of Industry – Water
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
DPI-Fisheries	Department of Primary Industries – Fisheries
DPIE-EES	Department of Planning, Industry and Environment – Environment, Energy and Science (the former Office of Environment and Heritage)
DPIE-Water	Department of Planning, Industry and Environment – Water
EWAG	Environmental water advisory group
GL	Gigalitre (unit of volume equivalent to one billion (1×10^9) litres
IQQM	Integrated Quantity/Quality Model
LTAAEL	Long-term annual average extraction limit
MDBA	Murray Darling Basin Authority
MER	Monitoring, evaluation and reporting
ML	Megalitre (unit of volume equivalent to one million (1×10^6) litres
Namoi Regulated Plan	*Water Sharing Plan for the Upper and Lower Namoi Regulated River Water Sources 2016*
Namoi Unregulated Plan	*Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012*
NARCliM	NSW and ACT Regional Climate Modelling Project
NSW	New South Wales
OEH	Former NSW Office of Environment and Heritage
Plan	*Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*
SMART	Specific, measurable, achievable, relevant and time-bound

Table of Contents

Executive summary

The Natural Resources Commission (the Commission) has reviewed the *Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010* (the Plan) in line with its statutory responsibility under the *Water Management Act 2000* (the Act).[1]

The Commission has assessed the extent to which the provisions of the Plan have contributed to the achievement of environmental, social and economic outcomes, and recommended where changes to the Plan provisions are warranted.

The Commission has concerns about the current Plan's ability to manage severe drought and to secure Tamworth's water supply. The Peel Valley is currently experiencing the worst drought on record. The latest three-year rolling total average rainfall is the lowest since records began in 1878 and inflows to Chaffey Dam over the two years to March 2020 are less than half that of the previous worst two-year drought on record (6 gigalitres (GL) compared to 13 GL in 1964-66). The current drought has had a significant impact on communities, the environment and water users, and has highlighted a range of issues with the Plan.

The NSW Government is undertaking a series of actions, including infrastructure upgrades and development of the *Namoi Regional Water Strategy* to improve water security in the region. Strategic planning and investment are welcome but do not address some fundamental issues in the Plan regarding its knowledge base, environmental protections, risk management, town water security and transparency for water users.

Advice on Plan replacement and amendment

Following a comprehensive analysis of available evidence and public consultation, the Commission has identified a range of issues that justify replacing the Plan in a staged manner. Addressing these issues will improve the health of the water sources, provide greater water security for Tamworth and its regional industries, and enable best practice water management.

The Commission's review has identified a range of issues that justify significant amendments to the replacement water sharing plans, as these plans in their current draft form largely retain issues identified in the current Plan. Major areas of concern include:

- A lack of transparency around the development and implementation of key Plan provisions. For example, the long-term average annual extraction limit (LTAAEL) for the unregulated water sources is not quantified numerically and the modelling for the regulated rivers LTAAEL is disputed by water users. Further, the Plan spreads the risk of increased extraction in the Peel Unregulated River and Alluvium water sources, and the waterways providing utility water supply to Tamworth, across other stakeholders in the Peel and Namoi valleys. These issues create uncertainty around future water availability for businesses and local water utilities and erode confidence in water management in the Peel Valley (**recommendations 2-9**).
- Limited knowledge of environmental water requirements when the Plan was developed. The Department of Planning, Industry and Environment – Energy, Environment and Science's (DPIE-EES) recently finalised *Namoi Long Term Water Plan* addresses these

[1] Parliament of NSW (2009) *Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010.* Available at: https://www.legislation.nsw.gov.au/#/view/regulation/2010/134/full.

knowledge gaps and should inform the replacement water sharing plans (**Recommendation 10**).

- Some Plan provisions do not sufficiently protect water sources and their water dependent ecosystems. For example, the Plan does not adequately protect the environmental contingency allowance (ECA), which is intended to reinstate natural flow variability, from extraction. This limits the effectiveness of this provision to deliver environmental outcomes (**Recommendation 11**).
- The Plan has a high level of entitlement and cannot adequately respond to risks such as those from prolonged drought, changes in water user behaviour, population growth or climate change. It does not proactively secure access to water for users in line with the priorities of the Act (**recommendations 14-18**). For example, the Plan does not have adequate mechanisms to protect critical needs or the local water utility supply considering natural variability in rainfall and inflows.
- There are conflicting views around the extent and variability of connectivity in alluvial water sources due to knowledge gaps. Contention will continue until the NSW Government's groundwater studies and modelling are completed and reviewed, risking compromising Plan outcomes and community trust in water management (**recommendations 19-22**).

As part of the water resource planning process required under the Commonwealth *Murray-Darling Basin Plan 2012* (*Basin Plan*), DPIE-Water proposes to split the Plan's water sources across four water sharing plans (separating the regulated, unregulated, alluvial and fractured rock water sources) to align them with the water resource plan areas set by the *Basin Plan*. The water sharing plans are currently in draft form and are expected to commence on 1 July 2020.[2] As part of this, DPIE-Water intends to include the regulated, alluvial and fractured rock water sources in new water sharing plans and amend an existing Namoi plan to include the Peel unregulated rivers, forming the *Water Sharing Plan for the Namoi and Peel Unregulated Rivers Water Sources 2012*. This plan will expire in 2023 but, like the new plans, does not address the particular issues with the Peel Plan identified in this report.

The timeline and process for splitting the Plan may limit opportunities to address some issues identified in this review. Splitting the Plan risks fragmenting management if appropriate links are not included between the four water sharing plans to support effective management of the connected water sources.

Given the severe drought, development of the *Namoi Regional Water Strategy* and uncertainties around infrastructure changes, the Commission recommends a staged approach to address the issues identified in this review:

- **by 1 July 2020**, address priority issues carried over from the current Plan to the draft *Water Sharing Plan for the Peel Regulated River 2020* (**recommendations 3, 10, 11 and 19**)
- **by July 2022**, address other issues identified in this review that are carried across from the current Plan to the four replacement water sharing plans. This will provide adequate time for additional studies and consultation, alignment with the *Namoi Regional Water Strategy,* which is due to be released in 2021, and replacement of the *Water Sharing Plan for the Namoi and Peel Unregulated Water Sources 2012* in 2023.

Table 1 provides an overview of the review findings and recommendations.

[2] Minister Pavey at NSW Budget Estimates on 10 March 2020, pg. 10-11. Available at: https://www.parliament.nsw.gov.au/committees/pages/budget-estimates.aspx

Findings and recommendations

Table 1: Overview of findings, recommendations and suggested actions
(* denotes initiatives that should be undertaken across NSW to support outcomes in all water sharing plans)

Overall advice on Plan replacement	
Recommendation 1	DPIE-Water should: a) by 1 July 2020, address priority issues carried over from the current Plan to the draft *Water Sharing Plan for the Peel Regulated River 2020* (**recommendations 3, 10, 11 and 19**) b) by July 2022, address other issues identified in this review that are carried across from the current Plan to the four replacement water sharing plans. This will provide adequate time for additional studies and consultation, alignment with the *Namoi Regional Water Strategy* to be released in 2021 and replacement of the *Water Sharing Plan for the Namoi and Peel Unregulated Water Sources 2012* in 2023.
Manage available water determinations, extraction and variability	
Finding	Stakeholders raised concerns with DPIE-Water and the Commission over the accuracy of the Integrated Quantity/Quality Model (IQQM), which models the operation of the dams and tributaries to meet water needs in the Peel River from Chaffey Dam to Carroll Gap. DPIE-Water updated the IQQM in 2017, including a recalibration, but did not produce a calibration report and stakeholders have been critical of the model inputs. DPIE-Water is currently replacing the IQQM in the Peel with an eWater Source model.
Recommendation 2	By 1 July 2020, commit to commissioning an independent review of the Peel eWater Source model, and complete and publish the findings by 1 July 2022 to improve transparency and build community trust.
Finding	There is a unique two-step process to assess if there has been growth in water extraction and determine compliance with the Peel Regulated River Water Source LTAAEL. The assessment generally used across NSW Basin plans is only triggered in the Peel Regulated River Water Source if an initial comparison of the observed and simulated extractions over the preceding 10 years of LTAAEL compliance assessment is over 120 percent of the modelled 10-year average extraction. This is a reactive, blunt test that delays the implementation of mitigation measures if growth in water use occurs.
Recommendation 3 (priority)	By 1 July 2020, include an enabling provision to bring the Peel Regulated River Water Source LTAAEL assessment process in line with other NSW Murray-Darling Basin water sharing plans by removing the 10-year rolling average comparison from the LTAAEL assessment measures.
Finding	The Peel unregulated river water sources do not have a numeric LTAAEL and are managed under an LTAAEL for the Namoi Unregulated Rivers Extraction Management Unit. This does not allow for transparent or targeted management of the Peel unregulated rivers. Further, the Namoi Unregulated Rivers Extraction Management Unit LTAAEL was based on licensee surveys undertaken in 2002 for the years 1993-99 for the purpose of volumetric conversions, which have not been revisited. LTAAEL compliance has not been assessed during the Plan period and DPIE-Water has not completed a documented risk assessment to justify this inaction. The NSW metering reforms will only require around a third of licensees in the unregulated water sources to be metered over the coming years. Depending on the relative

	volume of allocation held by these licensees, future unregulated river LTAAEL compliance may be unable to rely solely on metering results.
Recommendation 4	By 1 July 2020, commit to reviewing the historic licence conversion surveys at the water source scale, and compile a follow up survey and risk assessment by 1 July 2022 to: a) estimate historic and current extraction at a water source scale, and therefore the potential for activation of sleeper licences b) examine and engage with stakeholders, and publish the benefits and impacts of having a separate numeric LTAAEL for the Peel unregulated rivers, and implement any resulting recommendations c) enable transparent management with annual LTAAEL compliance reports.
Recommendation 5	By 1 July 2022, publish and implement a method of assessing extraction and LTAAEL compliance in unregulated water sources.
Finding	The boundaries of the Peel Alluvium Water Source defined by the Plan map do not include alluvial sediments along the minor tributaries. As such, any bores in alluvial aquifers on these tributaries would be assigned to the Peel Fractured Rock Water Source, reducing the ability to manage extraction risks. This also prevents licensees from accessing more flexible account management rules under the Peel Alluvium Water Source.
Recommendation 6	By 1 July 2022, complete the following actions, incorporating stakeholder engagement, and amend the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* to accommodate potential changes due to recommendations (b) to (d): a) review bore logs to determine if any licences in the Peel Fractured Rock Water Source are extracting from an alluvial aquifer rather than fractured rock b) assess the potential volumes of alluvial extraction relative to fractured rock extraction c) publish the results and, if extraction potential from alluvial aquifers under the Peel Fractured Rock Water Source is significant, outline and consult on steps to manage risks d) if (a)-(c) are addressed, include carryover provisions for the Peel Fractured Rock Water Source under the amendment clause.
Finding	The ratio of entitlements to the regulated and alluvial LTAAELs in the Peel Valley is high, which presents a risk to water management in the region. The Plan's unique LTAAEL assessment process cannot identify and respond to growth in extraction within acceptable timeframes, exposing the valley to environmental, social and economic impacts from decreased flows resulting from the potential rapid activation of previously unused 'sleeper' entitlement. This means that the Plan and its management currently rely on water licensee behaviour remaining relatively consistent.
Recommendation 7	By 1 July 2020, commit to undertaking the following actions over the following two years: a) model the potential for LTAAEL exceedance for all water sources under various scenarios, including full activation of sleeper licences. This modelling should be publicly reported and accompanied by a

	description of the potential environmental, social and economic risks, and mitigation strategies for those risks b) proactively and transparently manage the risk of sleeper licences activating and report publicly on this management c) as part of the *Namoi Regional Water Strategy*, investigate licence activation risks, consider economic scenarios (over the 30- to 50-year timeframe) and propose options to manage risks using Plan amendments or broader structural adjustment (such as buybacks or retiring licences as occurred in the major inland groundwater systems) d) engage with water users and the wider community on actions (a)-(c) and make any recommended plan amendments by 1 July 2022.
Finding	To limit local impacts of growth in extraction against the regulated and unregulated river LTAAELs on specific water user groups, the Plan requires the available water determinations (AWDs) to be reduced across a broad group of disconnected water users. This has the potential to penalise water users in disconnected catchments.
Recommendation 8	By 1 July 2022: a) support any provisions in water sharing plans that distribute impacts to other water sources or water sharing plans with clear objectives b) publish targeted, local mechanisms to address LTAAEL exceedance and resulting local impacts c) to complement this, by 31 December 2020, publish measures to manage and report on all relevant LTAAELs at a water source or Peel Valley scale.
Finding	The Plan does not have the mechanisms to adequately protect critical water needs considering natural variability or climate change. The current AWD process is not transparent and has limited capacity to manage dry periods, as it cannot effectively limit extraction without disproportionately impacting active licensees because of the high level of entitlement.
Recommendation 9	By 1 July 2022, incorporate the results of the following actions into the water sharing plans: a) transparently model and publish the Peel Valley's reliability of supply for each licence category and the volumes of water remaining in-stream in a range of climatic conditions at a time-scale appropriate to show short- and long-term effects of variability and various needs of licensees and the environment b) consult with stakeholders and develop Plan provisions and incident response plans to reduce the risks to environmental requirements, town water supply, basic landholder rights and domestic and stock needs, and provide greater certainty to licensees to support economic outcomes c) if results from (a) show reliability is inadequate, use inputs from (b) to propose mechanisms to resolve this through the *Namoi Regional Water Strategy*, considering mechanisms within and external to the Plan d) document rules for setting AWDs to allow for proactive and transparent management of water shortages under a greater range of

	scenarios and climatic conditions modelled as part of the *Namoi Regional Water Strategy*.
Deliver environmental outcomes	
Finding	When drafted over ten years ago, the Plan lacked sound knowledge of environmental water requirements. The development of the *Namoi Long Term Water Plan* largely fills this critical gap. It sets out what is required to maintain or improve environmental outcomes in the Peel and broader Namoi River Valley and can be used to underpin environmental water provisions. Plan provisions do not adequately provide for base flows in the Peel Regulated River which are important for providing connectivity between pools and riffles and supporting fish movement, or small freshes important for longitudinal connectivity. Plan provisions also do not adequately provide for low flows in several of the unregulated tributaries.
Recommendation 10 (priority)	By 1 July 2020, recognise the need to align environmental water provisions in the *Water Sharing Plan for the Peel Regulated River Water Source 2020* and *Water Sharing Plan for the Namoi and Peel Unregulated River Water Sources 2012* with the recently finalised *Namoi Long Term Water Plan*. Include amendment provisions in these plans that enable alignment to occur and set a timeframe for alignment by 1 July 2022.
Finding	Plan provisions do not adequately prioritise or protect the Plan's ECA in line with the Act, potentially constraining its delivery of environmental outcomes. For instance, the ECA: a) can be extracted under certain conditions for direct irrigation posing a risk to its effectiveness in reinstating natural flow variability and achieving environmental outcomes b) has releases that take lower priority than access licence water orders where the capacity to release water from Chaffey Dam is insufficient to meet both purposes on the same day c) is subject to the general security AWD, which constrains the amount of ECA to potentially less than the entitlement of 5,000 megalitres (ML) per water year d) cannot be carried over from one year to the next, which means any unused water is forfeited, limiting its strategic use to achieve environmental outcomes. **Note:** In relation to (b) the Commission acknowledges that the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* provides for channel capacity sharing between the environmental water allowance (currently known as the ECA) and water access licence orders. This is an improvement upon the arrangements in the current Plan, but the Commission believes it still does not adequately meet the requirements of the Act and may still impact the effectiveness of the ECA in meeting specific environmental objectives.
Recommendation 11 (priority)	By 1 July 2020: a) update the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* to include an amendment clause that allows for changes to planned environmental water provisions (for example, based on environmental water requirements in the *Namoi Long Term Water Plan* or potential for carryover of the ECA).

	By 1 July 2022: b) transition from shared channel capacity arrangement to prioritise release of the ECA. The Namoi-Peel Environmental Water Advisory Group should engage with stakeholders in planning for environmental releases. By 1 July 2022, ideally as part of development and consultation on the *Namoi Regional Water Strategy*, conduct studies into: c) removal of clauses 41(4) and 41(5) from the *Water Sharing Plan for the Peel Regulated River Water Source 2020* (Clause 62 in the current Plan), with changes to plan provisions within one year of completion of the study d) the potential for carryover of the environmental water allowance (currently known as the ECA) to provide for more strategic use of environmental water over multiple years and amend the plan within one year of completion of this study, if warranted.
Finding	Delays in implementing access rules are potentially impacting surface water flows and pose a risk to groundwater dependent ecosystems and instream ecological values. Access rules for the unregulated rivers do not effectively protect parts of the flow regime, including very low flows. Visible flow rules for unregulated river reaches are ambiguous around when water can be taken, and thresholds based on river height and gauges to measure this are not accurate. Access rules should be updated to reflect improved understanding of environmental water requirements from development of the *Namoi Long Term Water Plan*.
Recommendation 12	By 1 July 2022, review access rules (commence and cease to pump thresholds) in the *Water Sharing Plan for the Namoi and Peel Unregulated River Water Sources 2012* based on: a) improved understanding of environmental water requirements from the development of the *Namoi Long Term Water Plan* b) mapping of instream values based on the High Ecological Value Aquatic Ecosystem framework c) local knowledge of the water needs of landholders. **Note:** the review of access rules, including social and economic impacts and consultation with water users could occur as part of the development of the *Namoi Regional Water Strategy* and must be completed in time to inform replacement of the *Water Sharing Plan for the Namoi and Peel Unregulated Water Sources 2012*.
Finding	Except for high priority groundwater dependent ecosystems listed in Schedule 4, the Plan does not clearly identify the ecological values and assets it seeks to protect or the components of the flow regime that maintain these assets and values.
Recommendation 13	By 1 July 2022, address knowledge gaps regarding the location, needs and values of water dependent ecosystems (instream and groundwater dependent ecosystems) that the new water sharing plans seek to protect. This should include mapping of key habitat features, where practical. DPIE-Water should also include mapping of instream values developed from application of the High Ecological Value Aquatic Ecosystem framework as schedules in the water sharing plans. This would improve transparency and clarity about the values that the plan seeks to maintain and protect.

Meet the needs of water users	
Finding	The Plan does not explicitly protect basic landholder rights on the regulated river, despite the Act requiring water sharing to protect basic landholder rights as a second priority to protecting the water source and its dependent ecosystems.
Recommendation 14*	By 1 July 2022: a) include provisions to better protect stock and domestic basic landholder rights throughout the Plan area b) set aside a defined volume of water to maintain ongoing supply for basic landholder rights, domestic and stock, and local water utility licences, considering the findings of the *Namoi Regional Water Strategy*.
Suggested action A*	Recommence processes to develop the *Reasonable Use Guidelines* for basic landholder rights by 31 December 2020. The agreed standards should be reflected in amendments to the replacement water sharing plans.
Finding	The basic landholder rights for native title are not adequately supported with amendment provisions to ensure they are implemented following native title determinations and other land or water use agreements.
Recommendation 15*	By 1 July 2020, amend the replacement plans to include a provision to amend native title rights, with a timeframe of three months to undertake initial amendments of the new plans following native title determinations and other land or water use agreements, and enough time to undertake the detailed engagement, final amendment and entitlement process.
Finding	Current and future drought conditions, climate change and population growth predictions are key risks to town water supply in the Plan area. Stakeholders are calling for increased transparency and certainty beyond the existing *NSW Extreme Events Policy*, *Incident Response Guidelines* and the use of temporary water restrictions under Section 324 of the Act (see also **Recommendation 26**). Water resource planning should include the best available evidence which would include the current drought, paleoclimatic records and climate change projections. The Plan does not provide a transparent mechanism to ration extraction across the Plan area in drought and has an inadequate mechanism to allow Tamworth Regional Council to proactively manage their risks. AWDs could be used to transparently manage water use in drought throughout the Plan area.
Recommendation 16	Complete the following actions, incorporating stakeholder engagement, by 1 July 2022: a) as part of the *Namoi Regional Water Strategy*, model how Plan provisions function under a range of modelled climate scenarios, drawing upon paleoclimatic studies, assessment of risks from the current drought period, and projected changes to inflows and groundwater recharge under climate change b) based on the results from (a), develop mechanisms to ensure water will be managed to protect the water source, its dependent ecosystems and basic landholder rights, and be shared equitably among all other users, in that order, if scarcity and demand increases

	c) amend the Plan to address Plan-related risks to town water supply identified in (a), noting that amendments should allow Tamworth Regional Council to proactively manage its risks d) expand rules for setting AWDs, allowing for more certainty and proactive management of water shortages based on results from (a) (see also **Recommendation 26** on clear, defined triggers) e) use AWDs in conjunction with cease to pump thresholds to manage extraction during drought, including under predicted climate change.
Finding	The Plan includes a general objective to acknowledge the importance of Aboriginal water values and provides mechanisms for Aboriginal water use. However, the integration of Aboriginal values, engagement with Aboriginal peoples and ability of Aboriginal peoples to use water have been inadequately supported.
Recommendation 17*	By 1 July 2022 amend the replacement plans to include Aboriginal values and uses, clearly linked objectives and outcomes, and flow entitlement in the Plan area, using a strengthened NSW Aboriginal Water Framework (see **Suggested action B**).
Recommendation 18*	Co-design licences or other water access options with Aboriginal stakeholders that meet identified needs (for a range of cultural, environmental, social and economic uses) and include these in the new plans by 1 July 2022, using a strengthened NSW Aboriginal Water framework (see **Suggested action B**).
Suggested action B*	Continue development of a NSW Aboriginal Water Framework by 31 December 2020 to provide consistent and transparent guidelines and resourcing for Aboriginal involvement in water planning and management. At a minimum, the framework should consider: a) relevant guidelines and legislation, including any need for legislative reforms b) Aboriginal water values and its uses c) processes for allocating water for Aboriginal interests including cultural, environmental, social and economic purposes d) processes for improving Aboriginal water access and use, through simplified licencing or other identified mechanisms e) clear requirements for including native title determinations and proactive processes for undertaking other land/water use agreements f) strengthened Aboriginal engagement processes across the state to expand on the Murray-Darling Basin engagement process, broaden the stakeholder base (to include Traditional Owners, Nations, Local Aboriginal Land Councils and other relevant groups), and increase Aboriginal staff with capacity to lead and maintain engagement g) appropriate Aboriginal-led governance and decision-making arrangements, such as an Aboriginal Water Holder h) adequate resources including dedicated Aboriginal staff with capability in water planning and management, and funding, such as an Aboriginal Water Trust.

Manage the Peel as a connected system	
Finding	Splitting the Plan into four water sharing plans as part of the water resource planning process poses a significant risk to the effectiveness of future management of the connected Peel Valley water sources
Recommendation 19 (priority)	By 1 July 2020, ensure relevant settings are cross-referenced in the water sharing plans and there is ongoing monitoring of these connected water sources to determine if provisions to provide for and protect connectivity are effective.
Finding	The Plan was designed to account for the interrelated water sources of the Peel Valley, recognising that some water sources are more connected than others. However, delays in implementing access rules and alluvial extraction in some highly connected areas of the Peel Valley is potentially impacting surface water flows, with localised drawdown posing a risk to groundwater dependent ecosystems and instream (ecological) values. Understanding of these impacts is limited by knowledge gaps around the extent and variability of connectivity and sustainability of groundwater extraction. The Commission acknowledges that work is underway to address these knowledge gaps. DPIE-Water is developing a groundwater model for the Peel Alluvium and conducting studies to inform review of access rules.
Recommendation 20	By 1 July 2022 amend the water sharing plans to: a) include definitions for groundwater terms, including connectivity, ecological value, potential and type. Connectivity should include both discharge of groundwater to surface water and surface water to groundwater systems. b) provide greater clarity regarding variability in surface water-groundwater interactions in the plans by including schedules and maps and acknowledge this in any trading rules. Make these publicly available to improve transparency.
Recommendation 21	By 1 July 2022: a) undertake targeted monitoring to assess the adequacy of access rules that link groundwater access in the Cockburn River Alluvium Management Zone and Goonoo Goonoo Creek Alluvium Management Zone to associated unregulated streams b) map areas of surface water recharge and discharge to alluvial and other shallow groundwater systems, dependent on climatic conditions and improve knowledge on the degree of groundwater – surface connections in the Plan area c) where applicable, link AWDs between surface water and alluvium to reflect connectivity of these water sources.
Finding	Differing perspectives on the extent of surface-ground water connectivity in the Cockburn River have delayed implementation of groundwater access rules that link to surface water flows, potentially risking the health of these water sources and dependent ecosystems. DPIE-Water is currently undertaking a study to resolve this issue.

Recommendation 22	Complete the current study of connectivity in the Cockburn River and report findings to stakeholders as soon as practical. Amend access rules based on the findings of this study and identify any areas that require further research or community consultation.
Finding	The Plan does not currently recognise the role and value of lateral and longitudinal connectivity, including connectivity in the Peel River and to the Namoi River. There is a need to formally recognise and support the management of river connectivity to improve ecological outcomes in the Peel and broader Namoi Valley. The Commission acknowledges that the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* includes an ecological objective that recognises the importance of lateral and longitudinal connectivity. **Recommendation 11** which seeks to improve the protection of environmental water, would support connectivity.
Recommendation 23	Commission studies to provide for lateral and longitudinal connectivity between the Peel and Namoi rivers and improve environmental outcomes: a) investigate end-of-system flow options and scenario modelling to improve connectivity with the Namoi River, implementing any plan amendments by 1 July 2022 b) identify complementary actions outside of the Plan (see **Suggested action G**) to facilitate connectivity by 1 July 2021, including improving fish passage through removal of barriers.
Suggested action C*	By 1 July 2022, examine the most effective way of protecting environmental water between regulated rivers (including Peel and Namoi) – expanding *Prerequisite Policy Measures from the Southern Basin* or the draft *Active Management Policy*.
Provide economic outcomes and trade opportunities	
Finding	The Plan provides for trade, but trading activities may have been limited by drought impacts on AWDs, high water prices and the high level of entitlement. Some stakeholders have expressed interest in reinstating intervalley trading between the Peel and Lower Namoi valleys, which was previously trialled but discontinued. While intervalley trading in some form could increase trade flexibility, conversion factors used in the trials may not align with *Basin Plan* requirements. Revised pricing structures may impact on attempts to increase trade flexibility, as water in the Peel is relatively expensive compared with other valleys in the Murray Darling Basin.
Suggested action D	By 31 December 2020, engage with Peel Valley stakeholders to outline the reasons behind the removal of temporary intervalley trading between the Peel Valley and the Lower Namoi, with findings made publicly available.
Finding	The draft *Water Sharing Plan for the Peel River Regulated Water Source 2020* includes an amendment provision (Clause 67(1)(d)) to allow conversion of high security licences in the regulated river system to access licences in connected upstream unregulated water sources. These water sources are already at risk of insufficient flows due to current access and have a high level of entitlement compared to their LTAAEL. Any future amendments under this clause may have unintended impacts, including on water dependent ecosystems and connectivity between unregulated and regulated systems.

Recommendation 24	By 1 July 2020, publish guidance that the provision in the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* would only be implemented based on detailed modelling and assessment of environmental, social and economic impacts and benefits of proposed changes, and with broad stakeholder consultation.
Finding	Water restrictions during the Plan period have impacted industries and communities. These impacts are not currently considered in the Plan or its economic and social outcomes.
Recommendation 25	As part of the *Namoi Regional Water Strategy* and the environmental assessment, design and operation of the replacement Dungowan Dam, assess the full range of economic benefits and impacts of both the extraction of water and presence in-stream, including: a) benefits and impacts of secure water supply and time on water restrictions for town water supplies including residential and industrial uses b) benefits and impacts of flow and water quality on industries and water uses such as tourism, recreational fisheries, ecosystem services and community activities.
Improve Plan development and implementation	
Finding	Stakeholders are seeking improved engagement in Plan development, implementation and remakes; greater transparency in water allocation and management; and clear processes and oversight of the Plan. Further, it is critical that water sharing plan implementation, monitoring, evaluation and reporting (MER) have clear governance arrangements to provide accountability and clarity.
Suggested action E*	Continue to engage with the Stakeholder Advisory Panel and the broader community throughout Plan implementation and on subsequent water sharing plan reviews. In parallel, by 31 December 2020: a) review the existing stakeholder engagement strategy and opportunities to align stakeholder engagement with the development and implementation of the *Namoi Regional Water Strategy* b) expand membership of the Stakeholder Advisory Panel to be more representative of stakeholder groups, including environmental interests, Aboriginal communities and a representative spread of industry c) establish and develop terms of reference for a Namoi-Peel Environmental Water Advisory Group, including the role of this group in enhancing stakeholder engagement and improving understanding and awareness of the value of water for the environment d) map out touchpoints for engaging with the community to ensure that stakeholders are regularly informed of key aspects of plan implementation and adaptive management e) develop explanatory material to improve understanding of Plan provisions and their implementation.

Suggested action F*	By 1 July 2021, define and implement clear and consistent governance processes, roles and responsibilities, and timelines across the water sharing plans as part of the MER framework, adaptive management and stakeholder engagement activities (see **Recommendation 27**).
Finding	There are opportunities to improve Plan outcomes by taking a wider, integrated catchment management approach to support water sharing plan development and implementation. This will increase overall resilience at the landscape scale, which is particularly important as climate change places additional pressures on environmental, social and economic outcomes. Key issues include the impacts of cold water pollution, including the effectiveness of Chaffey Dam's multi-level offtake and the need to identify measures to mitigate the impacts of cold water pollution on aquatic biota.
Suggested action G*	By 1 July 2021, use the principles of integrated catchment management to consider risks and identify complementary measures in addition to Plan provisions that will help to meet Plan objectives and outcomes. Identify areas for collaboration or additional funding.
Finding	Stakeholders have called for more transparent rules and specific triggers within the Plan (rather than external policies and documents) to clearly and effectively manage the water sources under a wider range of climate conditions. This is to provide clarity around access priorities under different climatic scenarios and help licensees to manage their own risks under different circumstances. The Plan must account for the planned enlargement of Dungowan Dam and its impacts on the water sharing plan and its outcomes.
Recommendation 26	By 1 July 2020, commit to: a) investigate significant plan amendments due to the current drought works, proposed expansion of Dungowan Dam and recommendations from the *Namoi Regional Water Strategy*, by 1 July 2022 b) include triggers and rules for water sharing in a wider range of conditions, relating to water availability (in both Chaffey and Dungowan dams) using findings from the *Namoi Regional Water Strategy* by 1 July 2022. To complement this, by 31 December 2020, publish the current method for the AWD calculations and basis of recommendations, and update this as required.
Increase monitoring, evaluation and reporting	
Finding	MER is a key component of adaptive management. The Plan lacks a plan-specific MER framework and there has been limited MER of performance indicators to date. As a result, it is difficult to determine whether the plan provisions have been providing intended outcomes. DPIE-Water has developed environmental MER plans for the Namoi groundwater and surface water resources that can be used to guide MER activities under the new water sharing plans. However, the Peel Valley is not represented in all metrics of the MER plans, meaning that some proposed monitoring activities may give limited information for reporting against objectives for Peel Valley water sources.

	DPIE-Water also intends to develop MER frameworks for cultural and socioeconomic outcomes. The draft water sharing plans include improved and aligned objectives, strategies and performance indicators. Commitment to, and adequate resourcing of MER activities is critical to assessing the effectiveness of Plan provisions in achieving Plan objectives and adaptive management. New information generated during Plan implementation should support strategic adaptive management rather than waiting for Plan review. For example, the current study into the relationship between groundwater extraction and pools along the Cockburn River should inform adaptive management by 2022.
Recommendation 27	Define a MER framework for the replacement water sharing plans, supported by adequate resources and building on the following actions: a) strengthen, finalise and implement the *Namoi Surface Water Monitoring, Evaluation and Reporting Plan* and *NSW Groundwater Environmental Water Monitoring, Evaluation and Reporting Plan* following accreditation of water resource plans. b) by 31 December 2020, establish an interagency group to identify resourcing requirements, opportunities for collaboration across government agencies and use of technology to efficiently implement the MER plans c) develop NSW Murray-Darling Basin-wide cultural, social and economic MER plans by 1 July 2022 d) identify and address critical knowledge gaps including, but not limited to: i) river blackfish distribution and abundance, and population trends ii) drought refugia persistence and condition iii) impacts of cold water pollution. e) allow for periodic assessment of knowledge gaps for adaptive management and inclusion in future water sharing plans reviews.
Finding	Extraction in the unregulated river is unmetered and has not been monitored each year of the Plan. The Commission understands only about a third of licences in the unregulated rivers will be required to be metered under NSW's *Non-Urban Water Metering Policy*. It will be important to understand if the level of use associated with unmetered works may impact on connected water sources and to track the likelihood of activation of sleeper licences. Increasing monitoring of extraction would enable compliance with the LTAAEL to be tracked more effectively and potential risks identified.
Recommendation 28	By 1 July 2021 consider listing the Peel Unregulated River water sources as at-risk water sources, requiring metering of all licenced extraction. It will also be important to monitor active use and any growth during Plan implementation.

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 over the life of the water sharing plan, which is typically 10 years, unless it is extended.

The *Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010* (the Plan) commenced on 1 July 2010 and is due for extension or replacement on 1 July 2020.[3] It was developed using the 'macro' planning approach for the unregulated rivers and groundwater, informed by the Peel Interagency Regional Panel and Advisory Group.

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 the Plan depending on its review findings. Section 43A(3A) of the Act requires the Commission to consider some potential compensation requirements resulting from recommended changes to a plan.[4] Under the Act, compensation is payable by the State to access licence holders only in certain circumstances[5] where water allocations under a water sharing plan are reduced.

The Commission must also consider the water management principles,[6] including the water sharing principles, when reviewing the Plan. 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).[7]

---

3 Clause 3 of the Plan.

4 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.

5 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.

6 Section 5 of the Act.

7 Section 5(3) of the Act.

Further, the water management principles should be prioritised in the order that they are set out above.[8] Water sharing plans must be based on evidence to achieve these outcomes.

1.2 Review approach

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

- **Consultation –** with government agencies, community and industry organisations.
- **Consultation with Aboriginal stakeholders –** the Commission provided the opportunity for input to relevant Local Aboriginal Land Councils and government agencies. Interviews were conducted with NSW Aboriginal Land Council, Indigenous Land and Sea Corporation, Aboriginal Affairs NSW and Tamworth Local Aboriginal Land Council.
- **Document review** – the Commission reviewed the Plan and its background document. It also obtained publicly available information and unpublished reports from water management agencies, including DPIE-Water. As required, the Commission considered other relevant state-wide and regional government policies and agreements that apply to the Plan area.
- **Technical advice** – a range of consultants provided expert analysis on Plan provisions and opportunities for improvement.
- **Submissions** – the Commission is required to call for and consider public submissions and initially called for submissions via letters and calls to key stakeholders and 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 22 submissions in the initial round. Non-confidential submissions are published on the Commission's website. The Commission presented preliminary findings for this review to the Namoi and Peel Stakeholder Advisory Panel in March and April 2020, and made further information available on its website, requesting feedback through additional submissions. The Commission received seven submissions in this secondary round.

The Commission thanks DPIE-Water and other water management agencies for their cooperation in providing input to this review. For reference, **Figure 1** summarises the roles of the various NSW water management agencies.

[8] Section 9(1) of the Act.

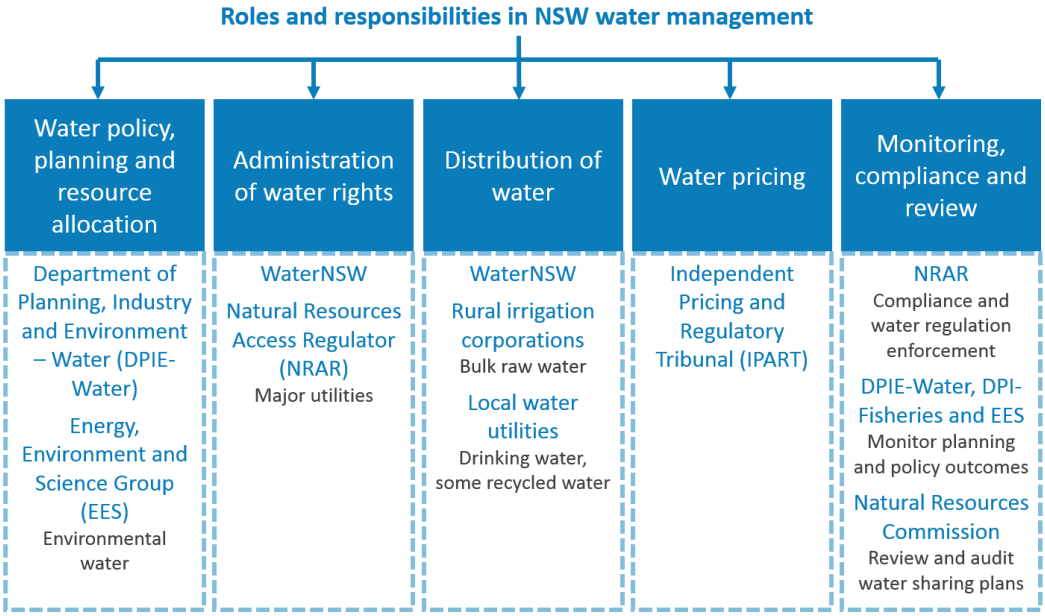

Figure 1: Roles and responsibilities in rural and regional water management[9]

The Commission evaluated the Plan's performance against its stated objectives, strategies and performance indicators, which were linked to each of the broader outcome categories required as part of the review (environmental, social, cultural and economic outcomes). These are provided in **Appendix A**.

The lack of clearly linked objectives, strategies and indicators, and limited monitoring, evaluation or reporting (MER) made it difficult to determine the Plan's performance. This report presents the Commission's findings using the best available evidence. To allow for future evaluation, a robust MER framework should be developed that better aligns objectives, outcomes and indicators (see **Chapter 10**).

Lack of transparency in Plan development and implementation was raised as a key issue in submissions and by the Namoi and Peel Stakeholder Advisory Panel. The Commission identified and agreed on the following principles with the Stakeholder Advisory Panel to improve transparency:

- procedures should be documented, peer reviewed, made available and followed by operators
- modelling should reflect the rules in the Plan, the method used for AWDs and water user behaviour
- monitoring of LTAAELs and response should be timely to avoid risk to priority users.[10]

The Namoi and Peel Stakeholder Advisory Panel also identified the following principles:

- stakeholders should have access to modelling, modelling inputs and assumptions should be clear, and models should be available for running a range of scenarios
- AWD calculations should be documented, unambiguous and codified in water sharing plans.

9 Revised from DoI-Water (2019) *NSW Regional Water Statement*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/218404/NSW-Regional-Water-Statement.pdf.

10 During the Namoi and Peel Stakeholder Advisory Panel with the Commission meeting on 9 April 2020.

The Commission adopted these principles for this review, which broadly align with the NSW Government's commitment in the Water Reform Action Plan, specifically the goal to '*ensure transparency in how we share, allocate and manage water*'.[11]

[11] Department of Industry (2017) *Securing our water: NSW Government Water Reform Action Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0016/136204/nsw-government-water-reform-action-plan.pdf.

2 The Plan context

This chapter provides environmental, social and economic context for the Plan area. Key points are:

- The Plan includes one regulated river source, five unregulated river sources, one alluvial groundwater source and one fractured rock groundwater source.
- There is variable connectivity between surface and ground water sources, with some highly connected classifications being contested by stakeholders (particularly in the Cockburn Water Source).
- There are two surface water storages – Chaffey Dam (100,500 ML) and Dungowan Dam (6,300 ML).
- The Plan area supports threatened species and endangered ecological communities, although significant historic native vegetation clearing has impacted habitat quality in some areas
- Tamworth is the main regional centre, with a wider regional population of just over 62,000, which is expected to increase to just under 80,000 by 2041.
- The Plan area is Gomeroi Country – to whom the water resources of the area are very important – and includes several significant cultural sites.
- Health care and social assistance is the greatest value-added industry, followed by agricultural industries, including livestock slaughtering (beef, poultry and sheep), crops for hay, cereal crops, milk, wool and eggs.
- The area is experiencing severe drought conditions. Inflows to Chaffey Dam over the two years to March 2020 were less than half the previous worst two-year drought on record.
- Climate change projections indicate an increase in all temperature variables (minimum, maximum and average) in the near and far future, with more hot days, seasonal changes in rainfall, declines in surface water and runoff, and a doubling of the number of droughts per decade by 2030.

2.1 Plan area and water sources

The Plan covers just over 4,600 square kilometres in the Peel Valley, which is a sub-catchment of the Namoi (**Figure 2**). The Peel Valley is characterised by low hills with moderate slopes and flat river valleys with deep, fertile alluvial soils. Drainage patterns are influenced by the complex and heavily faulted underlying geology.[12]

The Plan includes the Peel River from its headwaters in the Great Dividing Range south of Tamworth, along with its tributaries including Duncans Creek, Dungowan Creek, the Cockburn River, Goonoo Goonoo Creek, Moore Creek, Timbumburi Creek, Tangarratta Creek and Attunga Creek.[13]

12 NSW Office of Water (2011) *Peel Valley Catchment – groundwater status report* 2010. Available at http://www.water.nsw.gov.au/__data/assets/pdf_file/0004/548950/avail_ground_peel_report_2010.pdf.

13 NSW Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

Sixty percent of the Peel River's outflow comes from unregulated rivers and streams, including the Cockburn River (40 percent), Dungowan Creek (10 percent) and Goonoo Goonoo Creek (10 percent).[14] As a result of these unregulated inflows to the Peel River, medium to high flows in the mid to lower reaches are less affected by the river regulation associated with Chaffey Dam.[15]

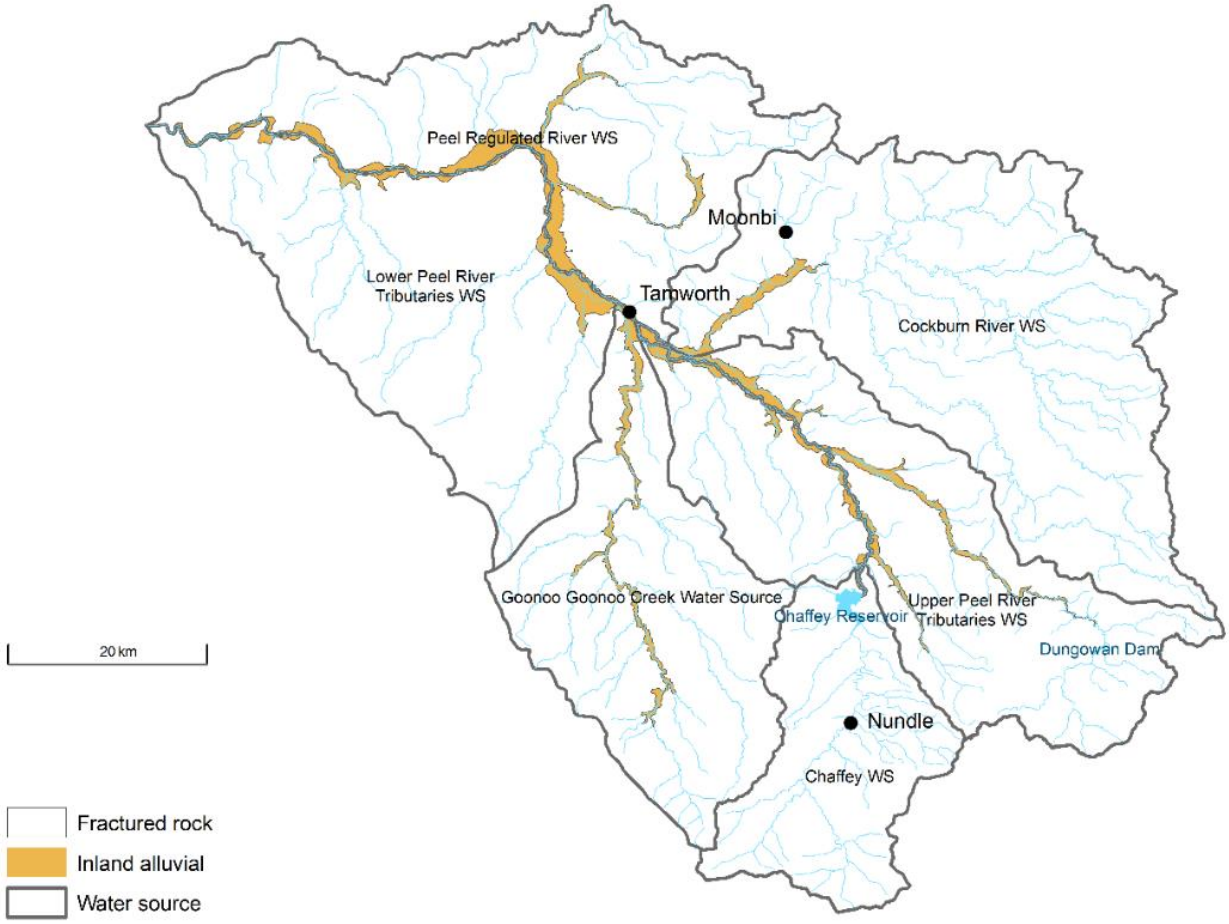

Figure 2: Plan area

The Plan sits within the Namoi Water Management Area and manages all surface and groundwater sources in this area, including the regulated river, unregulated rivers, underlying fractured bedrock and alluvial aquifers. Including all water sources in one plan was intended to manage connectivity between these water sources. **Table 2** lists the Plan's extraction management unit, water sources and management zones.

14 Green, D., Petrovic, J., Moss, P. and Burrell, M. (2011) *Water resources and management overview: Namoi catchment*. Prepared for the NSW Office of Water. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0003/549300/catchment_overview_namoi.pdf.

15 NSW Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

Table 2: Water source and extraction management units in the Plan area[16]

Extraction management unit	Water source	Management zone
-	**Peel Regulated River** - covers the Peel River from Chaffey Dam to the confluence with the Namoi River downstream of Somerton	-
Namoi Unregulated Rivers	**Chaffey**	Peel River
		Chaffey Tributaries
	Goonoo Goonoo Creek	Upstream Boiling Down Creek
		Downstream Boiling Down Creek
	Cockburn River	Cockburn River Tributaries
		Cockburn River
	Upper Peel River Tributaries	Duncans Creek and Other Tributaries
		Dungowan Creek
	Lower Peel River Tributaries	Moore Creek
		Lower Peel River Tributaries
-	**Peel Alluvium** (includes narrow and shallow aquifers in the valleys and tributaries, associated with the Peel River and its major tributaries, as shown on the Plan's registered map)	Peel Regulated River Alluvium
		Duncans Creek Alluvium
		Dungowan Creek Alluvium
		Cockburn River Alluvium
		Goonoo Goonoo Creek Alluvium
		Attunga Creek Alluvium
		Moore Creek Alluvium
-	**Peel Fractured Rock** (includes all water below the surface of the ground excluding the Peel Alluvium Water Source, as shown on the Plan's registered map)	-

2.1.1 Connection between surface and groundwater sources

The Peel alluvial aquifer consists of unconsolidated sand, gravel and clay deposits, usually less than 1.5 kilometres wide but can be up to 3 kilometres wide between Tamworth and Attunga. The thickness of deposits is variable (between 7-40 metres) but is generally around 15 metres.[17] Recharge is from rainfall and streamflow. Water quality is generally good and suitable for stock and domestic, irrigation and town water supply purposes.

16 Clause 4 of the Plan and NSW Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

17 NSW Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

Figure 3 shows a schematic explaining connected and disconnected gaining and losing streams. Following the Office of Water's original (pre-2010) public submissions process for the Plan and additional review and modelling of surface and groundwater connectivity in the alluvial management zones, the following connectivity classifications were made:

- **highly connected** – Peel Alluvium adjacent to the Peel Regulated River, Cockburn River, Dungowan Creek and Goonoo Goonoo Creek
- **less highly connected** – Peel Alluvium adjacent to Duncans Creek, Attunga Creek and Moore Creek.[18]

The Peel fractured rock aquifer underlies the alluvial aquifers across most of the catchment and is part of the larger New England Fold Belt fractured rock aquifer system.[19] Water yield and quality is variable. The aquifer is extensively developed for stock and domestic supplies, with some small scale commercial and irrigation development. DPIE-Water has 54 monitoring bores in the Peel alluvium,[20] which are monitored fortnightly. There are no monitoring bores in the fractured rock areas.

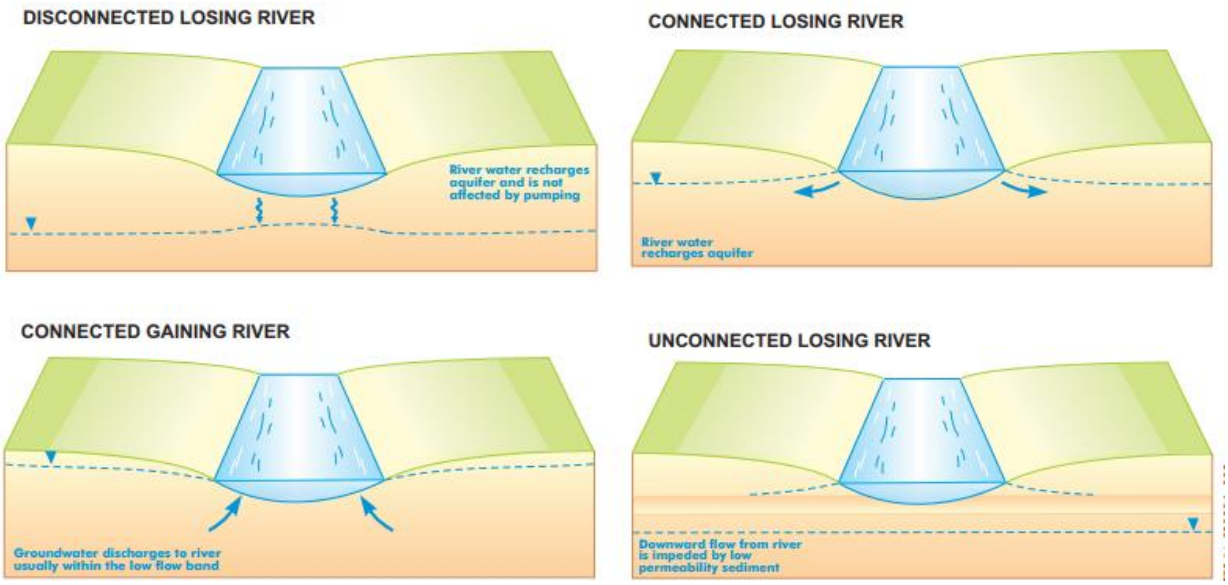

Figure 3: Types of groundwater and surface water connectivity influencing how streams and rivers respond to change in groundwater extraction nearby[21]

2.1.2 Surface water storages

The Plan area has two storages; Chaffey Dam and Dungowan Dam. Chaffey Dam is a major headwater storage on the Peel River, about 35 kilometres upstream of Tamworth. The storage capacity of Chaffey Dam at the start of the Plan was 62,000 ML. In 2015-16, an augmentation

18 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

19 *Ibid.*

20 *Ibid.*

21 MDBA (2006) *Evaluation of the connectivity between surface water and groundwater in the Murray-Darling Basin.* Available at https://www.mdba.gov.au/sites/default/files/archived/mdbc-GW-reports/101_Connectivity_between_GW_and_SW_in_the_MDB.pdf

project increased the dam's capacity to 100,500 ML.[22] This project aimed to secure permanent water supplies for Tamworth and Peel Valley water users and ensure compliance with NSW Dams Safety Committee standards for extreme floods.

Chaffey Dam is owned and operated by WaterNSW. Average inflow is about 40 gigalitres (GL) per year, while average downstream tributary inflow into the Peel River is about 55 GL per year.[23] It is a major source of water for users in the Peel Regulated River Water Source (entitlements are outlined in **Section 2.8**), including providing:

- planned environmental water releases, including the environmental contingency allowance (ECA)
- basic landholder rights for properties along the river
- town water supply for Tamworth Regional Council
- access for licenced Peel Valley irrigators and industries, including cotton, wheat, lucerne, vegetables, fruit trees, oil seeds, fodder and pasture for sheep and cattle.[24]

Dungowan Dam is on Dungowan Creek and is owned and operated by Tamworth Regional Council according to licence conditions, which require either transparent[25] or translucent[26] flows to be released.[27] It has a capacity of 6,300 ML and Tamworth Regional Council holds a 5,600 ML per year water access licence.[28] While Chaffey Dam is the primary storage for Tamworth's town water supply, Dungowan Dam is the preferred supply source (typically supplying about 40 percent of town water in non-drought periods) until its storage drops to around 65 to 70 percent. The dam is then maintained as an emergency backup in case water cannot be extracted from the Peel River.[29]

In October 2019, the NSW Government announced $480 million in joint funding to replace Dungowan Dam and is expected to provide an additional 7,000 ML per year of town water supply.[30] The new dam will not address supply impacts from the current drought but will be

22 WaterNSW (2015) *Fact Sheet: Chaffey Dam safety upgrade and augmentation*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0020/121790/Chaffey-information-sheet-December-2015.pdf.

23 As read off 'Peel River Inflow' in WaterNSW (2020) *Peel Regulated ROSCCo presentation – 11 February 2020*. Available at https://www.waternsw.com.au/__data/assets/pdf_file/0004/153616/Peel-ROSCCo-Presentation-11-Feb-2020.pdf.

24 WaterNSW (n.d.) *Chaffey Dam Fact Sheet*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0006/132576/Chaffey-Dam-Fact-Sheet.pdf.

25 A transparent flow in a regulated river system is when inflows are passed through a dam to enable a near-natural flow pulse into the river system. In the case of Dungowan Dam all inflows less than 10 ML per day must be released as outflows.

26 A translucent flow is like a transparent flow but only a portion of the inflow volume is passed. In the case of Dungowan Dam, when inflows exceed 10ML per day, releases from the dam into Dungowan Creek should be maintained at 10 ML per day.

27 Tamworth Regional Council (2015) *Tamworth Regional Council: Drought Management Plan 2015*. Available at: https://www.tamworth.nsw.gov.au/ArticleDocuments/220/2015%20Drought%20Management%20Plan%20-%20REVISION%201%20-%2012%20April%202016%20-%20PDF.pdf.aspx; DPIE-Water (2020) *Transparent and translucent flows*. Available at: https://www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/environmental-rules/transparent-and-translucent-flows.

28 Tamworth Regional Council (n.d.) *Water Supplies*. Available at: https://www.tamworth.nsw.gov.au/live/water-and-wastewater/water-supplies.

29 Tamworth Regional Council (2015) *Tamworth Regional Council: Drought Management Plan 2015*. Available at: https://www.tamworth.nsw.gov.au/ArticleDocuments/220/2015%20Drought%20Management%20Plan%20-%20REVISION%201%20-%2012%20April%202016%20-%20PDF.pdf.aspx.

30 WaterNSW (n.d.) *Webpage: New dams for NSW - Dungowan Dam*. Accessed 25 February 2020. Available at: https://www.waternsw.com.au/projects/new-dams-for-nsw/dungowan-dam

used to address longer-term risks.[31] There is currently no information available on the ownership, system operation or environmental release rules for the new dam, or implications for local water utility licences and accounting (see **Section 9.4**).

2.2 Environmental context

The Peel Valley is characterised by low peaked hills with moderate slopes and flat river valleys with deep, fertile, alluvial soils.[32] Before European settlement, much of the Plan area was characterised by the now threatened grassy box woodlands, including white box grassy woodlands with yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*Eucalyptus blakelyi)* on lower slopes.[33]

A variety of water-dependent and threatened fauna species are found in the Peel Valley.[34] The Plan area includes:

- 42 threatened fauna species, six threatened flora species, one threatened fauna population[35] and four threatened ecological communities
- 23 other flood-dependent or riverine fauna species, two other flood-dependent or riverine flora species, 11 flood-dependent or riverine plant community types (including wetland types) and seven groundwater dependent ecosystems[36]
- three endangered ecological communities[37] – the endangered ecological community along the Peel River below Chaffey Dam includes 21 native fish species, including threatened species such as the silver perch (*Bidyanus bidyanus*) and Murray cod (*Maccullochella peelii*)[38]
- 15 special environmental features, including five named wetlands in the Peel system.

Water-dependent ecosystems supported by the Peel Valley include instream aquatic habitats, small flood runners, anabranches, in-stream benches, point gravel bars and terraces, riparian

31 WaterNSW (2019) *Dungowan Dam*. Available at: https://www.waternsw.com.au/projects/regional-nsw/dungowan-dam.

32 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

33 *Ibid*.

34 Including species such as the eel-tailed catfish (*Tandanus tandanus*), golden perch (*Macquaria ambigua*), Murray cod (*Maccullochella peelii*), purple-spotted gudgeon (*Mogurnda adspersa*), silver perch (*Bidyanus bidyanus*), Bell's turtle (*Elseya bellii*), duck-billed platypus (*Ornithorhynchus anatinus*), greater broad-nosed bat (*Scoteanax rueppellii*), booroolong frog (*Ranoidea booroolongensis*), Davies tree frog (*Ranoidea daviesae*), glandular frog (*Litoria subglandulosa*), sphagnum frog (*Philoria sphagnicolus*), stuttering barred frog (*Mixophyes balbus*), and between 23 and 37 recorded water-dependent bird species such as the Australasian bittern (*Botaurus poiciloptilus*), blue-billed duck (*Oxyura australis*), and regent honeyeater (*Anthochaera phrygia*).

35 The tusked frog population in the Nandewar and New England Tablelands Bioregion.

36 Black Spring, Bundys Spring, Jacks Camp Spring, Black Springs, Crawney Pass, Moore Creek, Sulcor, see Schedule 4 of the Plan.

37 Upland Wetlands of the Drainage Divide of the New England Tablelands Bioregion, the Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregion, and the Lowland Darling River Endangered Aquatic Ecological Community. See Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

38 DPI (2007) *Lowland Darling River aquatic ecological community*. Available at: https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/634557/Lowland-Darling-River-aquatic-ecological-community.pdf.

forests, and floodplain watercourses, woodlands and wetlands.[39] Key ecosystems such as pools and backwaters provide important habitat, breeding areas and food sources, as well as refuge for native fish, invertebrates and mammals in low flow periods.[40] In-channel structures such as terraces and benches, which collect organic material, are also particularly important for the riverine ecology of the Peel River, as they promote carbon and nutrient cycling and provide a seedbank of riparian and aquatic plant species.[41] For instance, riverine vegetation supported by the Peel River includes river red gum woodland, river oak, roughbarked apple, red gum forest and sedgeland fens wetland.[42]

The ecological condition of the Plan's water-dependent environmental assets is driven by flows connecting these water-dependent ecosystems.[43] These connecting flows support the movement of nutrients, carbon and sediments, are migration and breeding triggers for native fish and waterbirds, and directly impact water quality, vegetation condition and habitat quality and availability.[44] Changes to these flow regimes can impact on aquatic species and processes and health of the Peel River.

Tributaries such as Goonoo Goonoo Creek naturally contribute saline flows and salt load into the Peel River due to their underlying geology. Under natural flow regimes this would be diluted by flows down the Peel River.[45] Regulation of the Peel River has also caused cold water pollution in the area downstream of Chaffey Dam,[46] and can release algae to the river, particularly in warmer months.[47] Changes to flow regimes and river hydrology also pose threats to native fish populations. Fish community status for the Peel River from Chaffey Dam to the confluence with the Namoi River is fair but the status for most tributaries is poor.[48]

Several rivers and tributaries are considered capable of supporting significant levels of biodiversity[49] and some are recognised as having low hydrologic disturbance.[50] In particular, the Peel River downstream of Chaffey Dam is identified as an environmental asset for native fish

---

39 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

40 *Ibid*.

41 *Ibid*.

42 DPIE-EES (2020) *Namoi Long Term Water Plan Part B: Namoi planning units.* Available at: https://www.environment.nsw.gov.au/research-and-publications/publications-search/namoi-long-term-water-plan-part-b-planning-units-draft.

43 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* Available at: https://www.environment.nsw.gov.au/topics/water/water-for-the-environment/planning-and-reporting/long-term-water-plans/namoi-consultation.

44 MDBA (2019) *Basin-wide environmental watering strategy*. Available at: https://www.mdba.gov.au/sites/default/files/pubs/basin-wide%20environmental%20watering%20strategy%20November%202019.pdf.

45 DPIE-Water (2019) *Namoi surface water resource plan – water quality management plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0016/273121/schedule-h-namoi-wqmp.pdf.

46 *Ibid*.

47 *Ibid*.

48 DPI (2016) *Fish Communities and Threatened Species Distributions of NSW*. Available at: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/669589/fish-communities-andthreatened-species-distributions-of-nsw.pdf.

49 Such as the Peel River and its tributaries (including in the Chaffey Water Source), Mulla Creek, and downstream reaches of Goonoo Goonoo Creek, Timbumburri Creek, Tangaratta Creek, Springs Gul, and Brown Springs Gul.

50 Including the upper reaches of the Cockburn River (above Limbri) and its tributaries, upper reaches of Duncans Creek and Dungowan Creek, upper reaches of the Peel River channel and upland sections of Peel River tributaries, upper reaches of Goonoo Goonoo Creek (DPIE-EES (2020) *Namoi Long Term Water Plan Part B: Namoi planning units.* Available at: https://www.environment.nsw.gov.au/research-and-publications/publications-search/namoi-long-term-water-plan-part-b-planning-units-draft).

due to its high biodiversity, hydrodynamic diversity, presence of threatened species and as a dry period and drought refuge.[51]

As outlined in **Section 2.1.1**, there is high connectivity between surface and groundwater in parts of the Plan area, with potential groundwater dependent vegetation, such as red gums, accessing groundwater through historic stream channels buried beneath the surface (known as palaeochannels). As well as surface-dwelling species that depend on groundwater, five species of aquifer-dwelling ostracod *Hancokcandonopsis gen.nov.* were identified in boreholes in the Peel River's alluvial aquifers.[52]

The Peel River does not support many floodplain wetlands and those that occur are infrequently watered by floods in the order of 30,000 to 50,000 ML per day or greater. There are currently five named wetlands within the Plan area.[53] There are also several floodplain wetlands in the lower reaches of the Peel River and near Somerton which are generally maintained by rainfall events in their local catchments.[54]

2.3 Social context

Tamworth Regional Local Government Area makes up most of the Plan area, with only small parts of Walcha and Gunnedah local government areas included. Most of the population live in the urban centre of Tamworth. Only about one quarter of the population lives in the small townships of Barraba, Kootingal, Manilla and Nundle, the villages of Attunga, Bendemeer, Dungowan, Moonbi, Somerton, and Woolomin, and various rural localities.[55]

Tamworth Regional Council is a key licence holder in the Peel Valley, holding water utility licences for the following towns:

- **Tamworth**
  - 16,400 ML per year from Chaffey Dam in the Peel Regulated River Water Source
  - 5,600 ML per year from Dungowan Dam (in the Upper Peel River Tributaries Water Source but accounted for in the Peel Regulated River Water Source)
  - 10 ML per year for reconditioned 'drift wells' from the Peel Alluvium Water Source
- **Moonbi/Kootingal –** 400 ML per year from the Peel Alluvium Water Source with a supplementary supply in drought via a pipeline from Tamworth town supply
- **Attunga –** 120 ML per year from the Peel Alluvium Water Source

51 MDBA (2019) *Basin-wide environmental watering strategy*. Available at: https://www.mdba.gov.au/sites/default/files/pubs/basin-wide%20environmental%20watering%20strategy%20November%202019.pdf.

52 Karanovic, I. (2018) 'A new Candonopsini (Ostradoa) genus from subterranean waters of New South Wales (Australia)' *Zootaxa*, 4379(2).

53 Benama Swamp (on Benama Creek within the Goonoo Goonoo Creek Water Source); Bennett's Swamp (on Sandy Creek on the Upper Peel River Tributaries Water Source); Blue Gully Swamp (on Blue Gully in the Lower Peel River Tributaries Water Source); Round Swamp (on Mulla Mulla Creek in the Cockburn River Water Source); and Three Corner Swamp (on unnamed creek in the Cockburn River Water Source)

54 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

55 .id Demographic Resource Centre (2017) *Tamworth Region population forecast.* Available at: https://forecast.id.com.au/tamworth.

- **Nundle –** 100 ML per year from the Peel Fractured Rock Water Source.[56]

In 2018, the Tamworth Regional Council area had an estimated resident population of just over 62,000. Water use data from Tamworth Regional Council indicates that, despite significant increases in population, water consumption has remained relatively constant since 1990 due to demand management measures.[57] The population has increased by around 5 percent since 2011 and is predicted to increase to just under 80,000 by 2041.[58] While about 57 percent of Tamworth Regional Council's water supply system is used by residences, over a third is non-residential consisting largely of:

- 1,224 commercial connections (totalling 15 percent of water use)
- 86 industrial and food processing connections (14 percent of water use)
- 45 institutions (three percent of water use).[59]

The population relying on Tamworth's water supply is projected to grow significantly by 2035 in relative terms. This will increase water demand from an average of around 9,700 ML per year and a high of 10,600 per year in 2015, to an average of 12,800 ML per year with an estimated high of 14,900 ML per year.[60] By 2045, this is projected to grow further to an average of 14,500 ML per year or a high of 17,200 ML per year.[61] The need for a secure water supply to service Tamworth's growing population is discussed in **Section 6.2.2**.

The Aboriginal and Torres Strait Islander population in the area is comparatively high at 10.1 percent of the population (compared to 5.5 percent for regional NSW) and has increased by nearly 2 percent since 2011.[62]

In line with population growth, dwellings are also increasing in the local government area, particularly separate dwellings, which represented 85 percent of the housing stock in 2016, compared to the regional NSW average of 80 percent.[63] Much of this stock is made up of 4 bedroom or larger dwellings, with medium and high density housing stock comparatively low for regional NSW. Most of the population and dwelling stock growth is in Tamworth town centre. This concentrated population and household growth poses significant challenges to an already strained town water supply.

As rural areas are experiencing decline across NSW, regional centres such as Tamworth are 'sponge cities', growing as key residential locations and service points for the population. Tamworth is a major regional service centre for north-western NSW, serviced by the New England and Oxley highways, Tamworth Regional Airport and the north western railway line.

---

56 Tamworth Regional Council (n.d.) *Town Water Supply FAQs - How much water does Tamworth use in a year?* Available at: https://yourvoice.tamworth.nsw.gov.au/town-water-supplies (accessed 14 February 2020) and Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

57 Tamworth Regional Council (n.d.) *Town Water Supply FAQs - How much water does Tamworth use in a year?* Available at: https://yourvoice.tamworth.nsw.gov.au/town-water-supplies (accessed 14 February 2020).

58 .id Demographic Resource Centre (2017) *Tamworth Region population forecast.* Available at: https://forecast.id.com.au/tamworth.

59 Tamworth Regional Council (2016) *2016 Demand Management Plan*. Available at: https://www.tamworth.nsw.gov.au/about/policies-plans-and-regulations/other-plans-and-strategies

60 *Ibid*.

61 *Ibid*.

62 .id Demographic Resource Centre (2017) *Tamworth Region population forecast.* Available at: https://forecast.id.com.au/tamworth.

63 *Ibid*.

Key infrastructure and services include a regional entertainment and conference centre, a sports dome and complex, Tamworth Regional Conservatorium of Music, Tamworth Hospital, a TAFE NSW campus, and the Australian Defence Force Flying Training School.[64]

Tamworth is home to several music, multicultural and food events, which attract many visitors from the region and internationally.[65] It is most well-known for the annual Tamworth Country Music Festival, which has taken place in late January since 1973. It is now Australia's largest music festival and one of the top 10 music festivals in the world, with over 700 performers and 2,800 shows across 120 different venues, attracting over 300,000 visitors across 10 days.[66]

Although the festival is a focus for tourism, there are also over 1 million tourists each year to the region who visit natural areas, participate in events or undertake business.[67] There is high amenity and recreation values in the area provided by the water sources in the MacDonald and Peel rivers, as well as their associated services. Examples of amenity and recreation uses include water and land-based activities at Chaffey Dam.[68] The dam is popular for water sports such as water skiing, swimming, sailing, boating, fishing (for Murray cod, yellowbelly, silver perch, catfish and rainbow trout), for bushwalking and picnicking across a number of reserves and parks, and camping in reserve campsites. There is the 'Arc-en-Ciel Trout Farm' at Hanging Rock, which is nationally renowned for its produce and offers recreational fishing, tours and other facilities.[69]

2.4 Cultural context

The Plan area is of significance to Aboriginal peoples and 10.1 percent of the area's population identified as Aboriginal and Torres Strait Islander in 2016 (notably higher than the regional NSW average of 5.5 percent).[70] **Figure 4** outlines the area, which is primarily Gomeroi Country (also identified as Kamilaroi, Gamilaraay, Gamilaroi and Kamilarai) and includes the Tamworth and Nungaroo Local Aboriginal Land Councils.

The Gomeroi is one of the four largest Nations in Australia and has critically shaped the area from the Hunter Valley north to Nindigully in Queensland and west to the Warrumbungle Mountains near Coonabarabran in NSW.[71] The east of the Plan area, along the Moonbi ranges and up onto the New England Tablelands, is also home to the Anaiwan people.[72]

64 Destination Tamworth (2018) *Explore*. Available at: http://www.destinationtamworth.com.au.
65 Destination Tamworth (2018) *Play*. Available at: http://www.destinationtamworth.com.au.
66 Tamworth Country Music Festival (2020) *Festival Information*. Available at: https://www.tcmf.com.au/festival-info.
67 Destination Tamworth (2018) *Play*. Available at: http://www.destinationtamworth.com.au.
68 Destination NSW (2020) *Chaffey Dam*. Available at: https://www.visitnsw.com/destinations/country-nsw/tamworth-area/nundle/attractions/chaffey-dam.
69 Destination NSW (2020) *Chaffey Dam*. Available at: https://www.visitnsw.com/destinations/country-nsw/tamworth-area/nundle/attractions/chaffey-dam; and Destination Tamworth (2018) *Play*. Available at: http://www.destinationtamworth.com.au.
70 .id Demographic Resource Centre (2017) *Tamworth Region population forecast.* Available at: https://forecast.id.com.au/tamworth.
71 Carpenter, M. (2017) *Kamilaroi – A Nations Identity*. Available at: https://kamilaroianationsidentity.weebly.com/location.html.
72 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

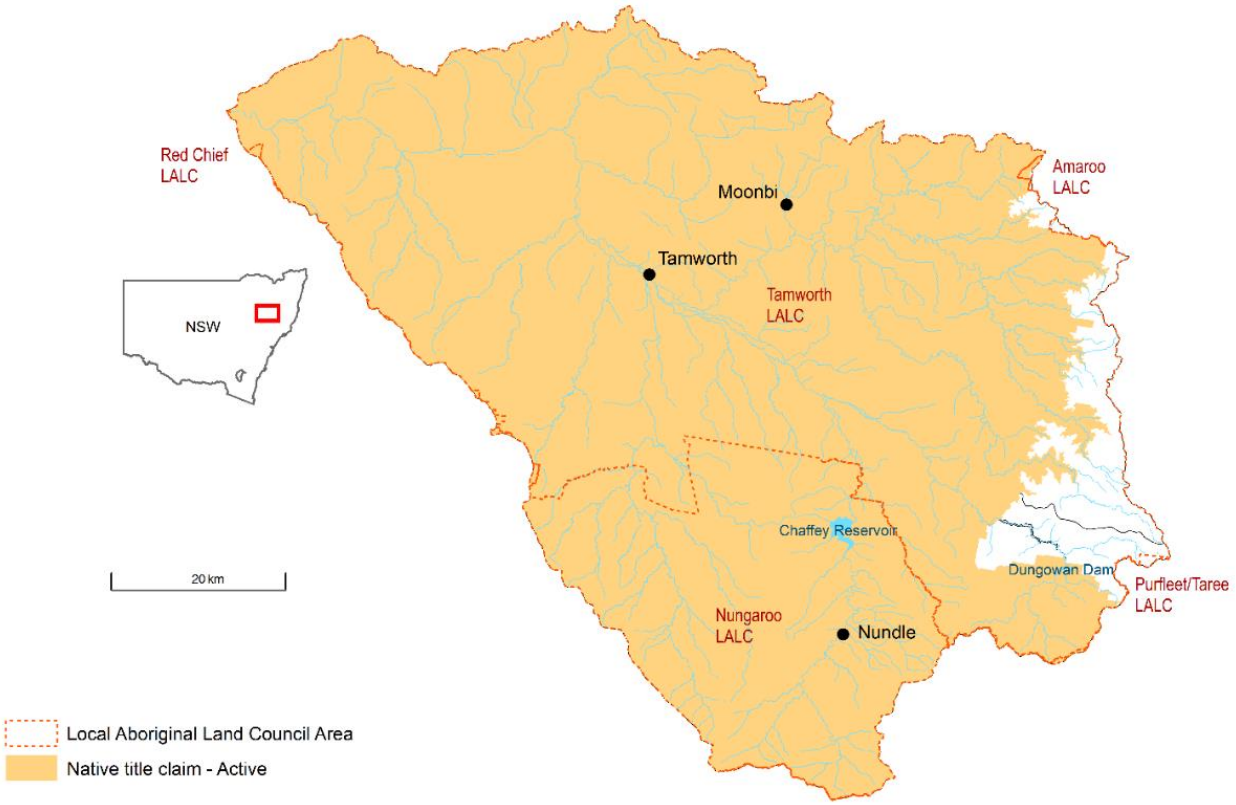

Figure 4: The Plan area showing the Gomeroi native title claim covering most of the Plan area, as well as the local Aboriginal land council boundaries.

Gomeroi history is recorded in rock art preserved across the region. Their language, Gamilaraay, lives on in many place names: Barraba means 'a place of many yellow jacket or box trees'; Manilla means 'winding river'; Calala is a 'place of battle or a winding river'; and Goonoo Goonoo is 'running water over rocks in times of drought'.[73]

Water has been identified as a crucial element of Gomeroi life, which is inherently interconnected with cultural values. Watering holes (within the river channel and on the floodplain) and rivers are essential for providing food, culture, shelter and water.[74] The Gomeroi have a current native title claim[75] that covers large parts of north west NSW, including most of the Plan area (see **Figure 4**). Although the claim was notified in 2012, there has been little progress.

There is much evidence of Aboriginal peoples' long connection with these lands and waters, with many registered and unregistered sites and values of cultural significance throughout the region[76], including: ceremonial areas and sites; extensive rock art, stone artefacts and tool-making areas, resource gathering and hunting areas.[77]

---

73 Destination Tamworth (2018) *Our History*. Available at: http://www.destinationtamworth.com.au/Explore/our-history.

74 Carpenter, M. (2017) *Kamilaroi – A Nations Identity*. Available at: https://kamilaroianationsidentity.weebly.com/location.html.

75 Registered as NC2011/006 - NSD37/2019 - Gomeroi People.

76 Destination Tamworth (2018) *Our History*. Available at: http://www.destinationtamworth.com.au/Explore/our-history.

77 Sources of information on cultural sites and values in the region include Aboriginal Heritage Information Management System (AHIMS), a database that contains detailed information on over 93,000 recorded sites and over 13,500 archaeological and cultural heritage assessment reports (see:

2.5 Economic context

The Tamworth Regional Council area is a major regional hub in NSW and had a gross regional product of $3.24 billion in 2018-19, which represents 0.5 percent of the gross state product.[78] The region's economy is diverse. Health care and social assistance is the most productive industry in the local government area (generating $344 million value added in 2018-19), followed by manufacturing ($262 million), agriculture, forestry and fishing ($242 million), construction ($210 million) and public administration and safety ($200 million).[79]

Land in the Peel Valley outside Tamworth is primary used for agricultural production, due to the favourable heavy black and grey clay soils resulting from the relatively young volcanic geology of the region.[80] Irrigation is generally associated with alluvial soils along streams and around 85 percent is concentrated around the Peel Regulated River Water Source and in the Upper and Lower Peel River Tributaries water sources.[81] Around 80 percent of irrigated land is pasture.[82]

The agriculture, forestry and fishing industry had the largest number of registered businesses in the Plan area, representing about a quarter of all registered businesses, compared to about 7 percent across NSW.[83] Livestock slaughtering is the most productive agricultural industry, with other industries including crops for hay, cereal crops, milk, wool and eggs.[84] Agricultural commodities in the Plan area had a value of $264 million in 2015-16, consisting largely of:

- **livestock slaughtering** (nearly 76 percent of the total agricultural commodities in the Plan area by value, or about $200 million), which consisted of half cattle and calves (or around $99 million), 46 percent as poultry (or around $92 million), and four percent as sheep and lambs (or around $8 million)
- **livestock products** (12 percent overall), which largely consisted of milk (40 percent or around $13 million), wool (38 percent or around $12 million) and eggs (22 percent or around $7 million)
- **crops** (12 percent overall), which consisted of about 45 percent (or around $16 million) cereal and broadacre crops (wheat and barley for grain) and 45 percent lucerne to be cut for hay (or around $14 million).[85]

https://www.environment.nsw.gov.au/topics/aboriginal-cultural-heritage/protect-and-manage/aboriginal-heritage-information-management-system). These sources of information have significant limitations and do not accurately reflect the cultural values and significance of these areas to Aboriginal peoples.

78 .id Demographic Resource Centre (2019) *Tamworth Regional Council economic profile*. Available at: http://economy.id.com.au/tamworth/gross-regional-product.

79 .id Demographic Resource Centre (2019) *Tamworth Region community profile*. Available at: http://economy.id.com.au/tamworth/value-add-by-industry.

80 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

81 *Ibid*.

82 *Ibid*.

83 .id Demographic Resource Centre (2018) *Tamworth Regional Council – Businesses by industry*. Available at: https://economy.id.com.au/tamworth/number-of-businesses-by-industry?WebID=10.

84 .id Demographic Resource Centre (2018) *Tamworth Regional Council - Agriculture*. Available at: https://economy.id.com.au/tamworth/value-of-agriculture.

85 As assessed by the Commission using ABS data. Australian Bureau of Statistics (2016) *7503.0 - Value of Agricultural Commodities Produced 2015-16*. Available at: https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/7503.0Main+Features12015-16?OpenDocument

Cultivated turf accounted for less than about 0.7 percent (or just less than $2 million) of agricultural commodity by value in the Plan area.[86]

The Commission understands that the chicken processing industry has expanded since 2015-16. It is continuing to grow, with plans to increase the Baiada's chicken processing operation threefold, which would result in an increase in potable water demand of about 6 ML per day.[87] While the processing relies upon industry outside the town (with a combination of high and general security licences from surface and groundwater), the processing facility uses Tamworth town supply (and Chaffey and Dungowan dams) rather than direct extraction from the Peel River.

2.6 Climate, variability and climate change

The Peel Valley generally has a temperate climate. Annual average rainfall varies across the valley, from up to 1,140 millimetres in the eastern ranges to 584 millimetres where the Peel River meets the Namoi River.[88] Average monthly evaporation exceeds average monthly rainfall for all months.[89]

Although generally temperate, rainfall in recent years has been more reflective of semi-arid regions due to the current severe drought. Tamworth had record low rainfall in 2019 and very low rainfall in 2018, resulting in the latest three-year rolling total average rainfall (around 400 millimetres per year) being the lowest since records began in 1878.[90] Rainfall also shows the natural, considerable variability in the Peel Valley's rainfall. Streamflow and annual discharge from the Peel River varies significantly between wet and dry years.[91] Seasonal streamflow variation occurs due to natural variation and irrigation use in summer.[92]

Temperatures in the Namoi region have increased by around 0.8 degrees Celsius since 1950, with the longest period of continued temperature increase in the most recent decades.[93]

Figure 5 shows river flow on the Peel River upstream of Chaffey Dam. While it does not show rainfall directly, inflows correlate with wetter and drier conditions. This demonstrates the multi-decadal variation in rainfall conditions known as secular variation, with shifts between flood dominated and drought dominated regimes over 20 to 50-year periods. This adds to variation and uncertainty in planning for water availability.

86 As assessed by the Commission using ABS data. Australian Bureau of Statistics (2016) *7503.0 - Value of Agricultural Commodities Produced 2015-16*. Available at: https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/7503.0Main+Features12015-16?OpenDocument

87 Murphy, J. (2019) 'Baiada's Tamworth $200m upgrade to create 700 jobs', *The Northern Daily Leader*, 24 July.

88 Tomlinson (2008) and O'Rourke (2009) cited in: NSW Office of Water (2010) *Water Sharing Plan - Peel Valley regulated, unregulated, alluvial and fractured rock water sources. Background document*.

89 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

90 Based on data from Bureau of Meteorology (2020) *Daily rainfall – Attunga.* Available at: http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=055000.

91 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

92 Ibid.

93 CSIRO (2006) *Climate Change in the Namoi Catchment - Prepared for the New South Wales Government by the CSIRO*. Available at: http://www.cmar.csiro.au/e-print/open/prestonbl_2006d.pdf.

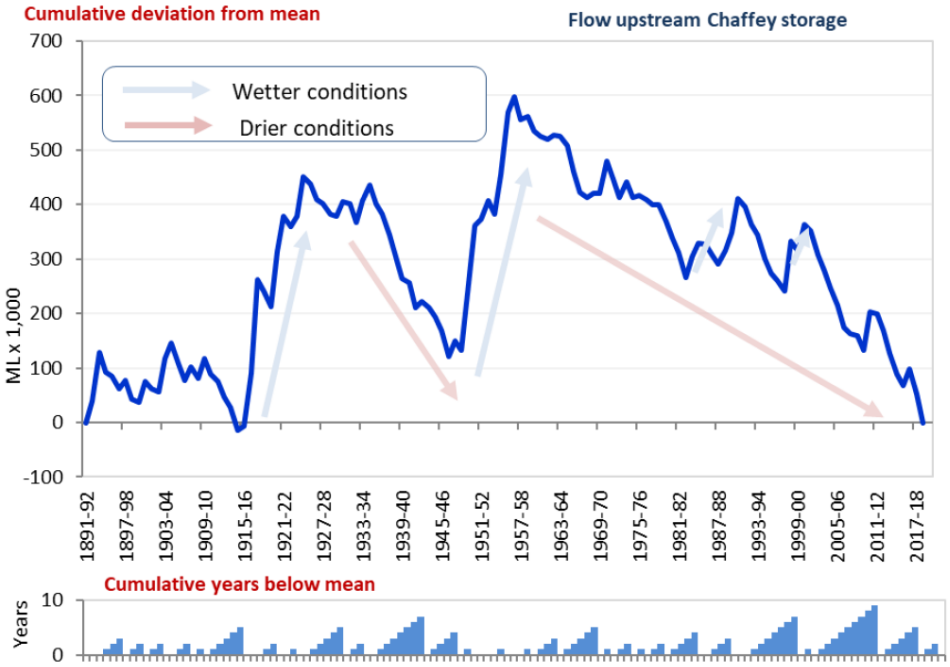

Figure 5: Long-term inflow to Chaffey Dam cumulative deviation[94]

Climate variability and climate change creates challenges for future water management in the region. The NSW Government has undertaken climate modelling for the New England North West region as part of the NSW and ACT Regional Climate Modelling (NARCliM) project, which produced a suite of 12 regional climate projections for south-east Australia across a range of likely climate scenarios.[95]

Temperature is currently the most reliable indicator of climate change, with all NARCliM models indicating that:[96]

- maximum and minimum temperatures will increase by 0.7 degrees Celsius in the near future (2020-2039)
- Tamworth will experience an additional five to ten hot days on average each year in the near future.[97]

Future changes in rainfall patterns are more challenging to model due to the complexities of weather systems that generate rain. As such, there is greater uncertainty around potential changes to rainfall, including average levels, seasonality and extremes such as drought and floods.[98] While the majority of models indicate that autumn rainfall will increase, and winter and summer rainfall will decrease across the region in the near future, there is significant variation in most projections. For example, near future projections for autumn range from a decrease of 9 percent to an increase of 47 percent.[99]

94 DPIE-Water (2019) *General Purpose Water Account Statement – Peel Catchment 2018-19*. Available at https://www.industry.nsw.gov.au/water/allocations-availability/water-accounting/gpwar

95 OEH (2014) *New England North West Climate change snapshot*. Available at: https://climatechange.environment.nsw.gov.au/~/media/374F072B30F94BFAB83C5BDB1C55373A.ashx.

96 *Ibid*.

97 'Hot days' are days above 35 degrees Celsius.

98 OEH (2014) *New England North West Climate change snapshot*. Available at: https://climatechange.environment.nsw.gov.au/~/media/374F072B30F94BFAB83C5BDB1C55373A.ashx.

99 *Ibid*.

Changes in surface runoff are important given their direct impacts to water availability and flows into dams.[100] Projections for the Namoi catchment have been assessed for NSW. In the near future (2020-2039), projections show that the multi-modal mean annual surface runoff is expected to increase by 4.1 percent in response to an increase in rainfall of 0.7 percent.[101] In the near future (2020-39), seasonal average surface runoff is projected to increase in autumn and spring. A small increase in summer and a small decrease in winter and summer is expected for the New England and north west planning region.[102]

The *Namoi Long Term Water Plan* states that CSIRO modelling indicates the number of droughts per decade will double by 2030.[103] Further, CSIRO modelling of climate impacts on water resources indicates that surface water and runoff will decline due to climate change, with up to 10 percent reduction in average annual runoff to rivers in the Namoi catchments and a 13 percent reduction in end of system flows.[104]

Changes in recharge are important given their direct impacts on groundwater resources availability and base flow volumes in streams.[105] In the near future (2020-39), climate change projections show that the multi-modal mean annual recharge is expected to decrease by 7 percent.[106]. In the near future (2020-2039), seasonal average recharge is projected to increase in spring and autumn and decrease in summer and winter for the New England and north west planning region. [107]

2.7 Current severe drought conditions

The Peel Valley is one of the worst drought-affected areas in NSW. Inflows to Chaffey Dam have been the lowest on record since May 2017.[108] The Peel River Regulated Water Source is currently considered to be in critical drought,[109] meaning only restricted town water supply, stock and domestic and other restricted high priority demands can be delivered.

The long-term average annual inflow to Chaffey Dam is just over 52,000 ML. **Figure 6** shows inflows and outflows from Chaffey Dam and Dungowan Dam from July 2016 until January 2020. While 2016-17 had good rains and inflow to Chaffey Dam was just over 83,000 ML, there

100 Littleboy, M., Young, J., Rahman, J. (2015) *Climate change impacts on surface runoff and recharge to groundwater.* Office of Environment and Heritage NSW. Available at: https://climatechange.environment.nsw.gov.au/-/media/NARCLim/Files/Climate-Change-Impact-Reports/Climate-Change-Impacts-on-Surface-Runoff-and-Recharge-to-Groundwater.pdf

101 *Ibid.*

102 OEH (2014) *New England North West Climate change snapshot*. Available at: https://climatechange.environment.nsw.gov.au/~/media/374F072B30F94BFAB83C5BDB1C55373A.ashx.

103 NSW DPIE (2019) *Namoi Long Term Water Plan consultation*. Available at: https://www.environment.nsw.gov.au/topics/water/water-for-the-environment/planning-and-reporting/long-term-water-plans/namoi-consultation.

104 CSIRO (2007) *Water availability in the Namoi*. Available at: http://www.clw.csiro.au/publications/waterforahealthycountry/mdbsy/pdf/Namoi-Report.pdf.

105 Littleboy, M., Young, J., Rahman, J. (2015) *Climate change impacts on surface runoff and recharge to groundwater.* Office of Environment and Heritage NSW. Available at: https://climatechange.environment.nsw.gov.au/-/media/NARCLim/Files/Climate-Change-Impact-Reports/Climate-Change-Impacts-on-Surface-Runoff-and-Recharge-to-Groundwater.pdf

106 *Ibid.*

107 *Ibid.*

108 GHD (2019) *Peel River Drought Response Works - Review of Environmental Factors for water delivery pipeline*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0015/151710/REF-Peel-Drought-Response-Stage-2-REF-a.pdf.

109 DPIE-Water (2020) *Drought update.* Available at: https://www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update.

has been minimal inflow since.[110] Inflows to Chaffey Dam over the two years to March 2020 were only 6 GL.[111] In the previous worst two-year drought period (1964 to 1966), inflows were over double this at 13 GL.[112] **Figure 6** also shows spikes in outflows from Chaffey Dam in June 2017 and June 2018, these were combined ECA and held environmental water releases.

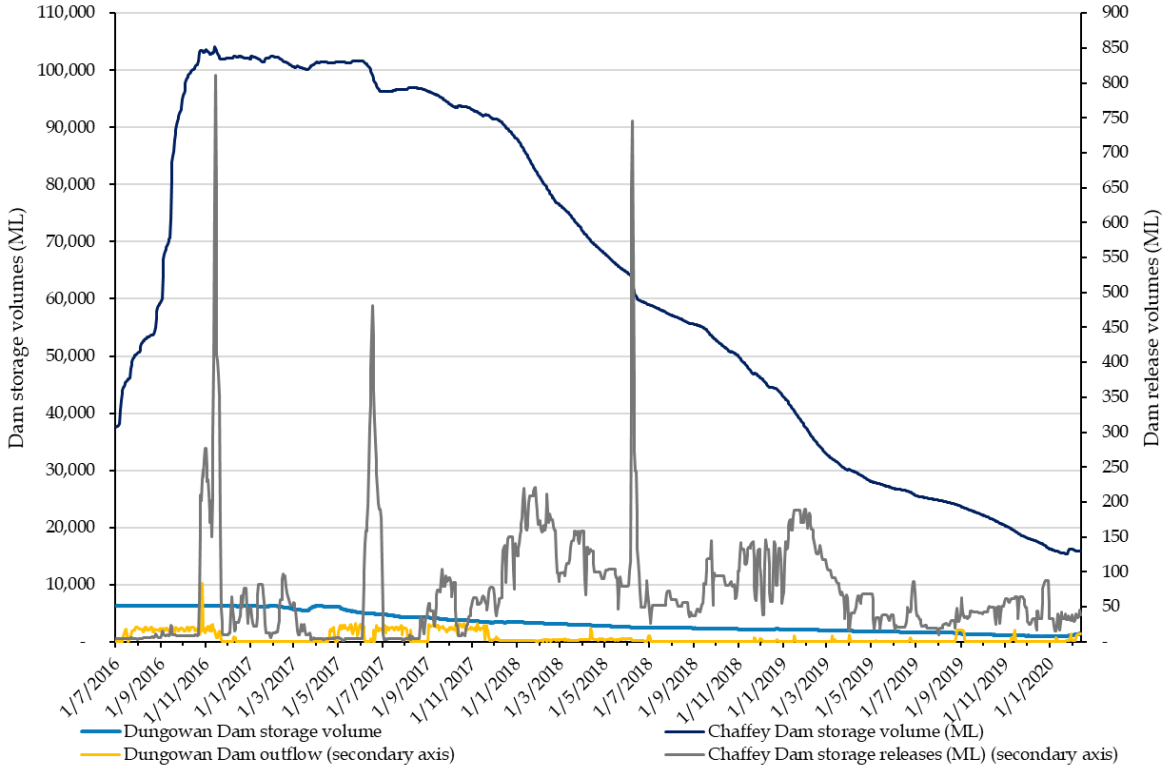

Figure 6: Chaffey Dam and Dungowan Dam storage and releases since July 2016 showing both dams at capacity in early 2017 and subsequent drawdown[113]

As of 16 March 2020, storage levels in Chaffey Dam are at 14 percent, while Dungowan Dam benefitted from rainfall in early February and as of 17 February 2020 is at 26 percent storage.[114] Local water utility needs have been under significant pressure in recent years as a result of severe drought conditions. Tamworth, Moonbi and Kootingal are currently on Level 5 water restrictions, which is considered 'emergency level'.[115] The NSW Government, Tamworth Regional Council and WaterNSW have implemented a range of additional strategies, including infrastructure to reduce transmission losses, and have funded work towards expanding Dungowan dam to manage drought impacts on the region's utility supply in the short and long term. These are discussed further in **Table 3** below and in **Section 2.1.1**.

110 GHD (2019) *Peel River Drought Response Works - Review of Environmental Factors for water delivery pipeline*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0015/151710/REF-Peel-Drought-Response-Stage-2-REF-a.pdf.

111 WaterNSW (2020) *Peel Drought – landholders' presentation*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0020/155612/Peel-Drought-Landholders-Presentation-March-2020.pdf.

112 *Ibid*.

113 Dungowan dam storage is estimated based on percent full as provided by Tamworth Regional Council on 18 February 2020. Chaffey Dam storage volume is mean volume per day as downloaded from WaterNSW Realtime water data 12 February 2020. Dungowan dam releases include pipeline and bypass releases.

114 WaterNSW (n.d.) *Peel Valley*. Available at: https://www.waternsw.com.au/supply/drought-information/regional-nsw/peel-valley.

115 Tamworth Regional Council (2019) *Water Restrictions*. Available at: https://yourvoice.tamworth.nsw.gov.au/town-water-supplies/water-restrictions.

Stakeholders consistently reported that local industries and businesses are under financial pressure as a result of the current water shortages and restrictions. These pre-existing pressures will be magnified by the global COVID-19 pandemic and additional difficulties in planning and managing a business as well as personal pressures. The pandemic is impacting on stakeholder engagement and consultation around the water resource planning process and on the replacement water sharing plans (see **Section 3.1**).

Table 3: Overview of Plan implementation and water management during the current drought[116]

Date	Events
July 2017 to June 2018	▪ Water use by irrigators in 2017-18 was high. 100 percent AWDs were based on relatively full storage levels at the start of the water year and extractive demand was relatively high later in the year due to minimal rainfall. ▪ Inflows to Chaffey Dam in 2017-18 were in the lowest five out of 100 years of inflows.
July 2018	▪ AWDs were 100 percent for all licensees except regulated river (general security) at 29 percent, and aquifer (general security) access licences at 65 percent AWD.
August 2018	▪ Tamworth Regional Council guaranteed some under-use in 2018-19 and supported its reallocation to assist irrigators. WaterNSW advised that such allocation of potential under-use cannot be assumed beyond this year.
October 2018	▪ Showers in September reduced system transmission and evaporation losses from those budgeted for the month, providing additional water for distribution.
December 2018	▪ Stage 1 drought – normal management – declared under *NSW Extreme Events Policy*. ▪ Chaffey Dam storage fell by around 8 GL, mostly to meet consumptive demand.
May 2019	▪ Stage 2 drought – emerging drought/water shortage under *NSW Extreme Events Policy*. ▪ Conditions particularly hot and dry since March 2019.
July 2019	▪ AWDs for the water year began with: - regulated river domestic and stock access licences and local water utility access licences – 70 percent - regulated river high security licences – 50 percent - aquifer (general security) access licences – 51 percent - regulated river (general security) access licences and ECA – 0 percent - all other licences received an AWD of 100 percent.
September 2019	▪ Stage 3 – severe drought/water shortage – declared under *NSW Extreme Events Policy*. ▪ Level 5 water restrictions were applied on 24 September to Tamworth, Moonbi and Kootingal towns.
October 2019	▪ Stage 4 – critical drought/water shortage – declared under *NSW Extreme Events Policy*. ▪ Chaffey Dam entered a new record low inflow since July 2018, as the usual winter inflow did not arrive, and transmission loss exceeded the budgeted amount by 3 GL. ▪ Storage inflows since July 2018 were 4 GL, significantly less than the previous historical minimum of 7.1 GL (July 1965 to September 1966).

116 Plan implementation overview based on WaterNSW (2016-2020) *Water allocation statements – Peel Valley*.

Date	Events
December 2019	▪ Implementation of emergency contingency measures on 2 December 2019, including a temporary weir at Dungowan and a temporary pipeline from Chaffey to the Dungowan to Tamworth pipeline, to reduce transmission losses. ▪ As a result of these works, flows in the Peel River downstream of Dungowan Village ceased from December 2019 and have not recommenced at the time of writing (17 April 2020). Pulse releases will maintain water quality in downstream pools and provide intermittent basic landholder rights and domestic and stock licence access.[117] ▪ Tamworth Regional Council constructed a new off-river storage facility to help improve water security. WaterNSW delivered up to 80 ML of water on 21 December via the Peel River downstream of the Dungowan temporary weir to fill this storage.[118]
January 2020	▪ Peel Valley water availability remains critically low. Chaffey Dam experienced: - critically low inflows in the 18 months since July 2018 at 4.1 GL - about one-third of the previous record low inflow of around 13.1 GL - extreme transmission loss, exceeding the budgeted loss by about 50 percent (6 GL) (although the Dungowan pipeline and temporary weir should reduce future transmission losses). ▪ A temporary water restriction (Section 324 order) was applied to Northern Basin catchments from 17 to 31 January and extended to 17 February to protect inflows arising from rainfall runoff for critical needs and connectivity. River pumping was not permitted by regulated river (high security access licences) and unregulated river access licence holders (noting that regulated river (general security) licences had zero AWDs). ▪ Rainfall events in mid-January produced runoff from major tributaries flowing into the Peel River. Inflows from Cockburn and Goonoo Goonoo Rivers to the Peel River re-established continuity from Tamworth down to the Namoi River junction, meeting its replenishment target at Carrol Gap. This resulted in an 'approval to take under temporary water restrictions' for high security users in the Peel Regulated River Water Source from 31 January 2020 to 7 February 2020. The approval to take ceased after this date to protect the tail-end of the flows.
February 2020	▪ The temporary water restriction or Section 324 order applied to Northern Basin catchments from 17 January 2020 expired on 17 February 2020. ▪ An initial exemption to this restriction in the Peel Valley granted on 31 January 2020 expired on 7 February 2020. An additional 'approval to take under temporary water restrictions' was granted in the Peel regulated water source from 9-17 February 2020 as flows were deemed well in excess of the flow targets to achieve high priority needs.
April 2020	▪ WaterNSW expect to have completed the permanent pipeline from Chaffey Dam to Dungowan village to further conserve Tamworth town water supplies.[119]

117 WaterNSW (2019) *Operations update – Peel Valley emergency drought works*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0019/151417/Drought-Relief-Fact-Sheet-Peel-Emergency-Works-December-2019.pdf.

118 WaterNSW (2020) *Regional Monthly Drought Report – 14th January 2020*. Available at https://www.waternsw.com.au/__data/assets/pdf_file/0003/152535/Regional-Drought-Report-January-2020.pdf?utm_source=Swift&utm_medium=Email&utm_campaign=NSW_drought_report.

119 WaterNSW (2020) *Peel Drought – Landholders presentation March 2020*. Available at https://www.waternsw.com.au/__data/assets/pdf_file/0020/155612/Peel-Drought-Landholders-Presentation-March-2020.pdf.

2.8 Water entitlements and use

The volume of water available in the Peel Valley is distributed between water access licences based on the share component of each licence and the AWDs. **Table 4** summarises licence data for the Plan area. There are currently 1,052 water access licences holding 128,417 share components in the Plan area.[120] Most share components are aquifer general security (25 percent), aquifer (23 percent) or regulated river general security access licences (23 percent). Other categories including local water utility, unregulated river, domestic and stock, and regulated river (high security) licences make up the remainder.

AWD provisions control the amount of water available to be extracted under each category of access license within a time period. DPIE-Water announces available water at the start of each water year (1 July), and can periodically increase the determination if it is below 100 percent (or 1 ML per share) and additional water becomes available. **Table 4** lists minimum AWDs for each licence category, plus ECA for reference.

Table 4: Shares, licence numbers and minimum AWD, by licence category[121]

Licence category	Share components	Number of licences	Minimum determination before lower priority categories can receive account water (%)[122]
Local water utility	17,160	5	70-100
Domestic and stock	6,596	76	70-100
Regulated river (high security)	804	13	50
Unregulated river	12,170	240	100
Aquifer	29,684	352	100
Regulated river (general security)	29,635	182	0[123]
ECA (non-extractive)[124]	*5,000 (ML)*	*N/A*	*Equal to regulated river (general security)*
Aquifer (general security)	32,368	184	51% of the AWDs for aquifer access licences and 49% for regulated river (general security) access licences.[125]

Figure 7 shows the Commission's estimate of the maximum potential extraction volume for each water source based on the domestic and stock component of basic landholder rights, plus

120 WaterNSW (n.d.) *NSW Water Register*. Available at: https://waterregister.waternsw.com.au/water-register-frame (accessed 26 September 2019).

121 *Ibid*.

122 'One off' AWDs for some licences in the Plan's first year are not shown. Where a range of AWDs are shown, this represents the range in minimum AWDs for different water sources for the licence category. These assume there has been no compliance activity due to LTAAEL exceedance and resulting available water reductions.

123 Under Clause 50, AWDs for regulated river (general security) access licences may be made after AWDs for regulated river (high security) access licences are 100 percent and there is sufficient water available after taking into account a range of other factors.

124 While not a licence category, the ECA is shown for reference. Its account is credited with a volume equal to 5,000 ML multiplied by the regulated river (general security) access licence AWD.

125 Under Clause 53(1)(a), the AWDs made at the start of each water year equal 51 percent of the AWDs for aquifer access licences in this water source and 49 percent of the AWDs for regulated river (general security) access licences.

the share components with full AWDs.[126] Extraction potential depends on various factors including physical availability of water and cease to pump thresholds, but provides an indication of the maximum volume of water that could be available in a higher flow year.

Reflecting the higher number of share components, the Peel Alluvium Water Source has the greatest extraction potential, as well as varying connectivity (described in **Section 2.1.1**) to the surface water sources. Of the unregulated water sources (part of the Namoi Unregulated Rivers Extraction Management Unit), the greatest extraction potential is in the Upper Peel Tributaries and Cockburn water sources.

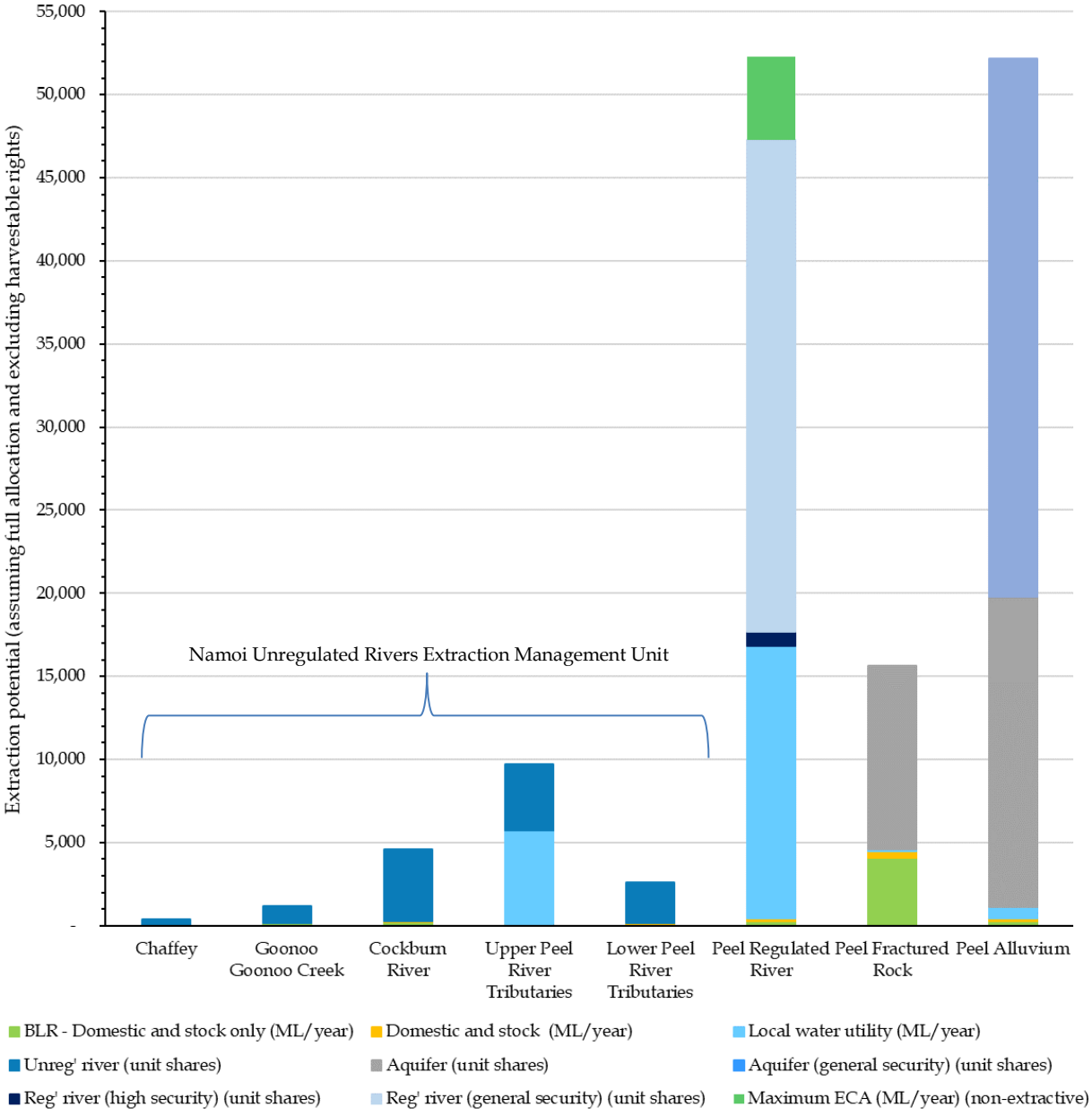

Figure 7: Summary of potential maximum annual entitlement for water access licences and the domestic and stock component of basic landholder rights for each water source in the Plan area[127]

126 Share component data as provided by WaterNSW 24 September 2019, domestic and stock estimate of basic landholder rights as estimated in Clause 20 of the Plan. Note that this excludes the harvestable rights component of basic landholder rights, as well as any floodplain harvesting.

127 Share component data as provided by WaterNSW 24 September 2019, domestic and stock estimate of basic landholder rights as estimated in Clause 20 of the Plan.

3 NSW planning context

This chapter provides an overview of other planning processes relevant to this review, including the *Murray-Darling Basin Plan* (the *Basin Plan*), NSW regional water strategies and the *NSW Extreme Events Policy*.

3.1 The *Murray-Darling Basin Plan* and water resource planning

3.1.1 Water sharing plan alignment with water resource plan boundaries

The NSW Government is developing water resource plans as part of the *Murray-Darling Basin Plan 2012* (the *Basin Plan*[128]) process.[129] As part of the water resource planning process, DPIE-Water is proposing to split the Plan's water sources to align with water resource plan areas defined by the *Basin Plan*. Draft versions of the proposed water sharing plans were publicly exhibited in 2019 and are expected to be implemented in July 2020.[130] **Table 5** summarises DPIE-Water's proposed plan divisions.[131]

Table 5: DPIE-Water's proposed changes to water sharing plan arrangements for the Peel Valley[132]

Proposed plans	Description of DPIE-Water's proposed change
Water Sharing Plan for the Peel Regulated River Water Source 2020	A new, stand-alone plan for the Peel Regulated River Water Source.
Water Sharing Plan for the Namoi and Peel Unregulated Rivers Water Sources 2012	Unregulated river surface water sources removed from the Plan and combined with the existing water sharing plan to have a single plan for the Namoi and Peel valley unregulated rivers.
Water Sharing Plan for the Namoi Alluvial Groundwater Sources 2020	Alluvial water sources removed from the Plan and included in a new plan for the Namoi and Peel valley alluvial water sources.
Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020	Fractured rock water sources removed from the Plan and included in a new plan for all Murray-Darling fractured rock water sources.

The Commission has not comprehensively reviewed the draft replacement plans as part of this review but has considered their implications when developing the review findings. Significant implications include risks associated with separating the current Plan water sources across multiple water sharing plans and the potential impact on consideration of connectivity (see **Chapter 7**).

128 Note: the term 'Basin' is in reference to the Murray-Darling Basin, unless otherwise noted.
129 Water resource plans aim to align Basin-wide and state-based water resource management to implement the *Basin Plan* through state legislation, policies and plans. The water resource plans build on existing water planning and management arrangements and include multiple documents, including the water sharing plans.
130 Minister Pavey at NSW Budget Estimates on 10 March 2020, pg. 10-11. Available at: https://www.parliament.nsw.gov.au/committees/pages/budget-estimates.aspx
131 DPIE-Water (2019) *Namoi Surface Water Resource Plan Fact Sheet - PUB19/236*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/279012/proposed-changes-wsp-arrangements-peel-reg-river-water-source.pdf.
132 *Ibid*.

3.1.2 Links to the Murray Darling Basin Cap and sustainable diversion limit

The Murray Darling Basin Cap on surface water diversions (the Cap) was introduced in 1995 to 'protect and enhance the riverine environment and protect the rights of water users' and introduce long-term limits on water extraction.[133] NSW water sharing plans include an LTAAEL, which can be lower than the Cap. For the Peel Regulated River Water Source, the LTAAEL and Cap are the same (15,100 ML).[134]

On 1 July 2019, an accounting and compliance framework based on sustainable diversion limits was introduced as part of the *Basin Plan*. The sustainable diversion limits are intended to represent an environmentally sustainable level of take.[135] These limits have now replaced the Cap, with enforcement starting once the Murray Darling Basin Authority (MDBA) accredits the water resource plans.[136]

The Commission understands that NSW intends to submit water resource plans to the MDBA by 1 July 2020.[137] NSW has entered 'good faith' negotiations with the MDBA and Australian Government. After submission, the MDBA:

- formally assesses the water resource plan against *Basin Plan* requirements and consistent with the Commonwealth *Water Act 2007* process
- may seek clarification or amendments from NSW
- provides the Commonwealth Minister with a recommendation whether the water resource plan should be accredited.

The Commonwealth Minister then considers the recommendation and, if agreed, accredits the water resource plan. Full accreditation is therefore unlikely to be feasible before quarter four in 2020.

Under the *Basin Plan*, the Peel regulated and unregulated water sources is included in the Namoi surface water sustainable diversion limit (of 488,300 ML per year, along with a baseline diversion limit of 508,300 ML per year).[138] The proposed groundwater sustainable diversion limit for the Peel Valley alluvium is equivalent to the LTAAEL (9,344 ML per year).[139] DPIE-Water is proposing to reduce the Peel Valley Fractured Rock LTAAEL from 71,218 ML per year to 15,874 ML per year to align with the *Basin Plan* sustainable diversion limits.[140]

133 MDBA (2019) *Transitioning from the Cap to sustainable diversion limits.* Available at: https://www.mdba.gov.au/basin-plan-roll-out/sustainable-diversion-limits/transitioning-cap-sustainable-diversion-limits.

134 Notes under Clause 39(2) of the Plan.

135 MDBA (2019) *Sustainable diversion limit reporting and compliance framework*. Available at: https://www.mdba.gov.au/ basin-plan-roll-out/basin-wide-compliance-review/sustainable-diversion-limit-reporting-compliance.

136 *Ibid*.

137 Minister Pavey at NSW Budget Estimates on 10 March 2020, pg. 10-11. Available at: https://www.parliament.nsw.gov.au/committees/pages/budget-estimates.aspx

138 MDBA (2019) *Current diversion limits for the Basin Murray–Darling Basin Authority*. Available at: https://www.mdba.gov.au/basin-plan-roll-out/sustainable-diversion-limits/current-diversion-limits-basin.

139 DoI-Water (2019) *Namoi Alluvium Water Resource Plan Fact Sheet - Relationship between the water resource plan and water sharing plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0014/231620/namoi-alluvium-wrp-relationships-fact-sheet.pdf.

140 DoI-Water (2019) *Water Resource Plans Fact sheet NSW - Proposed changes to groundwater sharing plans*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/236578/proposed-changes-to-groundwater-sharing-plan-fact-sheet.pdf

DPIE-Water outlined additional changes proposed in the draft water sharing plans to align them with *Basin Plan* requirements in its water resource plan fact sheets.[141]

3.1.3 Namoi Long Term Water Plan

DPIE-EES has developed the *Namoi Long Term Water Plan* as part of the environmental water management framework established under the *Basin Plan*.[142] The *Namoi Long Term Water Plan* includes objectives, targets and environmental flow requirements for key water dependent species and river functions based on best available information and input from a range of technical experts. It sets out the environmental water requirements of the system to guide water management and improve environmental outcomes over the long-term.[143] Water resource plans, and by association the relevant water sharing plans, must have regard to the relevant long term water plan for their area.[144] As such, any replacement water sharing plans developed for the Peel Valley should align with and address the risks set out in the *Namoi Long Term Water Plan*. The Commission has drawn on the *Namoi Long Term Water Plan* to inform this review.

3.2 NSW regional water strategies

The NSW Government, led by DPIE-Water, is developing 12 new regional water strategies that are expected to be completed by 2021. DPIE-Water is currently preparing the *Namoi Regional Water Strategy* and has scheduled public consultation late 2020.[145]

These valuable strategies are intended to draw on climate evidence and a range of tools and solutions to plan and manage the water needs in each NSW region over the next 20 years, including identifying risks to town water supply. They will set out a long-term 'roadmap' of actions to address the following objectives:

- deliver and manage water for local communities
- enable economic prosperity
- recognise and protect Aboriginal cultural values and rights
- protect and enhance the environment
- affordability - identify least cost policy and infrastructure options.

---

141 For example, see: DPIE-Water (2019) *Namoi Surface Water Resource Plan Fact Sheet - PUB19/236*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/279012/proposed-changes-wsp-arrangements-peel-reg-river-water-source.pdf; DPIE-Water (2019) *Namoi Surface Water Resource Plan Fact Sheet - PUB19/236*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/279012/proposed-changes-wsp-arrangements-peel-reg-river-water-source.pdf; and DPIE-Water (2019) *Water Resource Plan Fact Sheet: Proposed changes to groundwater sharing plans*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/236578/proposed-changes-to-groundwater-sharing-plan-fact-sheet.pdf.

142 DPIE-EES (2019) *The Namoi catchment and Long Term Water Plan explained*. Available at: https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-for-the-environment/namoi-catchment-long-term-water-plan-explained-190256.pdf?la=en&hash=4C9FF12FD975253E05266CD9E41A390CE31569AD

143 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW.

144 DPIE-EES (2019) *The Namoi catchment and Long Term Water Plan explained*. Available at: https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-for-the-environment/namoi-catchment-long-term-water-plan-explained-190256.pdf?la=en&hash=4C9FF12FD975253E05266CD9E41A390CE31569AD.

145 DPIE-Water (n.d.) *Regional water strategies.* Available at: https://www.industry.nsw.gov.au/water/plans-programs/regional-water-strategies. Accessed 7 April 2020.

DPIE-Water is developing the strategies in partnership with water service providers, local councils, communities, Aboriginal stakeholders and other stakeholders across NSW. Water sharing plans should incorporate and build on the work within and behind the regional water strategies and allow for adaptation and improvement as they are completed.

3.3 NSW Extreme Events Policy

DPIE-Water's development and publication of the *NSW Extreme Events Policy* has significantly improved transparency and certainty around decision making in drought. It provides a framework for structured and proactive management of Basin water resources in extreme events.[146] As outlined in **Table 6**, the *NSW Extreme Events Policy* facilitates early intervention and delays the suspension of some water sharing arrangements, so suspensions only occur in periods of severe water stress and water quality impacts.[147] It states that in critical drought, critical human water needs are to be secured as a priority.[148]

Table 6: Management approaches during stages of DPIE-Water's incident response guide framework[149]

Stage based on risk level	Agency or management approaches	Normal Plan rules	Contingency or operational measures	Suspension of parts of a Plan
Stage 1	Normal management operations - long-term planning, including drought security planning.	In force		
Stage 2	Operational adjustments may be required. Implement emergency management readiness. WaterNSW establish and update inter-agency critical water advisory panel for surface water sources. Minister advised. Initial communications with potentially affected communities and stakeholders.	In force	Possibly activated	
Stage 3	Adjust management operations. Emergency management on standby. Critical water advisory panel operational and meeting for groundwater and surface water sources, with regular ministerial updates. Increase communications with affected communities and stakeholders.	Possibly also in force	In force	Possibly activated
Stage 4	Normal operations untenable, activate emergency management. Implement state agency or regional response if required or triggered. Maintain critical water advisory panel, with regular ministerial updates. Increase regular communications with affected communities and stakeholders.		In force	In force

146 Department of Industry (2018) *NSW Extreme Events Policy*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0008/187703/Extreme-Events-policy.pdf

147 Under section 49B of the Act, all or part of water sharing plans can be suspended if the Minister 'is satisfied that there is an extreme event in relation to a particular Basin management area or part of the Basin water resources'.

148 Department of Industry (2018) *NSW Extreme Events Policy*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0008/187703/Extreme-Events-policy.pdf

149 *Ibid*.

4 Manage available water determinations, extraction and variability

There are significant challenges with the Plan's ability to manage AWDs and extraction in a variable system. These include:

- how LTAAELs were initially defined
- spreading impacts from increased extraction across other water sources and plans
- high entitlement to LTAAEL ratios, with risks from potential rapid activation
- a high proportion of the LTAAEL needed for critical uses, with growth in utility water use largely accounted for in the *Water Sharing Plan for the Upper and Lower Namoi Regulated River Water Sources 2016* (the Namoi Regulated Plan)
- the inability for the AWDs to effectively reduce use due to the high number of inactive licensees and resultant disproportionate impact on active licensees.

If AWDs cannot restrict use and there are low inflows and high losses, there may not be enough water for environmental requirements, basic landholder rights and town utility needs in later years. While the system can accommodate these risks in wetter years, this can cause uncertainty for water users during drought.

The Plan does not effectively manage risks to water sharing. It must shift from a reactive, optimistic approach that relies on regular inflows to a proactive, risk-based approach that includes provisions to manage water shortages in the Plan. Without the fundamental ability to control extraction, the Plan cannot achieve its social, economic and environmental outcomes.

LTAAELs are key mechanisms to establish water availability and manage its use. They define the limit of water that can be taken from each water source for purposes including domestic and stock, urban, industrial and agricultural uses and held environmental water. LTAAELs should manage competition between entitlement holders and the water that needs to remain in the river for the environment, community, social and cultural needs. They reinforce the value of water and support the water market and the integrity of tradeable water entitlements.

There are eight water sources in the Peel Valley. The Plan sets out five LTAAELs. The Note to Clause 39(1) of the Plan estimates the sum of the LTAAELs of these water sources combined to be 110 GL, which consists of:

- 15.1 GL under Cap baseline conditions from the Peel Regulated River Water Source
- 9.3 GL in the Peel Alluvium Water Source[150]
- 71.2 GL in the Peel Fractured Rock Water Source[151]
- an unspecified figure for the five Peel Unregulated River Water Sources (as part of the broader Namoi Unregulated Rivers Extraction Management Unit), although a basic estimate could be 14.4 GL.[152]

150 Clause 39(4) of the Plan.

151 Clause 39(5) of the Plan. According to the Plan's Background Document, the fractured rock LTAAEL was based on a sustainability factor (50 percent) multiplied by the annual average rainfall recharge for non-high conservation areas, and DPIE-Water considered it to be the estimated sustainable limit for the water source.

152 Based on the total valley LTAAEL of 110 GL estimated in the Note to Clause 31(1) of the Plan minus the sum of the combined regulated surface water, alluvium and fractured rock LTAAELs.

The Plan's LTAAELs are also linked to the LTAAELs in the Namoi Regulated Plan and the *Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012* (the Namoi Unregulated Plan). The LTAAELs and links to other water sharing plans are discussed further in **Section 4.2**.

4.1.1 Peel Regulated River Water Source

The LTAAEL for the Peel Regulated River Water Source is based on the long-term average annual extraction volume as modelled by the Integrated Quantity/Quality Model (IQQM)[153] that would have occurred with the:

- water storages and water use development that existed in 2007-08
- share components existing at the start of the Plan (2010)
- application of the rules defined in the Plan
- plus, the long-term average annual extraction from Dungowan Dam water storage by Tamworth Regional Council.[154]

Stakeholders raised concerns with DPIE-Water and the Commission over the accuracy of the IQQM.[155] Irrigator groups the Commission has engaged with were highly critical of the IQQM inputs, saying initial inputs were '*based on cotton crops being grown in the Peel Valley. The calculations were not reviewed [based on an] arbitrary deadline*'[156] and that the IQQM '*generated results inconsistent with other valleys and lived experience*'.[157]

The Commission notes that the Peel IQQM was initially developed in the late 1990s and was independently audited in September 2007, with the auditors concluding it was sufficiently robust and lacked sufficient bias that it could be used to simulate long-term diversions in the Peel Valley.[158]

Since this audit, DPIE-Water built a current condition model for the Peel Regulated River in 2017.[159] DPIE-Water advised that the IQQM was recalibrated as part of this update. However:

- no formal calibration report was developed, only an internal presentation
- the recalibration timeframe only includes a short period since the dam was enlarged
- there was no assessment of growth or change in crop area – DPIE-Water advised that its staff spoke to WaterNSW and irrigators to determine crop area and which water source (surface water or groundwater) was used at the farm scale to inform model setup and update.[160]
- DPIE-Water advised that data from 2009-17 suggests the water use and crop area conditions were similar through this period, except for Chaffey Dam enlargement and subsequent activation of Plan clauses.[161]

153 Peel IQQM computer model with system file W59, as outlined in the note under Clause 39(2) of the Plan.
154 Clause 32(9) of the Plan.
155 Submissions: Peel Valley Water Users' Association 23, received October 2019 and 14 April 2020.
156 Interview: Peel Valley Water Users' Association, 12 November 2019.
157 Submission: Peel Valley Water Users' Association, received 23 October 2019.
158 DPIE-Water (2019) *Namoi Water Resource Plan – Pre basin plan Scenario Report – Peel Regulated River System: Appendix D to Schedule F*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0016/273112/appendix-d-to-schedule-f-namoi-sw-wrp-modelling-peel-pbp-scenario-report.pdf.
159 Advised by DPIE-Water, 2 March 2020.
160 *Ibid*.
161 *Ibid*.

Due to the previous stakeholder concern regarding the accuracy of the IQQM and its inputs, and the planned replacement of IQQM with eWater Source (which calculates the LTAAEL), the Commission considers that an independent, published review of eWater Source is warranted to improve transparency and build community trust. The review should include consultation with all water users' associations in the Plan area and other licensees to provide local insights and understanding of the system and history of water management.

Irrigators have called for the Peel Regulated River's LTAAEL to be increased:

> '*The Regulated Peel's …LTAAEL is unacceptable by any measure. If this review of the Peel's Water Sharing Plan does nothing else, it is essential for the survival of the Regulated Water Users in the Peel Valley that the Peels LTAAEL is increased to bring it into parity with all of the other Regulated Valleys in the NSW portion of the Murray Darling Basin*'.[162]

The Commission agrees that the ratio of shares to LTAAEL is unusually high (see **Section 4.3.1**). However, the LTAAEL should be defined based on environmental needs rather than existing entitlement. It is worth noting that LTAAEL compliance under the Plan has not been triggered and the LTAAEL has not limited extraction to date. The AWDs have rather been determined by the scale of entitlement and water available in the system (see **Section 4.3** for more detail).

The Peel Regulated River LTAAEL is typical of regulated water sharing plans across NSW except for the:

- inclusion of extraction from Dungowan Dam
- accounting for Tamworth Regional Council's growth in use through the Namoi Regulated Plan
- two-step process to determine growth in extraction against the LTAAEL.

The accounting of extraction from Dungowan Dam as part of the Peel Regulated River LTAAEL is unusual as the dam is physically in the Upper Peel Tributaries Water Source. The potential impact of this is discussed in **Section 4.2**.

While extraction from Dungowan Dam is accounted for under the Peel Regulated River LTAAEL, growth in Tamworth Regional Council's extraction from the dam and other sources (largely Chaffey Dam, located in the Regulated River Water Source) is accounted for against the Namoi Regulated Plan. When assessing LTAAEL compliance, the AWDs for the Plan's regulated river (general security) access licences may be reduced when the LTAAEL assessment demonstrates:

> '*…that that current modelled long term average annual extractions, <u>minus</u> 95% of the growth in extraction by the City of Tamworth has exceeded the long-term average annual extraction limit by 3% or more…*'.[163]

162 Submission: Individual, received 12 September 2019.
163 Clause 42(2) of the Plan.

This means that 95 percent of any growth in use from Tamworth Regional Council is captured instead under the Namoi Regulated Plan which states that an assessment shall be carried out each year to determine that growth, and that:[164]

> '*The current long-term average annual extraction from these water sources plus 95% of the growth in extraction by Tamworth City Council… may not be permitted to exceed the long-term extraction limit…*'.[165]

Under the Namoi Regulated Plan, if the LTAAEL is exceeded, then the AWDs made for supplementary licences and regulated river (general security) licences in the Upper Namoi Regulated River Water Source and the Lower Namoi Regulated River Water Source may be reduced.[166]

The most significant difference in the Peel Regulated River LTAAEL is its unique two-step process to assess if there has been growth in water extraction, which is as follows:

- **Step 1 –** DPIE-Water compares the observed and simulated extraction over the preceding 10 years for each annual assessment of LTAAEL compliance.
- **Step 2 –** If the observed 10-year average annual extraction in (1) is over 120 percent of the modelled 10-year average annual extraction, then DPIE-Water compares the latter with a current conditions scenario, which should represent as accurately as possible all water use development, supply system management and other factors affecting the long-term average annual extraction volume from the water source at the time of assessment.[167]

To test LTAAEL compliance, most NSW regulated river water sharing plans only require a comparison of the Plan LTAAEL and current conditions scenario (Step 2). DPIE-Water outlined the unique initial 10 year rolling average test (Step 1) was included in the Plan in 2010 due to:

- concerns with the IQQM's representation of water use, particularly regarding the variable water demands of lucerne, which fluctuate based on regional weather or economic factors
- the (then planned) enlargement of Chaffey Dam, which would result in the IQQM modelling showing an increase in water extraction before there was a chance to verify if it had occurred. At the time, DPIE-Water considered there were other factors constraining growth in water use, such as land suitability for irrigation and market forces.[168]

DPIE-Water described the 10-year rolling average test (Step 1) as being more 'reactive' than the two-model comparison test (Step 2).[169] A reactive assessment of extraction may not detect growth in extraction in a timely way, and this may impact on the environment, downstream basic landholder rights, and Tamworth Regional Council's town water supply during drought. This is a key issue and is discussed further in **Section 6.2**).

The draft *Water Sharing Plan for the Peel Regulated River 2020* includes this two-step test. However, as Chaffey Dam has already been enlarged (a key reason for the test), the two-step process is no longer required and LTAAEL assessment and should be brought in line with other NSW water sharing plans in the Basin.

---

164 Clause 30(4) of the Upper and Lower Namoi Regulated Plan.
165 Clause 31(1) of the Namoi Regulated Plan.
166 Clauses 31-32 of the Namoi Regulated Plan.
167 Clause 41 of the Plan.
168 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.
169 *Ibid*.

4.1.2 Peel Unregulated River Water Sources

The Plan does not include a numeric LTAAEL for the five Peel unregulated river water sources. The unregulated water sources are managed under an LTAAEL for the Namoi Unregulated Rivers Extraction Management Unit.[170] Stakeholders consider that the advantages and disadvantages of a single extraction limit for the Namoi and Peel system be examined, as it had previously been rejected by DPIE-Water.[171]

Exceedance of the Namoi Unregulated Rivers Extraction Management Unit LTAAEL due to an increase in use in the unregulated rivers in the Plan area would be dispersed across all the unregulated water users across the Namoi and Peel valleys (see **Figure 8**). This socialises local impacts in individual catchments across the broader valley.

While it may achieve an undefined social objective of enabling additional extraction in certain areas, the disconnection of the water accounting from the actual amount of water available can create risks. While the Plan allows growth in extraction to be managed across hydrologically disconnected water sources, trade rules do not permit trade of licences between these same water sources. This approach is inconsistent, as the Plan recognises the potential for environmental and social impacts at the small trade scale, while the overarching limit does not address these risks.

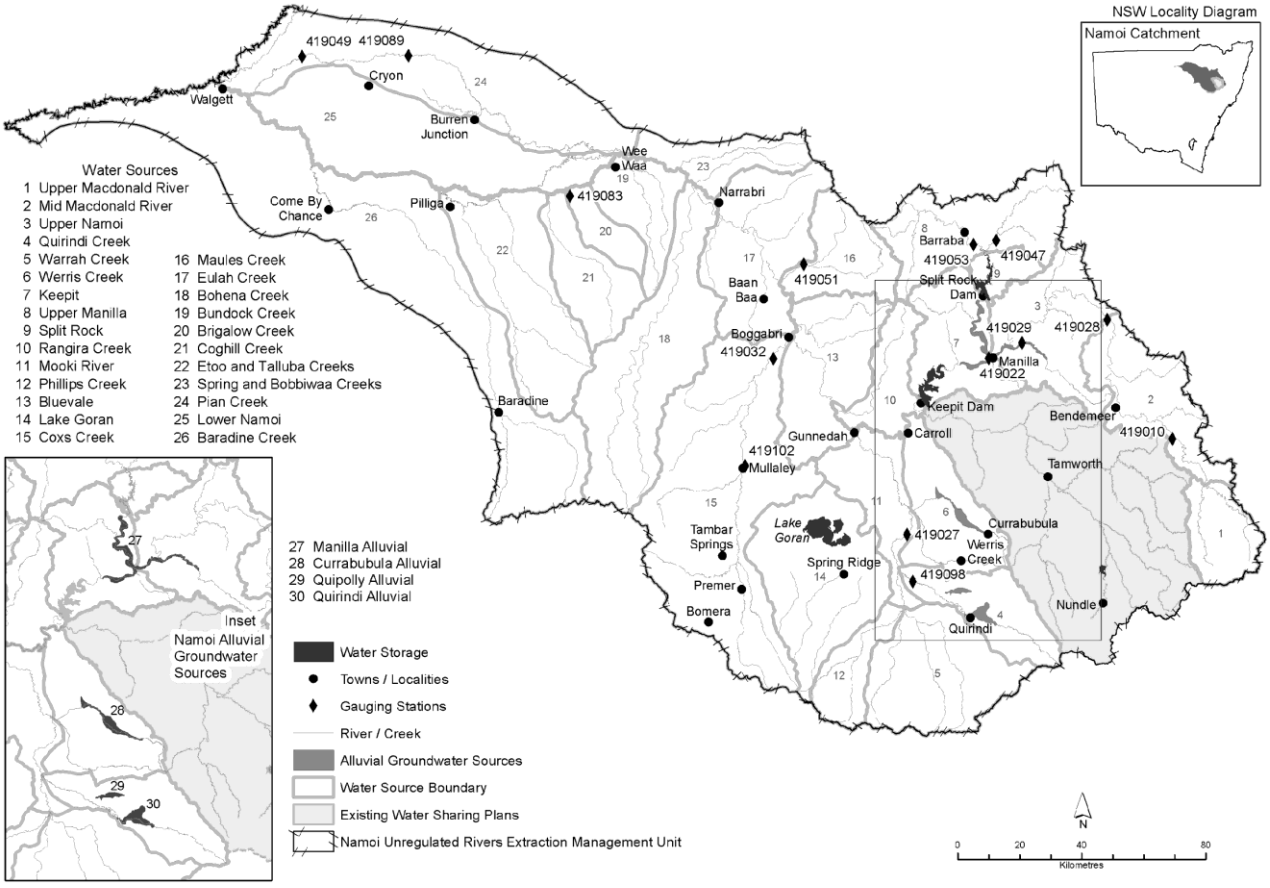

Figure 8: The Plan area (light grey) in the Namoi Unregulated Rivers Extraction Management Unit.[172]

170 Clause 29(2) of the Namoi Unregulated Plan and Clause 39(3) of the Plan.

171 Submission: Peel Valley Water Users' Association, 23 October 2019.

172 Appendix 1 of the *Water Sharing Plan for the Namoi Unregulated and Alluvial Water Sources 2012*. Available at: https://www.legislation.nsw.gov.au/#/view/regulation/2012/493/app1.

DPIE-Water derived water use in this extraction management unit from 'volumetric conversion' surveys of licensees conducted for 1993-99 and completed around 2002.[173] DPIE-Water advised that a breakdown is not available at a scale below the extraction management unit (that is, at the Peel Valley or water source level).[174] However, as the survey was carried out at the licensee scale, the Commission understands that DPIE-Water could determine the historic extraction at a finer scale with the appropriate resources.

The Plan audit also found that the unregulated river LTAAEL development and implementation did not include a:

- follow up survey
- structured and documented risk assessment
- annual assessment.[175]

The audit also found that DPIE-Water did not comply with Plan provisions requiring annual LTAAEL compliance for the unregulated rivers across the extraction management unit.[176] DPIE-Water advised that this was due to a lack of metered users in the rivers and it may be improved by the implementation of the *NSW Non-Urban Water Metering Framework*.[177]

As discussed in **Section 10.5**, the metering reforms will only require around a third of licensees in the unregulated water sources to be metered and LTAAEL compliance cannot rely solely on metering results. There are alternative methods to define extraction, but DPIE-Water advised as part of the audit that these are time consuming and resources were unavailable to complete the work.[178]

The Commission recommends that DPIE-Water review the surveys at the water source scale and complete a follow up survey and risk assessment to:

- estimate historic and current extraction at a water source scale and therefore the potential for activation of sleeper licences
- examine, engage with stakeholders and publish the benefits and impacts of having a separate numeric LTAAEL for the Peel unregulated rivers, and implement any resulting recommendations
- enable transparent management with annual LTAAEL compliance reports.

Further, DPIE-Water should publish and implement a method to assess extraction and LTAAEL compliance in unregulated water sources that will not be fully metered under the *NSW Non-Urban Water Metering Framework*.

---

173 The Commission understands that DPIE-Water carried these surveys out on a licence by licence basis to determine an appropriate volumetric conversion for licences that were previously based on spatial area and type of use.

174 Advised by DPIE-Water, 20 March 2020.

175 Alluvium and Vista (2019) *Audit Report: Audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.

176 *Ibid*.

177 Advised by DPIE-Water, 2 March 2020.

178 Alluvium and Vista (2019) *Audit Report: Audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.

4.1.3 Peel Alluvium Water Source

The macro groundwater planning method generally used to define LTAAELs has several identified limitations, particularly:

- in alluvial systems where the aquifers are recharged by regulated and unregulated rivers
- if the calculated LTAAEL is lower than the total allocated volume.[179]

The LTAAEL for the Peel Alluvium Water Source was not developed using the macro approach, as it would have been lower than entitlement, and the aquifers are recharged by the rivers.[180] Instead, the LTAAEL was defined to equal current average extraction.[181] Critically, this approach does not consider sustainable extraction – a decision made to avoid 'unacceptable impacts on inland rural communities' if extraction levels were reduced.[182] The approach assumed that the volume of water extracted when the Plan commenced in 2010 was sustainable, in terms of recharge to replenish the water source for future use and provide enough water for the environment and basic landholder rights.

DPIE-Water advised that it assesses extraction against the LTAAEL (9.3 GL) and that the LTAAEL has not been exceeded under the Plan. The Plan audit found that while DPIE-Water uses a spreadsheet to calculate and assess compliance against groundwater LTAAELs (for the Peel Alluvium and Peel Fractured Rock water sources), this process was not supported by formal, written procedures that capture roles, responsibilities, oversight and controls.[183]

4.1.4 Peel Fractured Rock Water Source

In the Peel Fractured Rock Water Source – which is defined as a non-connected system – the LTAAEL was calculated using the macro groundwater planning method, which identified a percentage of estimated rainfall recharge to reserve as planned environmental water, leaving the remainder of the estimated rainfall recharge as the LTAAEL.[184] The LTAAEL is based on:

- average annual rainfall recharge in non-high conservation areas of 142,435 ML per year
- a sustainability factor of 50 percent.

---

179 DPI - Office of Water (2015) *Macro water sharing plans – the approach for groundwater. A report to assist community consultation.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0019/547300/macro-water-sharing-plans-the-approach-for-groundwater.pdf.

180 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

181 As per note under Clause 32(4) of the Plan, the LTAAEL is equal to: average annual extractions from July 1997 to June 2004 for metered entitlements issued under Part 5 of the *Water Act 1912*, plus estimated annual extraction for unmetered entitlements issued under Part 5 of the *Water Act 1912*, plus estimated annual water requirements for domestic and stock rights and native title rights, plus estimated average annual extraction from July 1993 to June 1999 for entitlements issued under Part 2 of the *Water Act 1912* in existence immediately before the start of the Plan, licensed to extract water from Wallamoore Anabranch.

182 DPI - Office of Water (2015) *Macro water sharing plans – the approach for groundwater. A report to assist community consultation,* p.29. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0019/547300/macro-water-sharing-plans-the-approach-for-groundwater.pdf.

183 Alluvium and Vista (2019) *Audit Report: Audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.

184 DPI - Office of Water (2015) *Macro water sharing plans – the approach for groundwater. A report to assist community consultation.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0019/547300/macro-water-sharing-plans-the-approach-for-groundwater.pdf.

DPIE-Water's draft *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* amends this LTAAEL to about 15.9 GL to align with the sustainable diversion limit under the *Basin Plan*.[185] The Commission is not aware of DPIE-Water engaging directly with Peel Valley stakeholders regarding this change and stakeholders advised the Commission that it was not effectively communicated to them.[186]

The boundaries of the Peel Fractured Rock Water Source are defined by the Plan map, not by the material of the aquifer. The Plan states '*the Peel Fractured Rock Water Source includes all water contained below the surface of the ground shown on the Registered Map excluding the Peel Alluvium Water Source*'.[187]

Stakeholders noted that bores are being constructed in alluvial aquifers on minor tributaries.[188] If licenced, these works would be assigned to the Peel Fractured Rock Water Source under the Plan, as they are outside the Peel Alluvium Water Source boundary defined in the Plan map. Water source boundaries and licence categories should be based on hydrogeological evidence. While combining all alluvial and fractured rock aquifers outside the major tributaries simplified Plan development and administration by removing the need to map all the alluvial sediments, it created complexity around:

- **the basis for the fractured rock LTAAEL –** as the current limit is based on recharge with a sustainability factor applied
- **controlled allocations**[189] **–** as additional licences could be within alluvial systems which could increase extraction from any connected unregulated or regulated surface water sources
- **carryover –** as the current Plan allows carryover in the unregulated river water sources and for aquifer access licences in the Peel Alluvium Water Source (see **Section 4.3.2**) but not in the Peel Fractured Rock Water Source.

All alluvial aquifers should be defined as being in the Peel Alluvium Water Source, and the rules aligned with any connected surface water sources. To effectively manage the different risks to alluvial and fractured rock aquifers (see **Section 4.3.2**), DPIE-Water should:

- review bore logs to determine if any licences in the Peel Fractured Rock Water Source are extracting from an alluvial aquifer rather than fractured rock
- assess the potential volume of additional alluvial extraction and relative reduction in fractured rock extraction
- publish results and, if extraction potential from alluvial aquifers under the Peel Fractured Rock Water Source is significant, outline and consult on steps to manage risks.

185 DPIE-Water (2019) *Namoi Surface Water Resource Plan Fact Sheet - PUB19/236*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/279012/proposed-changes-wsp-arrangements-peel-reg-river-water-source.pdf.

186 As advised by the Peel Valley Water User representative in the Stakeholder Advisory Panel meeting on the Commission's preliminary findings, 3 April 2020.

187 Clause 4(6) of the Plan.

188 As advised by the Peel Valley Water User representative in the Stakeholder Advisory Panel meeting on the Commission's preliminary findings, 9 April 2020.

189 For water sources with unassigned water, controlled allocation orders can be used to provide potential licensees with the right to apply for water access licences See DPIE-Water (n.d.) *Controlled allocations*. Available at: https://www.industry.nsw.gov.au/water/allocations-availability/controlled.

Alternative options could include:

- separating the Peel Fractured Rock Water Source into two management zones; one covering any licence extracting from a works in the fractured rock and the other in alluvial aquifers based on bore logs, or
- remapping the Peel Alluvium Water Source and moving licences extracting from alluvial aquifers into that source.

4.2 Complex accounting risks environmental, social and economic outcomes

The process to develop LTAAELs (as described above) and account for growth in water extraction has created potential spatial and social inequity. The draft replacement water sharing plans do not address these issues and risk entrenching them further.

To limit the impact from growth in use or activation of sleeper licences, the Plan accounts for growth against a broader group of water users outside the Plan area, particularly for the Peel unregulated river water sources (see **Section 4.1.2**). This dispersal and socialisation of risk was designed to support economic and social outcomes for some water users but could create:

- a disparity between the actual volume and the planned volume of water (through the lack of a feedback process)
- a distorted water market, which does not reflect the true value of water
- local impacts to environmental, social, cultural and economic outcomes.

Due to management of the Peel and Namoi unregulated rivers in the Namoi Unregulated Rivers Extraction Management Unit, if licence activation or metering (see **Section 10.5**) in the unregulated Peel Valley rivers increases, it could be covered by underuse in the Namoi Valley unregulated rivers. Conversely, increased activation or metering in the Namoi Valley unregulated rivers could be covered by underuse in the Peel Valley. This creates environmental, social and economic inequity in the following ways:

- If overall extraction is under the LTAAELs, over-extraction in individual water sources could be hidden under the current linked water sharing plan structure. However, local over-extraction will be felt in the local downstream environment through impacts on:
  - environmental functions such as water quality and habitat
  - economic viability, with reduced ability to extract and a higher proportion of time below cease to pump thresholds
  - social and cultural outcomes such as fishing and amenity.
- Over-extraction in hydrologically disconnected water sources can affect licensees more broadly, with the socialisation of LTAAEL compliance having economic and social impacts such as:
  - disconnected water sources having AWDs reduced, impacting economic and social outcomes
  - increasing flows in those disconnected water sources, benefitting downstream users (for example, if unregulated use in the Namoi led to the Peel Valley unregulated use being reduced, then users in the downstream Peel Regulated River and Namoi River and the connected alluvial systems could benefit from increased water availability).

The Plan requires that AWDs for regulated river (general security) access licences and the ECA cannot be made until the AWDs for local water utility and regulated river (high security) access licences reach 100 percent or 1 ML per share respectively, and delivery losses have been accounted for.[190] This aims to ensure there is enough water for local water utility needs. If sleeper licences are activated after this point (see **Section 4.3.3**), the system would not be able to physically supply the required volumes of water without impacting environmental outcomes and this would affect licensees' AWDs in the following year. This is discussed further in **Section 4.3.5**.

The Plan does not provide a mechanism to reduce the unregulated river access licences AWD below 100 percent until annual extractions (averaged over three water years) in the broader Namoi Unregulated Rivers Extraction Management Unit exceed the extraction management unit's LTAAEL by five percent or more.[191] Only then can the AWDs be reduced in the following water year, and the reduction would apply to all unregulated water sources in the broader Namoi Valley.

Over-extraction in one water source within the extraction management unit, with its resulting environmental, social and economic impacts, can be covered within the broader management unit. This means that if all sources are managed near their limit and extraction in one water source increases, this will drive the extraction management unit above the LTAAEL. The impact of this would be felt across disconnected water sources, as AWDs across the extraction management unit would be reduced.[192] This risk is amplified as the unregulated system has limited metering and there is a risk of undetected growth in extraction in these areas.

DPIE-Water should manage and report on the LTAAELs at a water source or Peel Valley scale to reduce spatial inequity and improve local environmental, social and economic outcomes. The need for water source-level LTAAEL reporting is important considering the potential amalgamation of elements of the current Plan into Namoi water sharing plans. The Plan requires the AWDs to be reduced across a broad group of disconnected water users. This could penalise water users in disconnected catchments, and create local environmental, social and economic risks. DPIE-Water should include measures to manage and report on LTAAELs at a water source or Plan scale in implementation plans, and publicly report on targeted mechanisms to address LTAAEL exceedance and resulting local impacts.

4.3 High extraction potential is a risk

Several factors increase the risk of LTAAEL exceedance and over-extraction, particularly in the unregulated and alluvial water sources, including:

- very high entitlement to LTAAEL ratios
- generous account management rules with three-year averages and 100 percent carryover
- minimal active management of extraction by DPIE-Water through AWDs (which are generally set at 100 percent).

The Commission recognises that there are practical limits to access (daily availability of water) and the relatively small scale of irrigation operations and minimal on-farm storage compared to

190 As identified in Section Clauses 48, 19 and 50 of the Plan.
191 Clause 43 of the Plan.
192 While the water sources are all connected downstream (that is, at Walgett, the Namoi River is connected to all the waterways), the various water sources are not connected to each other. The Commission notes the inadequacy of this aspect of the Plan, as the limits on trading rules more accurately reflect this geographic disconnect.

other areas such as the lower Namoi. However, DPIE-Water has not documented a clear, transparent assessment of risk, mitigation measures or their implementation to effectively manage extraction in the Plan area.

4.3.1 High ratio of share component to LTAAEL

There are significant issues in the Peel Valley regulated, unregulated and alluvial water sources when managing a high access licence share component to LTAAEL ratio (see **Table 7** and **Figure 9**). Only the current Fractured Rock Water Source LTAAEL is above the level of potential extraction.

Stakeholders, particularly water user association members, are concerned about the Plan's high ratio of entitlement to LTAAEL and have requested that the Peel Regulated River Water Source LTAAEL is raised. One stakeholder's experience observing the Inter-Agency Panel thought they developed the Regulated River Water Source LTAAEL with '*great haste, little consultation and investigation … to meet the deadline to access funding from the Federal Government*'.[193] However, enforcement of the LTAAEL has not caused AWDs to be reduced to date. Further, raising the LTAAEL may exacerbate issues in very dry years such as the recent drought, and result in downstream environmental, social and economic risks.

Table 7: Total estimated extraction potential (assuming full AWDs) for each water source compared to LTAAELs as outlined in the Plan

	Total estimated extraction potential with full AWDs (ML per year)[194]	LTAAEL (ML per year)	Extraction potential to LTAAEL ratio
Peel Unregulated Rivers (as part of the Namoi Unregulated Rivers Extraction Management Unit)	18,269	(estimated) 14,338[195]	(estimated) 1.3
Peel Regulated River	48,000	15,100	3.2
Peel Alluvium	51,622	9,344	5.5
Peel Fractured Rock	14,748	71,218	0.2

This high ratio adds unnecessary risk and uncertainty to Plan management. Using an extreme example to illustrate the point, if all alluvial licensees decided to activate and extract their entitlement, the alluvial LTAAEL could be exceeded by over five times in one year (compliance activity would be required once the average extraction over five years was 15 percent, or about 1,400 ML, over the LTAAEL). The AWD would need to be near zero for the next four years to account for the excess and return the extraction to the LTAAEL.

193 Submission: individual, 12 September 2019.
194 Assuming full allocations and excluding harvestable rights.
195 See **Section 2.8.1**, the unregulated LTAAEL is estimated based on the LTTAEL in the note under Clause 39(1) of the Plan minus the regulated river, alluvium and fractured rock water source LTAAELs listed in the note to Clause 39(2), Clause 39(4) and Clause 39(5) respectively.

While this scenario is unlikely due to the practical limits to access (the daily availability of water), the relatively small scale of Peel irrigation operations and limited on-farm storage compared to other water sources, mean that even a small percentage of activation can have significant impacts. DPIE-Water have not assessed the risk to licensees, their businesses and the broader system. Having alluvial access reduced significantly or cut off due to exceedance of the LTAAEL would have broader and longer-term impacts on licensees than cease to pump thresholds being met. Significantly reduced access for any user group would likely have severe consequences, with one stakeholder stating that '*from an economic and social point, having access cut off [under cease to pump rules] would be death knell for those businesses*'.[196] These risks are primarily caused by the Peel's high entitlement to LTAAEL ratios.

Figure 9 compares the potential extraction with LTAAELs for each water source, highlighting the potential for over-extraction and resulting impacts.[197] It indicates that if domestic and stock landholder rights and licences and local water utility licensees extracted their full entitlement from the Peel Regulated River Water Source in any year, the LTAAEL would be exceeded before any general security licences accessed water.

While most growth in local water utility use is accounted for by the Namoi Regulated Plan (see **Section 4.1.1**), the Plan does not state the starting point from which growth is assessed (that is, if the modelling relied on town water use of around 8,000 ML in 2010, or projected use by Plan expiry in 2020). Regardless, the LTAAEL should be based on the sustainable level of extraction. Further, accounting rules do not remove the potential for local environmental, social and economic impacts from over-extraction.

Tamworth Regional Council has not required their full entitlement, reducing the risk of local impacts from over-extraction. Again, while the accounting of the local water utility growth in use is largely outside the Plan (see **Section 4.2**) for the unregulated and regulated rivers (and none of the use is accounted for in the unregulated system), the impacts of extraction will be seen in the Plan area.

196 Interview: Cockburn Valley Water Users' Association, 12 November 2019.

197 Noting that the Namoi (Peel Valley) unregulated river LTAAEL is an estimate of the Peel Valley's component of the LTAAEL for the broader Namoi Unregulated River Extraction Management Unit.

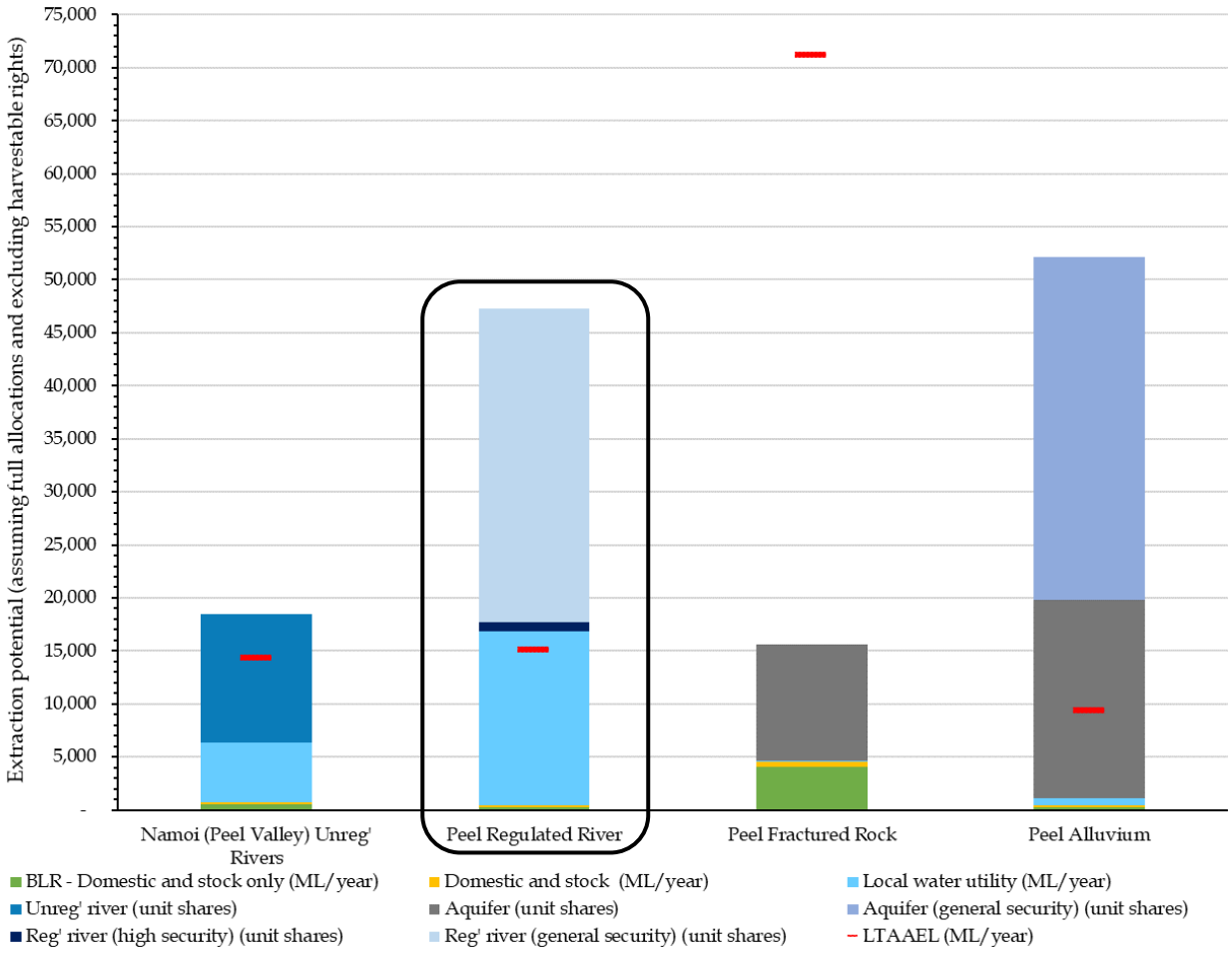

Figure 9: Entitlements and basic landholder rights (domestic and stock component only) compared to the long-term average annual extraction limits. Note the discussion in Section 4.3.4 regarding the second-year reserve for domestic and stock, and local water utility licences, not shown in this figure.[198]

4.3.2 Carryover increases risks in unregulated and alluvium water sources

Carryover allowances enable specific licence holders to carry over their water balance from one year to the next to provide flexibility. Carryover rules vary between water sources to protect environmental outcomes. The Plan aims to provide enough flexibility in water account management to encourage responsible use of available water. While the Plan itself generally provides for flexibility, some stakeholders consider this could be further improved by increasing the consistency of carryover provisions between water sources.

In the Peel Unregulated and Alluvium water sources, the volume of water able to be held in a licensees account is governed by a three-year rolling average. If licensees:

- have not extracted their full account balance over the preceding two years, and
- the AWD is less than 100 percent, then
- licensees can carry over their previous two years AWDs up to 100 percent.

198 Note: the entitlement per year is about 3.1 times the LTAAEL if assuming 100 percent AWD for all licence categories. However, recognising the Plan's clauses regarding utility allocation of 70 percent of entitlement in year one and 70 percent in year two, the maximum volume allocated is about 4.7 times the LTAAEL.

Therefore, even if AWDs are reduced, licensees can extract more than 100 percent of their share component in any one year if they have 'carried over' water.[199] This increases the risk of reducing flows and impacting downstream environmental, social and economic outcomes, even without a significant activation of sleeper licences. **Table 8** summarises the Plan's carryover provisions. Carryover is not allowed in the Peel Regulated River Water Source or the Peel Fractured Rock Water Source.

Table 8: Summary of carryover provisions

Water source	Licence types	Carryover provision	Three-year carryover	Carryover volume (%)
Chaffey		Yes	Yes	100
Goonoo Goonoo Creek		Yes	Yes	100
Upper Peel River Tributaries		Yes	Yes	100
Lower Peel River Tributaries		Yes	Yes	100
Cockburn River		Yes	Yes	100
Peel Regulated River		No	No	-
Peel Alluvium	Aquifer (general security) access licences, supplementary (general security) water access licences, domestic and stock water access licences	No	No	-
	Aquifer access licences and supplementary water access licences	Yes	Yes	100
Peel Fractured Rock		No	No	-

Stakeholder interviews identified community interest[200] in allowing carryover in the Peel Fractured Rock Water Source, aligning the carryover rules with other water sources.[201] For deep regional aquifers that are not connected to surface water, such as the fractured rock aquifers in the Peel Valley, a three-year carryover period is unlikely to negatively impact the aquifer because of the slow response to recharge, provided the water source only includes bores within fractured rock not alluvial aquifers (see **Section 4.1.4**).

Carryover could be considered for the Peel Fractured Rock Water Source due to its relatively low level of entitlement compared to the LTAAEL and longer recharge periods. Carryover rules for fractured rock are adopted in the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020*.

199 Clauses 56 and 58 of the Plan.
200 Interview: Peel Valley Water Users Association, 12 November 2019.
201 Submission: individual, 31 August 2019; interview: Peel Valley Water Users' Association, 12 November 2019.

4.3.3 Reliance on sleeper licences activating gradually

Due to the issues described above, the Plan and its management currently rely upon water licensee behaviour remaining relatively consistent, including sleeper licences not being activated.
As one stakeholder with regulated river and alluvial licences noted, '*in the long term irrigators … will need to realise that they will have lower allocation than they have thought and will have to purchase extra licences, driving up the cost of licences*'.[202] Activating inactive licences would draw extraction closer, or above, the LTAAEL.

Stakeholders identified the potential for increased extraction due to significantly reduced water pricing (except for utilities) from the Independent Pricing and Regulatory Tribunal's changed pricing decision in 2018.[203] Increased extraction could also be due to the severe drought and need for additional water supply. Water use in the Peel Regulated River Water Source has increased significantly since this point but a trend cannot be determined due to the small sample size. If the reduced price has caused activation of sleeper licences, the risk of exceeding the LTAAEL is increased. This is a risk to outcomes as the LTAAEL is managed retrospectively, after impacts have occurred.

DPIE-Water should model the potential for LTAAEL exceedance for all water sources under various scenarios, including full activation of sleeper licences. An economic scenario analysis should be undertaken to assess the risk of changed licensee behaviour and licence activation. DPIE-Water should assess the risks and impacts on each of the Plan water sources for a range of economic and climatic scenarios, such as further increase in poultry or industrial production, severe drought, or a new factor influencing licensee behaviour. The assessment timescale should show short- and long-term effects of variability and the various needs of licensees, other water users and the environment.

DPIE-Water should immediately begin managing risks carried to the new water sharing plans by:

- modelling the potential for LTAAEL exceedance for all water sources under various scenarios, including full activation of sleeper licences. This should be publicly reported and accompanied by a description of the potential environmental, social and economic risks, and mitigation strategies for those risks
- proactively and transparently manage the risk of sleeper licences activating and report publicly on this management.

Following this, as part of the *Namoi Regional Water Strategy,* DPIE-Water should investigate licence activation risks, consider economic scenarios (over the 30- to 50-year timeframe) and propose options to manage risks using Plan amendments or broader structural adjustment (such as buybacks or retiring licences as occurred in the major inland groundwater systems). transparently report on the potential environmental, social and economic risks and develop strategies to reduce those risks. Any water sharing plan amendments recommended by this work should be implemented by July 2022, after engaging with water users and the wider community.

202 Interview: member of the Cockburn Valley Water Users' Association, 7 November 2019.
203 Independent Pricing and Regulatory Tribunal (2017) *Peel Valley – Final Report WaterNSW rural bulk water services*. Available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-legislative-requirements-water-bulk-water-review-of-prices-for-waternsws-rural-bulk-water-services-from-1-july-2017-formerly-state-water-corporation/fact-sheet-peel-valley-final-report-waternsw-rural-bulk-water-services-13-june-2017.pdf.

4.3.4 The ratio of LTAAEL to critical needs is of concern

Tamworth implemented level 5 water restrictions late in 2019 (see **Section 6.2.2**), with significant impacts on business and the community. There is also community tension between some irrigators and town water extraction over the sharing of water. Examples of contrasting stakeholder views include:

- '*Council continues to seek a bigger share of the limited water resources, to service this growing population & Government is supportive of rural expansion away from Capital cities, without consideration of the impacts on existing & rural communities*'[204]
- '*Tamworth Regional Council is city centric and is apparently willing to destroy the Peel's other water users by severely limiting their access to the resources of Chaffey Dam*'[205]
- '*The Plan prioritises general security licence holders over town water*'[206]
- *'There is no protection of the basic landholder rights nor equitable sharing between users*'.[207]

Many stakeholders attributed mental stress stemming from the lack of water to the Plan, and not the current drought or climate change.

As outlined in **Section 2.7**, the current drought is the worst on record in terms of inflows, and storage and transmission losses have been very high.[208] These are the primary causes of extended water restrictions for Tamworth. However, while there is no evidence to understand if there has been growth in extraction by licensees, any growth in extraction by general security, unregulated, or alluvial groundwater irrigators is likely to have exacerbated the drought's impacts on communities, basic landholder rights and the environment.

DPIE-Water must understand and communicate the extent of growth in extraction, and the degree to which it has affected Tamworth's water availability and the environment to inform requirements for any future measures to address drought.

Tamworth Regional Council introduced water conservation measures (minor restrictions) in 2013-14, while low to moderate water restrictions were in place for much of 2014-15.[209] The augmentation of Chaffey Dam in 2015-16 was intended to benefit the water security of Tamworth and some of the smaller towns usually supplied by groundwater. For example, Moonbi and Kootingal's primary water supply source (groundwater bores) frequently fails during drought periods, at which point Tamworth's water supply is used as a backup supply source.[210]

The Plan provides for a second year of water supply for Tamworth and other critical needs by reserving 70 percent of the entitlement for local water utility and domestic and stock licences to help maintain supply.[211] To increase security of supply for Tamworth and reduce the impact of

204 Submission: individual, received 13 September 2019.
205 Submission: individual, received 13 September 2019.
206 Submission: individual, received 17 September 2019.
207 Submission: individual, received 12 September 2019.
208 DPIE-Water (2020) *Water Allocation Statement: Peel Valley 15 April 2020*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/294943/WAS-peel-20200415.pdf
209 Tamworth Regional Council (2016) *2016 Demand Management Plan*. Available at: https://www.tamworth.nsw.gov.au/ArticleDocuments/220/TRC%202016%20June%20Demand%20Management%20Plan%20Final%20-%20PDF.PDF.aspx
210 Tamworth Regional Council (2015) *Tamworth Regional Council: Drought Management Plan 2015*. Available at: https://www.tamworth.nsw.gov.au/ArticleDocuments/220/2015%20Drought%20Management%20Plan%20-%20REVISION%201%20-%2012%20April%202016%20-%20PDF.pdf.aspx
211 Clauses 47(5) and 48(5) of the Plan.

water restrictions on the town, Tamworth Regional Council has requested DPIE-Water increase its initial AWD from 70 percent of entitlement to 100 percent of entitlement in the current and next water year.

Given the potential risks to town water supply, the simple mechanism of setting aside 70 percent of entitlement for the second year appears inadequate. Specifically, due to the risks from the high ratio of share components to LTAAELs, and potential activation of sleeper licences described in the previous sections, the Plan does not provide a mechanism to ensure enough water is present to supply critical needs in the second year. The Commission notes that the difference between Tamworth Regional Council's use and entitlement reduces some of the risk of managing the system with only a two-year reserve. Even if all the Plan's mechanisms worked as required, this would only provide water for critical needs for one year into the future when a drought may extend beyond this horizon.

The Plan requires that AWDs for regulated river (general security) access licences and the ECA cannot be made until the AWDs for local water utility and regulated river (high security) access licences reach 100 percent or 1 ML respectively, and delivery losses have been accounted for.[212] The delivery loss in normal rainfall periods is around 30 percent but during drought can be over 100 percent.[213] Transmission losses from evaporation and infiltration are around 13,000 to 17,000 ML per year, more than double Tamworth's annual water demand.[214] The prioritisation of AWD calculations is intended to ensure there is adequate water for local water utility needs. As described in **Section 4.3.3**, if sleeper licences are activated after this point, the system would not be able to supply the required volumes of water without unsustainable impacts.

DPIE-Water should review the adequacy of the Plan mechanisms to provide reliability of supply for local water utility and domestic and stock needs considering climate variability. This should include transparently modelling and publishing the Plan's reliability of supply for each licence category and the volumes of water remaining in-stream in a range of climatic conditions. This should be at a timescale appropriate to show short- and long-term effects of variability and the various needs of licensees and the environment. If reliability of supply is inadequate, DPIE-Water should propose mechanisms to resolve this through the *Namoi Regional Water Strategy* and implement any changes to water sharing plans by July 2022.

4.3.5 Managing extraction using available water determinations

AWDs allow water managers to adjust the amount of water available without needing to change the level of entitlement. This makes them an effective tool to manage water supply in a variable climate. AWDs are currently used for this purpose in the Peel Regulated River Water Source (but this has limited efficacy due to the high entitlement and inactive licences, see **Sections 4.3.1** and **4.3.3**). However, the Plan does not provide a mechanism to reduce AWDs for:

- unregulated river access licences
- aquifer access licences in the alluvium and fractured rock water sources.

212 As identified in Section Clauses 48, 19 and 50 of the Plan.
213 Personal Communication, DPIE-Water, 17 October 2019.
214 GHD (2019) *Peel River Drought Response Works - Review of Environmental Factors for water delivery pipeline*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0015/151710/REF-Peel-Drought-Response-Stage-2-REF-a.pdf.

Even in a severe drought, AWDs are set at 100 percent (unless the LTAAEL was previously exceeded) and management relies on cease to pump thresholds to manage risk and impacts from lower flows. In contrast, while the general security licensees hold 29,635 unit shares, the average AWD over the last 10 years has been 58 percent.[215] This is concerning due to the connectivity between the systems, with the regulated river receiving about 60 percent of its flows from unregulated tributaries and connectivity between alluvial and surface water sources.

AWDs should be set to meet high priority needs (basic landholder right, utility needs, domestic and stock and high security licences) and ensure extraction over the medium term is within each LTAAEL.[216] While the Plan includes rules to achieve this, high priority needs in later years are at risk because the planning timeframe is limited to the recorded past and allows only for short droughts (see **Section 6.2**).

The Plan does not adequately allow for proactive management to secure priority water rights considering the area's natural variability and climate change (see **Section 6.2**). In addition, there is a practice of placing water in general security accounts even though it is not physically available at that point in time in anticipation of possible inflows from the tributaries. This was highlighted in an interview with WaterNSW.[217] While DPIE-Water and WaterNSW must have expected such inflows to be in excess of Tamworth's requirements, these actions appear to place general security users ahead of critical environmental needs, basic landholder rights and town needs. This is a risk to environmental, social and economic outcomes as it raises a liability against the river and expectations from licensees and the general community that water will be made available to extract.

The maximum volume of water that can be extracted in any year is governed by the volume of available water, sum of licenced share components and the LTAAEL (via AWDs). While 40 percent of entitlement is in the Peel Alluvium Water Source, the greatest recorded extraction volume is from the Peel Regulated River Water Source (37 percent of entitlement).

Figure 10 shows the effect of DPIE-Water's reduced AWDs in 2018-19 and the start of 2019-20 on reducing regulated river and alluvial extraction. The LTAAEL is shown for comparison, noting that extraction in individual years can legitimately exceed the LTAAEL. Crucially, for the Peel Regulated and Alluvial water sources, extraction did not reduce proportionally when AWDs were reduced, partly due to the volume of entitlement in the water sources. While aquifer (general security) licence AWDs were reduced, extraction in the Peel Alluvium Water Source increased slightly on the two previous years (from 5,910 ML to 6,365 ML).

Similarly, while the total regulated river licence AWDs decreased by 40 percent, extraction only decreased by 16 percent between 2017-18 and 2018-19, and was above extraction in 2016-17. This is common, as extraction increases in periods of low rainfall, when AWDs are decreased. It demonstrates that the reduction required to reduce extraction in the Plan area would disproportionally impact active licensees due to the high number of shares.

215 WaterNSW (2020) *Peel Annual Operations Plan 2019-20*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0020/150941/Peel-Annual-Operations-Plan-Water-Year-2019-20.pdf.

216 Division 2 and clauses 42 to 45 of the Plan.

217 Personal communication, WaterNSW, 18 February 2020.

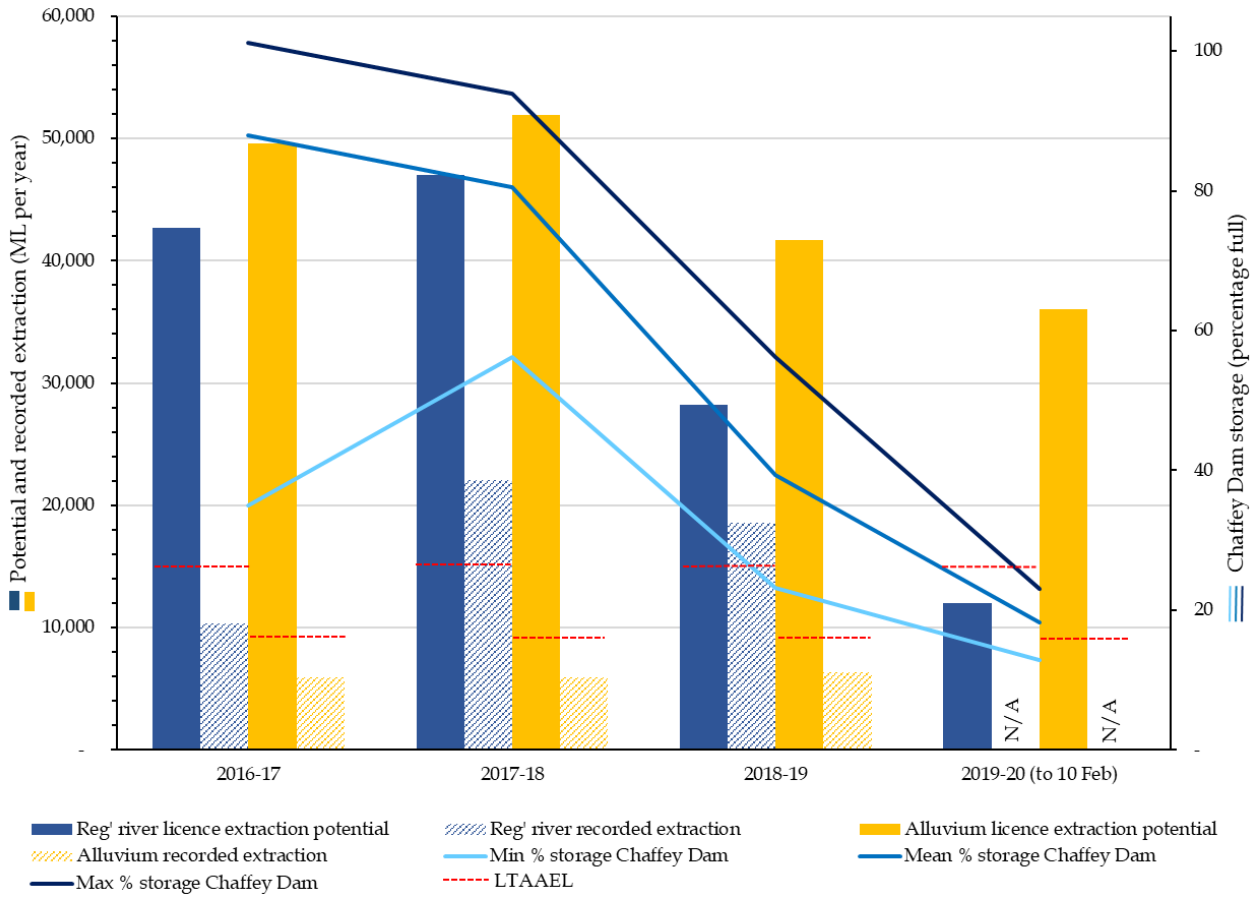

Figure 10: Potential extraction (AWDs multiplied by licence shares) compared to recorded extraction for the Plan's regulated river and alluvium water sources[218]

The recent water year provides an example of the need for additional and more transparent mechanisms to manage AWDs. On 1 July 2018, the Bureau of Meteorology was predicting a dry winter to spring and dam levels were already relatively low (29 percent full, about 29,000 ML for Chaffey Dam and 40 percent full, or about 2,500 ML for Dungowan Dam). However, AWDs were set at 100 percent or 1 ML per share for all licences except the ECA, aquifer (general security) and regulated river (general security). Regulated river (general security) and ECA ended the water year with AWDs of 38 percent giving aquifer (general security) licences an AWD of 69 percent.[219]

Based on AWDs, the Commission estimated that, excluding carryover, in the 2018-19 water year there was approximately:

- 28,000 ML regulated river entitlement allocated for extraction
- 1,900 ML of ECA held in available storage reserves
- 12,000 ML set aside for the following year's minimum requirements[220]

218 Access licence data as provided by WaterNSW on 24 October 2019, domestic and stock estimate of basic landholder rights as estimated in Clause 20 of the Plan.

219 DoI-Water (2018) *Available Water Determination Order for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2018*. Available at: https://www.industry.nsw.gov.au/water/allocations-availability/allocations/determinations/2018.

220 Estimated from 70 percent AWD for domestic and stock entitlements, and local water utility entitlements, and 50 percent AWD for high security.

- 18,000 ML of unregulated river entitlement allocated for extraction if flows occur
- This totalled about 60,000 ML of surface water assigned, of which about 46,000 ML was credited to accounts for potential extraction that year.[221]

This means that water available for extraction for the year was double the amount of actual dam levels. There was an additional 41,500 ML of alluvial entitlement allocated for extraction, some of which was from water sources connected to the surface water. This approach invites crisis management rather than prudent, proactive risk-based water management.

In contrast with aquifer access licences more generally in the Peel Alluvium and Fractured Rock water sources, aquifer (general security) access licences can only extract water in the Peel Regulated River Alluvium Management Zone, and their AWD is linked to surface water, with 51 percent equivalent to the aquifer access licence determination and 49 percent equivalent to the regulated river (general security) access licence. Aquifer access licences are provided 1 ML per share component,[222] so aquifer (general security) access licences receive a minimum of 51 percent of their entitlement when surface water general security licences can have zero percent AWD. This may prioritise alluvial access licences in one water source over urban water, basic rights and the environment (ECA) in another connected water source (as described in **Chapter 7**).

The Plan needs additional mechanisms to reduce AWDs. AWDs for unregulated and aquifer access licences can only be reduced if average use over the preceding three or five years respectively exceeds the respective LTAAELs. This time-lag is too long to protect critical needs if extraction increases. Aquifer access licences in the Peel Alluvium Water Source always receive 100 percent AWD, despite this water contributing to base flow for the regulated river. Due to the connectivity of the system (see **Chapter 7**), this could impact unregulated, regulated and downstream surface water users, as well as the environment and basic landholder rights.

If extraction in the Peel Regulated River Water Source causes its LTAAEL to be exceeded, the AWDs for regulated river (general security), ECA and aquifer (general security) licences would be reduced. Because 95 percent of any growth in Tamworth Regional Council's utility water use is assigned to the Namoi Regulated Plan, the Peel Regulated River Water Source LTAAEL is likely to only be exceeded due to activation of sleeper regulated river (general security) licences (assuming the few high security licences are already active). Exceedance of this LTAAEL through growth in extraction by general security licensees would therefore unreasonably impact the ECA. As discussed in **Section 5.1.3**, the ECA should have greater protection under the Plan and should at a minimum be protected from AWD reductions due to LTAAEL exceedance.

In the short term, DPIE-Water should document rules for setting AWDs to allow for proactive and transparent management of water shortages under a greater range of scenarios and climatic conditions modelled as part of the *Namoi Regional Water Strategy* and make amendments by July 2022. As discussed in **Section 4.3.4**, by July 2022, DPIE-Water should transparently model the Plan's reliability of supply for each licence category and the volumes of water remaining in-stream in a range of climatic conditions as part of the *Namoi Regional Water Strategy*. The modelling should be used to develop Plan provisions and incident response plans to reduce the

221 DoI-Water (2018) *Available Water Determination Order for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2018*. Available at: https://www.industry.nsw.gov.au/water/allocations-availability/allocations/determinations/2018.

222 Unless the LTAAEL has been exceeded and available water determinations are reduced, as per Clause 52 of the Plan.

risks to environmental requirements, town water supply, basic landholder rights and domestic and stock needs, and provide greater certainty to licensees to support economic outcomes.

4.4 Recommendations

The Commission makes the following recommendations in **Table 9** to better manage available water, extraction and variability.

Table 9: Recommendations for DPIE-Water to better manage available water, extraction and variability

Recommendations	
2	By 1 July 2020, commit to commissioning an independent review of the Peel eWater Source model, and complete and publish the findings by 1 July 2022 to improve transparency and build community trust.
3 (priority)	By 1 July 2020, include an enabling provision to bring the Peel Regulated River Water Source LTAAEL assessment process in line with other NSW Murray-Darling Basin water sharing plans by removing the 10-year rolling average comparison from the LTAAEL assessment measures.
4	By 1 July 2020, commit to reviewing the historic licence conversion surveys at the water source scale, and compile a follow up survey and risk assessment by 1 July 2022 to: a) estimate historic and current extraction at a water source scale, and therefore the potential for activation of sleeper licences b) examine and engage with stakeholders, and publish the benefits and impacts of having a separate numeric LTAAEL for the Peel unregulated rivers, and implement any resulting recommendations c) enable transparent management with annual LTAAEL compliance reports.
5	By 1 July 2022, publish and implement a method of assessing extraction and LTAAEL compliance in unregulated water sources.
6	By 1 July 2022, complete the following actions, incorporating stakeholder engagement, and amend the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* to accommodate potential changes due to recommendations (b) to (d): a) review bore logs to determine if any licences in the Peel Fractured Rock Water Source are extracting from an alluvial aquifer rather than fractured rock b) assess the potential volumes of alluvial extraction relative to fractured rock extraction c) publish the results and, if extraction potential from alluvial aquifers under the Peel Fractured Rock Water Source is significant, outline and consult on steps to manage risks d) if (a)-(c) are addressed, include carryover provisions for the Peel Fractured Rock Water Source under the amendment clause.
7	By 1 July 2020, commit to undertaking the following actions over the following two years: a) model the potential for LTAAEL exceedance for all water sources under various scenarios, including full activation of sleeper licences. This modelling should be

Recommendations	
	publicly reported and accompanied by a description of the potential environmental, social and economic risks, and mitigation strategies for those risks b) proactively and transparently manage the risk of sleeper licences activating and report publicly on this management c) as part of the *Namoi Regional Water Strategy*, investigate licence activation risks, consider economic scenarios (over the 30- to 50-year timeframe) and propose options to manage risks using Plan amendments or broader structural adjustment (such as buybacks or retiring licences as occurred in the major inland groundwater systems) d) engage with water users and the wider community on actions (a)-(c) and make any recommended plan amendments by 1 July 2022.
8	By 1 July 2022: a) support any provisions in water sharing plans that distribute impacts to other water sources or water sharing plans with clear objectives b) publish targeted, local mechanisms to address LTAAEL exceedance and resulting local impacts c) to complement this, by 31 December 2020, publish measures to manage and report on all relevant LTAAELs at a water source or Peel Valley scale.
9	By 1 July 2022, incorporate the results of the following actions into the water sharing plans: a) transparently model and publish the Peel Valley's reliability of supply for each licence category and the volumes of water remaining in-stream in a range of climatic conditions at a time-scale appropriate to show short- and long-term effects of variability and various needs of licensees and the environment b) consult with stakeholders and develop Plan provisions and incident response plans to reduce the risks to environmental requirements, town water supply, basic landholder rights and domestic and stock needs, and provide greater certainty to licensees to support economic outcomes c) if results from (a) show reliability is inadequate, use inputs from (b) to propose mechanisms to resolve this through the *Namoi Regional Water Strategy*, considering mechanisms within and external to the Plan d) document rules for setting AWDs to allow for proactive and transparent management of water shortages under a greater range of scenarios and climatic conditions modelled as part of the *Namoi Regional Water Strategy*.

4.5 Compensation and the purpose of proposed recommendations

Under the Act, compensation may be payable by the State to access licence holders only in some circumstances[223] where water allocations under a water sharing plan are reduced. Section 43A(3A) of the Act requires the Commission to consider some potential compensation

[223] As set out in Section 87 and Section 87AA. Section 87 specifies 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.

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 changes 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.

The Commission considers that compensation might be payable under Section 87AA in relation to **Recommendation 3** of this review. This is only if the effect of the proposed recommendation is found to constitute a reduction in water allocations for the purposes of the section, and to then trigger an entitlement to compensation.

Recommendation 3 seeks to remove the 10-year rolling average comparison from the Peel Regulated River Water Source LTAAEL assessment measures and bring the LTAAEL assessment method in line with other regulated river water sharing plans which provide for a timelier response to growth in use (see **Table 9** above). This recommendation would change the way in which the assessment of average annual extractions against the LTAAEL for the Peel Regulated River Water Source is made and may result in a reduction in the maximum AWD in certain circumstances.

Removing the 10-year rolling average comparison from the LTAAEL assessment measures is intended to restore water to the environment, and other water users such as Tamworth Regional Council's town water supply, in response to natural reductions in inflows such as those that have been observed over the course of the continuing drought. Therefore, the Commission considers this proposed change to be consistent with Section 43A(3A)(a) of the Act.

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. DPIE-Water should seek legal advice regarding any potential compensation implications of implementing the recommendations in this report.

5 Deliver environmental outcomes

The current Plan aims to protect the needs of the environment by setting LTAAELs and other provisions across the Peel Regulated River Water Source (**Section 5.2**), unregulated river water sources (**Section 5.2**), and groundwater sources (**Section 5.4**). However, risk assessments undertaken as part of the development of the water resource plans and the *Namoi Long Term Water Plan* raise doubt as to whether a number of these provisions adequately mitigate risks to ecological values.

The Commission was not able to identify evidence that the current Plan adequately protects environmental water in accordance with the Act, which requires that:

- the sharing of water from a water source must protect the water source and its dependent ecosystems,[224] and protect basic landholder rights[225] (in that order[226])
- the sharing or take of water under any other right must not prejudice the requirement to protect the water source and its dependent ecosystems, and basic landholder rights.[227]

Under certain conditions, environmental water can be extracted, reducing the potential benefits to the environment.

The Plan lacks information on the water dependent environmental assets that require protection or the flows that are needed to sustain ecological values. When the Plan was developed, it was stated that information on ecological features and their water requirements was not adequate. As such, a precautionary approach was recommended, supported by adaptive management to improve the evidence base.[228] Environmental water requirements are now better understood through the development of the *Namoi Long Term Water Plan*[229] and are based on best available information.

While the Plan has objectives to protect groundwater dependent ecosystems, there is not enough detail in Plan provisions to demonstrate this in practice.

This chapter outlines these issues and opportunities to improve environmental outcomes.

5.1 Peel regulated river environmental provisions and outcomes

5.1.1 Hydrology and river condition

Environmental water provisions for the Peel Regulated River Water Source seek to reinstate some natural flow variability in the Peel River immediately downstream of Chaffey Dam. These provisions were informed by an unpublished report prepared for the Peel Interagency Panel on ecological features of the Peel River.[230] The report drew upon a range of technical papers, but

224 Clause 5(3)(a) of the Act.
225 Clause 5(3)(b) of the Act.
226 Clause 9(1)(b) of the Act.
227 Clause 5(3)(c) of the Act.
228 Foster, N. and Lewis, A. (2009) *Ecological features of the regulated Peel River*. Report prepared for the Peel Interagency Panel (unpublished, provided by DPIE-Water).
229 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* Available at: https://www.environment.nsw.gov.au/research-and-publications/publications-search/namoi-long-term-water-plan-part-a-catchment-draft.
230 Foster, N. and Lewis, A. (2009) *Ecological features of the regulated Peel River*. Report prepared for the Peel Interagency Panel (unpublished, provided by DPIE-Water).

acknowledged there was not enough information to quantify ecological water requirements when the Plan was developed, and recommended adaptive management of plan provisions as new information became available.

River regulation has altered the flow regime of the Peel River, particularly the reach between Chaffey Dam and Dungowan Creek where there are no significant tributaries. Regulated releases from Chaffey Dam have altered flow variability impacting instream features situated directly below the dam.[231] The hydrograph over the irrigation season reflects the blocky delivery of water for downstream users (see **Figure 11**), while flood and high flows have been substantially reduced.[232]

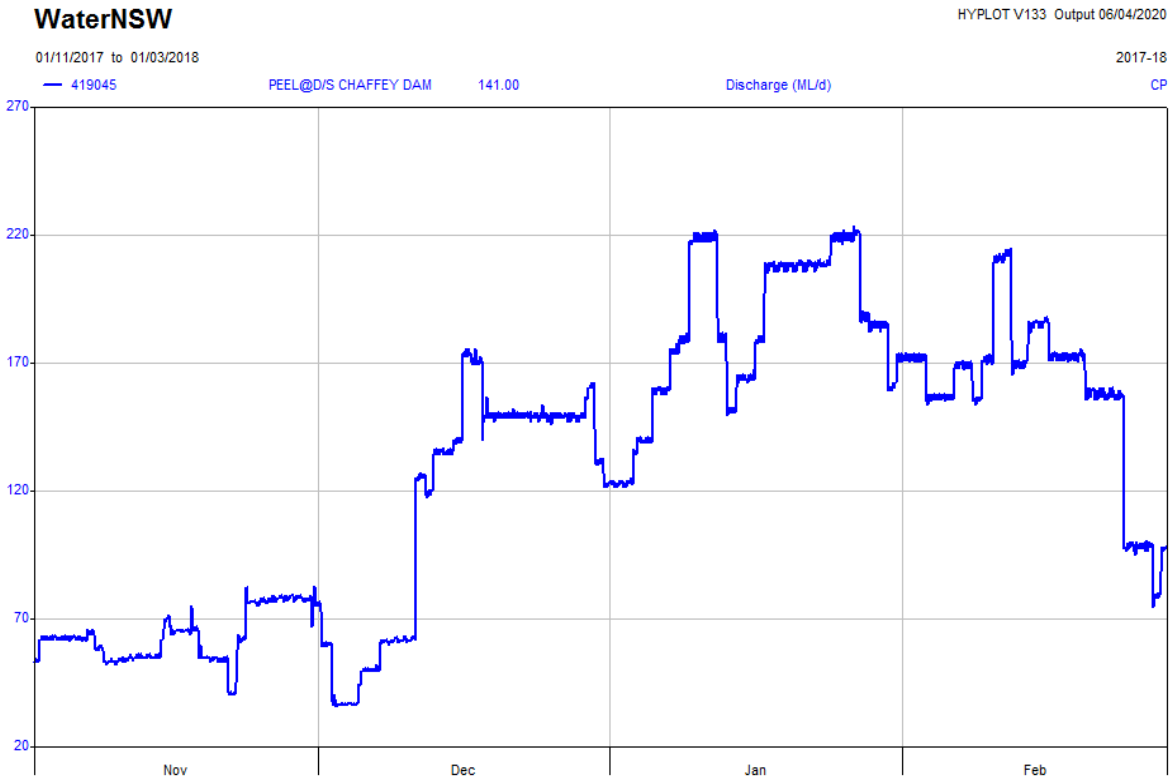

Figure 11: Water releases from Chaffey Dam during the 2017-18 irrigation season[233]

Flow variability is less of an issue downstream of Piallamore at the confluence of the Peel River and Dungowan Creek, as inflows from unregulated rivers and streams become more influential on the flow regime and introduce natural flow variability.[234] However, the planned replacement of Dungowan Dam with a larger storage may have implications for inflows into the Peel River and the environment if not carefully managed.

231 Foster, N. and Lewis, A. (2009) *Ecological features of the regulated Peel River*. Report prepared for the Peel Interagency Panel, (unpublished, provided by DPIE-Water).

232 Green D., Petrovic, J., Moss, P. and Burrell, M (2011) *Water Resources and Management Overview: Namoi Catchment*. Prepared for the NSW Office of Water. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0003/549300/catchment_overview_namoi.pdf.

233 WaterNSW (2020) *Real-time data*. Available at: https://realtimedata.waternsw.com.au/wgen/users/b9db89b255b3481db15beed71d3f3489/rscf_org419045.plot.png?20200406204545&1586169946464.

234 DPIE (2019) *Namoi Surface Water Resource Plan Description.* Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/273108/appendix-a-namoi-peel-wrpa-description.pdf.

Changes in hydrology have led to modification of the river channel, particularly directly downstream of Chaffey Dam. Reduction in high velocity flows has resulted in channel narrowing, invasion by riparian vegetation and has resulted in immobilisation of instream gravel, leading to growth of filamentous algal mats and biofilms.[235]

Priority environmental assets of the Peel Valley, such as silver perch, Murray cod and freshwater catfish, are threatened by changes to hydrology, most notably prolonged periods of low or very low flows, extended periods between freshes, and long periods between overbank flows. For example, small freshes, which are important annually for fish dispersal and condition and one in at least every two years for spawning have not been fully met in the Peel Regulated River Water Source (Chaffey Dam to Carroll Gap) since 2016-17.[236] These threats are directly influenced by Chaffey Dam and the rules and settings in the Plan. Other threats to priority species include disrupted fish passage from the dam and weirs.

Despite changes in natural flow variability, the Peel River below Chaffey Dam is identified as an environmental asset for native fish based on its high biodiversity, hydrodynamic diversity, number of threatened species, and as a dry period and drought refuge.[237]

DPIE-Water completed assessments of High Ecological Value Aquatic Ecosystems and assessed the sensitivity of ecological functions and assets to extraction and changes in flow. The process generated consequence scores for regulated and unregulated river reaches. The results of this analysis are shown in the *Namoi Surface Water Risk Assessment* and in **Table 10**. The Peel River reaches rated medium to very high due to high fish diversity, the presence of threatened species, large tracts of riparian vegetation that provide habitat, and the presence of the Lowland Darling River Aquatic Endangered Ecological Community.

Table 10: High ecological value aquatic ecosystems consequence scoring for the Peel Regulated River and tributaries[238]

River reach		Sensitivity to changes in flow
Regulated river reach	Peel River at downstream Chaffey Dam	Very high
	Peel River at Piallamore	Very High
	Peel River at Carroll Gap	Medium
Unregulated river reaches	Upper Peel tributaries	Medium
	Cockburn River	Medium
	Goonoo Goonoo Creek	Low

235 Foster, N. and Lewis, A. (2009) *Ecological features of the Peel regulated river*. Report for the Peel Interagency Group, (unpublished). Provided by DPIE-Water.

236 CEWO (2019) *Commonwealth Environmental Water Portfolio Management Plan: Namoi River Valley 2019-20*. Available at: https://www.environment.gov.au/system/files/resources/cc517b29-b1dd-4f99-a2c5-c0c6d8d8f673/files/portfolio-mgt-plan-namoi-2019-20.pdf.

237 MDBA (2019) *Basin-wide environmental watering strategy*. Available at: https://www.mdba.gov.au/sites/default/files/pubs/basin-wide%20environmental%20watering%20strategy%20November%202019.pdf.

238 Adapted from DPIE-Water (2019) *Namoi Surface Water Resource Plan Risk Assessment*, pp. 22-23. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/273118/schedule-d-namoi-sw-wrp-risk-assessment.pdf.

While environmental water provisions aim to improve ecological processes immediately downstream of Chaffey Dam, there is limited information to assess the effectiveness of current provisions in the Peel River due to limited event-based monitoring and reporting. A baseline study of macroinvertebrate assemblages and periphyton was undertaken in 2010 to evaluate the effectiveness of stimulus flow rules[239] but there is no reporting of follow-up monitoring. The Commission understands that subsequent macroinvertebrate sampling was undertaken in 2013 and 2015[240] but data have not yet been interpreted.

The *Namoi Long Term Water Plan* and *Namoi Water Resource Plan Risk Assessment* identify risks for the Peel River associated with insufficient water to meet environmental water requirements. The *Namoi Long Term Water Plan* indicates there is insufficient environmental water to create larger flow types of the required frequency and duration in the Peel.[241] The *Namoi Surface Water Risk Assessment* provides risk ratings for a range of flow characteristics for Peel River reaches. For example, the risk assessment gives a high-risk rating for baseflows in the Peel River at Piallamore, indicating environmental water provisions are inadequate to provide for baseflows. In the reach between Piallamore and Carroll Gap, baseflows (100 – 300 ML per day) have not been adequately achieved in more than seven years.[242]

Further, there is a trend to use planned environmental water in conjunction with held environmental water in regulated rivers. While this approach is logical to maximise environmental outcomes from water for the environment, it means that any monitoring of the effectiveness of environmental water provisions must recognise and attribute observed environmental benefits to this conjunctive use.

5.1.2 Stimulus flows

Before the upgrade of Chaffey Dam in 2016, the Plan required 1,600 ML of inflows to be set aside as stimulus flow if the storage exceeded 50,000 ML capacity at the start of the water year. The stimulus flow was designed to inundate low level benches and restore some of the natural flow variability in the upper reaches of the Peel River immediately downstream of Chaffey Dam.

There were restrictions on the timing of the release, presumably to avoid the release coinciding with peak periods for irrigation water orders. The stimulus flow could only be released between March and August if there had not been a flow greater than 500 ML per day in the Peel River at Piallamore in the previous 90 days. Access to the stimulus flow was also permissible under certain conditions under Clause 62 of the Plan (see **Section 5.1.4**).

The Commission understands that the stimulus flows were released when available.[243] However, there is limited publicly available information on the timing and effectiveness of

239 DPI (2012) *Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sharing Plan 2010-2011 progress report – Assessment of environmental flow rules developed for the Regulated Peel River*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/549422/imef_peel_valley_water_sharing_plans_progress_report.pdf.

240 I. Growns, personal communication, 18 March 2020.

241 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW.p.55.

242 CEWO (2019), *Commonwealth Environmental Water Portfolio Management Plan: Namoi River Valley 2019-20.* Available at: https://www.environment.gov.au/system/files/resources/cc517b29-b1dd-4f99-a2c5-c0c6d8d8f673/files/portfolio-mgt-plan-namoi-2019-20.pdf

243 Alluvium (2019) *Audit report: audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at:

these releases. Given the stimulus flows were intended to be released over seven days, with a peak of 500 ML per day on the second day of the release, it is likely that these releases would have resulted in inundation of low level in-stream benches at Woolomin. Based on the minimum flow thresholds in the *Namoi Long Term Water Plan*,[244] these releases would be comparable to a small fresh for the Peel River downstream Chaffey Dam (gauge 419045).

5.1.3 Environmental Contingency Allowance

The ECA was implemented as part of the Chaffey Dam upgrade in 2016 to compensate downstream environments for some of the lost overflow from the smaller dam.[245] It was developed in place of a stimulus or transparency rule.[246] Under certain conditions, the ECA can be made available for extraction via announcement. The Plan requires up to 5,000 ML to be made available as ECA multiplied by the general security AWD. Like general security licences, the ECA cannot be carried over, meaning it is forfeited if not used in the water year.

Two ECA releases have occurred during Plan implementation (see **Table 11**). Both occurred in the winter of the 2016-17 and 2017-18 water years. These releases were made in conjunction with held environmental water managed by the Commonwealth Environmental Water Office (CEWO) to increase the total volume available to achieve specific objectives:

- In the 2016-17 water year, to allow for silver perch (and other native fish) to move upstream into the higher reaches of the Peel River and maintain flows to support juvenile native fish. Secondary objectives included restoring flow variability and increasing the food supply for native fish by 'flushing' nutrients off the low in-channel bars.
- In the 2017-18 water year, to achieve a flow pulse up to 750 ML per day to support native fish movement and dispersal opportunities by increasing connectivity, increasing access to habitat and building native fish condition, and increase instream productivity. The watering action also provided opportunities for movement and survival of native fish in the lower Namoi River (including silver perch between Gunnedah and Narrabri).

These releases occurred through collaboration between NSW and Australian government agencies and delivered several environmental benefits. However, the timing of these releases in winter was suboptimal. The Commission understands this was largely attributed to:

- minimising the potential for ECA extraction via direct irrigation, which is allowed under Clause 62 of the Plan
- delays associated with the approval process for the watering action in response to community concerns.

Key lessons and findings from these release events and monitoring results include:[247]

- a pulse of 750 ML per day is more effective than 500 ML per day in wetting low-level benches in the Peel River

https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.

244 DPIE-EES (2020) *Namoi Long Term Water Plan Part B: Namoi planning units*. NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW

245 DoI-Water (2018) *Background Info of ECA in Peel: presentation to the Namoi (Peel) WRP SAP 3*. Provided by DPIE-Water and as advised by DPIE-Water.

246 *Ibid*.

247 CEWO (2019) *Commonwealth Environmental Water Portfolio Management Plan: Namoi River Valley 2019-20*, p.7. Available at: http://environment.gov.au/water/cewo/publications/portfolio-mgt-plan-namoi-2019-20.

- flows of 750 ML per day can also result in some fine sediment movement and scouring, however, flows over 1,000 ML per day may be required to effectively mobilise sediment and algae that has accumulated downstream of Chaffey Dam
- operation of Chaffey Dam has substantially reduced the number of small freshes in the Peel River - these may be important for supporting native fish populations, as native fish depend on small freshes to maintain healthy condition, and to support dispersal and recruitment.

These lessons should inform future watering events and how environmental water is released from Chaffey Dam.

Environmental water has also been forfeited based on decisions by environmental water managers (see **Table 11**). For example, in the 2018-19 water year, a decision was made not to release the ECA, as recent inflows from tributaries provided for the environmental water demand by topping up refuge pools along the Peel River between Tamworth and the Namoi River.[248] This decision was made in the context that drought conditions would continue into 2019-20 and the forfeited volume, while reallocated to extend supply for critical human needs, would also support the environment over the coming summer.

Table 11: Environmental releases from Chaffey Dam involving ECA and Commonwealth held environment water[249]

Water year	AWD (%)	Available ECA (ML)	ECA use (ML)	Available CEWO held environmental water (ML)	CEWO held environmental water use (ML)	Forfeited (ML)
2016-17	100	5,000	4,933	1,257	1,257	0
2017-18	100	4,970*	2,635	1,257	1,257	2,335
2018-19	38	1,900	0	477	0	2,377
2019-20	0	0	0	0	0	
Total		**11,870**	**7,568**	**2,991**	**2,514**	**4,712**

* 30 ML was used as part of the 2016-17 release which continued for one day into the next water year.

5.1.4 Risks of extraction of uncontrolled environmental flows

The Plan includes rules that allow extraction of uncontrolled unregulated flows in the Peel Regulated River Water Source and uncontrolled environmental flows (stimulus flow and ECA releases) via announcement to general security access licences. Thresholds for access to these uncontrolled flows depends on the general security AWD.

248 Pers. comms, Paul Keyte, DPIE-EES, 7 May 2020.
249 Data provided by DPIE-EES, 7 May 2020.

The Commission understands that the current access rules that allow for extraction of uncontrolled environmental flows for direct irrigation:[250]

- limit the effective use of the ECA to reinstate natural flow variability
- risk achieving the Plan objective[251] to protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources
- risk meeting environmental water requirements under the *Namoi Long Term Water Plan*.

Extraction of these flows can impact on the extent that the ECA can provide for connectivity along the Peel Regulated River and associated environmental benefits and discourages use in certain, ecologically preferable, times of year (see **Section 6.2.3**). Further, the ability to extract the ECA is inconsistent with provisions in other NSW water sources.

The access threshold of 50 ML per day at Piallamore gauge also appears inadequate to:

- provide suitable depths for fish movement
- support native fish spawning and riverine productivity benefits
- address the impacts of river regulation on the rest of the Peel River.[252]

The access threshold for uncontrolled environmental flows upstream of Piallamore has not been revisited since 2010, despite a provision to increase the access threshold if the installed pump capacity increases by more than 20 percent from Plan commencement. The access threshold currently sits at 50 ML per day and can be increased to 100 ML per day. The higher access threshold would align with the minimum flow threshold for base flows as defined in the *Namoi Long Term Water Plan*.[253]

The Commission considers these access rules to:

- be inconsistent with the intent of planned environmental water to support basic river health and water quality
- pose a significant risk to meeting the Plan's environmental objectives by altering the desired hydrographs and flow patterns needed to achieve targeted environment outcomes
- extraction of the ECA is inconsistent with the objectives of the *Namoi Long Term Water Plan*
- inconsistent with the priorities of the Act.

Based on the evidence presented, there is strong justification for protecting environmental water from extraction, particularly as changing access rules will improve environmental outcomes and encourage the strategic use of the ECA in line with the *Namoi Long Term Water Plan*. Protecting the ECA from extraction will help deliver ecologically important flows and strengthens the water sharing plan – as a component of the *Namoi Surface Water Resource Plan* – in providing for environmental watering consistent with relevant catchment- and Basin-scale environmental watering plans.[254]

250 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW.
251 Clause 10(b) of the Plan.
252 DPIE-EES (2020) *Namoi Long Term Water Plan Part B: Namoi planning units*. NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW
253 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW.
254 See Section 10.26 of the *Basin Plan*.

5.1.5 Minimum daily releases

The Plan allows for a minimum daily release of 3 ML per day from Chaffey Dam minus any extraction, except when a release greater than that required for basic landholder rights, access licence extractions and, or the ECA flow.

The Plan and background document do not provide a clear ecological basis for this minimum daily volume. Based on the *Namoi Long Term Water Plan*, it may help to meet very low flow requirements in the Peel River immediately downstream of the dam. However, it is unlikely that this daily release will meet very low flow requirements along the length of the Peel Regulated River.

The minimum daily release of 3 ML is likely to be insufficient to maintain surface flows and connectivity during extended dry periods. For example, in 2019 the river below Chaffey Dam became a series of disconnected pools, isolating aquatic species that were then impacted by poor water quality, especially low dissolved oxygen.

In December 2019, the clause in the Plan requiring a minimum daily release was suspended as the Peel Regulated River Water Source was declared as Stage 4 (Critical Drought) under the *NSW Extreme Events Policy* (**Section 3.3**).[255] Suspending the Plan allowed WaterNSW to minimise transmission losses associated with the daily release and undertake weekly pulse releases of up to 30 ML to retain water in the river, periodically connect refuge pools important for fish populations during dry times and supply basic rights.[256] The suspension order was extended until 30 June 2020, unless revoked.

5.2 Unregulated rivers' environmental provisions and outcomes

In the unregulated river reaches of the Peel Valley, environmental water provisions are largely based on commence and cease to pump rules. These flow rules generally allow for access to surface water while there is visible flow or low flow in the water source. When visible flows cease or, in some river reaches, fall below a low flow threshold, pumping must cease. The intent of these rules was to protect water in pools and provide for connectivity with other water sources, including into the regulated river.[257] These rules can be amended as provided for in Clause 94 of the Plan.

Despite the intent of these access rules for the unregulated rivers, they do not appear to effectively protect certain parts of the flow regime. According to the *Namoi Surface Water Resource Plan Risk Assessment* and the *Namoi Long Term Water Plan*, hydrological alterations have occurred in most of the unregulated water sources in the Peel Valley. Most notably, cease to flow periods have been highly altered and occur more frequently, and low flows and base flows have been highly altered and occur less frequently.[258]

---

255 Critical human water needs have priority for the management of remaining water supplies when Stage 4 water restrictions are declared.

256 DPIE-Water (2020) *Water sharing plan part suspension for Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/suspensions/water-sharing-plan-part-suspension-for-peel-valley-regulated,-unregulated,-alluvium-and-fractured-rock-water-sources-2010.

257 DPIE-Water (2019) *Namoi Surface Water Risk Assessment*, Section 3.3.1 p.12. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/273118/schedule-d-namoi-sw-wrp-risk-assessment.pdf.

258 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW.

Based on the risk assessment undertaken for the water resource planning process, the current commence and cease to pump provisions in the Plan do not effectively manage risks from extraction to ecological values. For example, in several unregulated river reaches there is a medium likelihood for extraction to impact ecological values.

There are also several other issues with these access rules and their implementation:

- there have been delays in implementing commence and cease to pump rules and they have not been enforced beyond voluntary compliance, meaning there is a high level of uncertainty around the protection of water for the environment in unregulated rivers
- visible flow rules are left to interpretation by the user, meaning there is potential ambiguity around when water can be taken - even if implemented, these rules are likely to be inadequate from an environmental perspective
- thresholds based on river height and gauges used to measure if the threshold is being reached are not necessarily accurate – this has been an issue in the Cockburn River. To resolve this, DPIE-Water is relocating a gauge to a more stable section of the river and changing from a height-based to a flow-based threshold to improve accuracy. The Commission supports this change.[259]
- rules are likely inadequate for protecting very low flows and ecologically important first flush flows. There is a provision to protect the first 24 hours of flow in Moore Creek but not in any other unregulated sources.

Several Peel Valley unregulated water sources were categorised as medium to high risk for water available for the environment and capacity to meet environmental water requirements.[260] Flow characteristics identified as most at risk in the Peel unregulated water sources included zero flow periods and base flow (or low flows). These risks are not addressed in the draft water sharing plan.

It is critical to protect refuge pools and other river habitat, and the limited volume of water that flows along unregulated streams, particularly in a highly variable climate. To help relieve unnatural cease to flow periods and support more ecologically relevant low flows and base flows, the *Namoi Long Term Water Plan* recommends reviewing Plan access rules, including having cease to pump thresholds that are greater than visible flows.

There is still potential to improve environmental outcomes in unregulated river reaches of the Peel Valley through more adequate cease to pump provisions.

5.3 Protect groundwater dependent ecosystems

Water sharing plans are required to reserve water for the overall health of groundwater dependent ecosystems. The Plan includes objectives and provisions to protect groundwater dependent ecosystems. However, there are opportunities to strengthen their protection in the replacement water sharing plans by:

- including consistent groundwater dependent ecosystem definitions across all plans

259 Department of Industry (2019) *A review of groundwater-surface water connectivity in the Cockburn Alluvial Management Zone*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/232175/cockburn-hydrogeological-review.pdf.

260 DPIE-Water (2019) *Risk Assessment for the Namoi Water Resource Plan Area (SW14)*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/273118/schedule-d-namoi-sw-wrp-risk-assessment.pdf.

- updating mapping and identification of all types of groundwater dependent ecosystems
- expanding consideration of groundwater dependent ecosystems beyond high-priority ecosystems
- aligning setback distance provisions with the NSW *Aquifer Interference Policy*.

5.3.1 Define groundwater dependent ecosystems

The Plan has sound objectives for groundwater dependent ecosystems but does not provide a definition of what these are in the Plan dictionary. Two of the draft replacement plans (the *Water Sharing Plan for the Namoi Alluvial Groundwater Sources 2020*[261] and *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020*[262]*)* include definitions but the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020*[263] does not, despite having a key objective to protect wetland ecosystems.

Given the interconnectedness of surface and groundwater in the Peel valley (see **Chapter 7**), all water sharing plans should include definitions for groundwater dependent ecosystems in their dictionary and these definitions need to be consistent.

5.3.2 Map and identify types of groundwater dependent ecosystems

The Plan lists high priority groundwater dependent ecosystems,[264] (see **Section 2.2**) but does not identify all potential groundwater dependent ecosystems in the Plan area or specify their type. It is important to identify which type of groundwater dependent ecosystem are present across the Plan area as they require different management approaches.

There are also some identified gaps regarding the groundwater dependent ecosystems listed in the Plan. DPIE-Water recently used High Ecological Value Aquatic Ecosystems analysis to identify additional high-priority, groundwater dependent ecosystems to inform the *Namoi Water Resource Plan* process.[265] This analysis[266] is a much finer scale than used during Plan development and the Commission supports its use to protect groundwater dependent ecosystems.

All replacement water sharing plans need to include accurate schedules and maps listing high priority groundwater dependent ecosystems. Currently there appear to be inconsistencies in the level of detail provided in the draft plans which will create confusion. The draft replacement *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020*

---

261 DPIE-Water (2020) *Draft Water Sharing Plan for the Namoi Alluvial Groundwater Sources*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/230806/schedule-a-draft-wsp-namoi-alluvial-gw.pdf.

262 DPIE-Water (2020) *Draft Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/236515/draft-wsp-nsw-mdb-fractured-rock-wrp.pdf.

263 DPIE-Water (2020) *Draft Water Sharing Plan for the Peel Regulated River Water Source 2020.* Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0010/279037/draft-amended-wsp-peel-valley-reg-river-water-sources-2020.pdf.

264 Schedule 4 of the Plan.

265 Dabovic, J., Dobbs, L., Byrne, G. and Raine, A. (2019) 'A new approach to prioritising groundwater dependent vegetation communities to inform groundwater management in New South Wales, Australia', *Australian Journal of Botany*, 67, pp. 397-413. Available at: https://www.publish.csiro.au/BT/pdf/BT18213.

266 DPIE-Water (2019) *Draft Namoi Alluvium Water Resource Plan - GW14 Namoi Alluvium Water Resource Plan Area*: Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0007/192337/draft-namoi-alluvium-wrp.pdf.

includes a list of groundwater dependent ecosystems.[267] However, it only lists Black Spring out of the seven high priority groundwater dependent ecosystems listed as dependent on the Peel Fractured Rock Water Source in the current Plan.

The Plan currently only seeks to protect high-priority groundwater dependent ecosystems (if identified), while low and medium priority ecosystems are considered in other legislation such as the *Environmental Planning and Assessment Act 1979*. The Plan should clarify terminology and the extent of protection of low and medium priority groundwater dependent ecosystems. This is important given the classification of high priority or high ecological value ecosystems is inconsistent across jurisdictions and policies.

5.3.3 Align Plan provisions with the *NSW Aquifer Interference Policy*

The *NSW Aquifer Interference Policy* is designed to holistically protect groundwater dependent ecosystems, considering potential water level and quality impacts.[268] It requires impact assessments for all proposed extraction works if an entire aquifer is a high priority groundwater dependent ecosystem, including the extent of impact on the whole water source.
The Plan includes a range of setback distances for works near groundwater dependent ecosystems[269] to minimise potential impacts of groundwater extraction on environmental features.

The Plan also has provisions for the Minister to require a hydrogeological study to demonstrate there will be minimal or no impact on groundwater dependent ecosystems. These clauses should be retained, though consideration and alignment with the *NSW Aquifer Interference Policy* is recommended. These principles were supported in a stakeholder submission:

> *'It is important that the Peel WSP establishes sustainable levels of take and appropriate buffer distances to ensure adequate protection of groundwater dependent ecosystems, environmental assets and interconnected river systems'.*[270]

5.4 Strengthen the protection of environmental water

5.4.1 Proposed rule changes as part of water resource planning process

As part of the water resource planning process, DPIE-Water has not proposed any changes to the current Plan's planned environmental water rules in the Peel Regulated River Water Source that would materially improve environmental outcomes. However, they have clarified that the environmental water allowance (called ECA in the current Plan) is to be released at the request of the environmental water manager in accordance with an applicable environmental watering plan. The Commission also supports the planned establishment of an Environmental Water Advisory Group for the Namoi Valley to improve environmental water governance (see **Section 9.1.2**).

---

267 Schedule 1 in DPIE-Water (2020) *Draft Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020*, p. 57. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/236515/draft-wsp-nsw-mdb-fractured-rock-wrp.pdf.

268 Office of Water (2012) *NSW Aquifer Interference Policy*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0005/151772/NSW-Aquifer-Interference-Policy.pdf.

269 Clauses 78 and 79 of the Plan.

270 Submission: CEWO, 24 October 2019.

However, there are further opportunities to address risks to ecological values. Some of the opportunities outlined below will likely have minimal impact on water users, others will require further investigation to understand impacts on other users and may require plan amendment depending on the findings of further analysis.

Unacceptably high risks such as hydrological alteration of low flows and baseflows in several Peel tributaries need to be addressed, as well as the protection of environmental water from extraction.

5.4.2 Remove provisions allowing for the extraction of environmental water

The *Namoi Water Resource Plan Risk Assessment* and *Namoi Long Term Water Plan* identify significant risks for the Peel River associated with insufficient water to meet environmental water requirements. Strategic use of the Plan's environmental water provisions, including the ECA, is needed to mitigate this risk. This water must also remain in the river and be effectively coordinated with tributary flows and held environmental water, when appropriate.

There several options to strengthen the protection of environmental water and address the current permissible take of uncontrolled environmental flows for direct irrigation (see **Section 5.1.4**). The removal of clauses 41(4) and 41(5), which have been carried across into the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* from the current Plan (Clause 62), should be investigated. These clauses allow for access to uncontrolled environmental flows in the Peel Regulated River, based on specific access thresholds, via announcement to general security access licences. Removing these clauses would provide environmental water managers with greater confidence in the coordinated delivery of planned and held environmental water. It would also encourage environmental watering to occur at seasonally preferable times, for example, to provide cues for fish movement and spawning and deliver better environmental outcomes

It is unlikely that protecting the ECA would significantly impact long-term water use given access to uncontrolled environmental flows is in addition to volumes assigned through the AWD process and ECA releases to date have occurred outside the peak irrigation season.

Development of the *Namoi Regional Water Strategy* (and potentially the Dungowan Dam environmental assessment) could provide an opportunity to further examine the benefits of protecting environmental water. During consultation on the *Namoi Regional Water Strategy*, the NSW Government should clearly communicate that environmental water protection is assessed as inadequate to address risks to environmental outcomes in the Peel and its intention to address this issue. The NSW Government should set clear objectives for protecting environmental water in the *Namoi Regional Water Strategy*.

5.4.3 Improve prioritisation of environmental water

Environmental water must be treated with greater priority than currently is the case, in accordance with water management principles under the Act. The release of ECA from Chaffey Dam should not take lower priority if Chaffey Dam cannot release the ECA plus access licence water orders for the same day.[271] This means that commercial licensees can take priority over environmental needs and conflicts with the Act.

[271] Clause 31(2)(d) of the Plan.

The Commission acknowledges that the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* provides for channel capacity sharing between the environmental water allowance (currently known as ECA) and water access licence orders. This improves on current arrangements but still does not meet the requirements of the Act and may still impact the effectiveness of the ECA in achieving specific environmental objectives. There is scope to transition from shared channel capacity arrangement to prioritise release of the ECA to maximise environmental outcomes and increase the likelihood of achievement of specific hydrographs needed to achieve targeted environmental objectives.

As noted in **Section 5.4.2**, consultation on this change could occur as part of the development of the *Namoi Regional Water Strategy*.

5.4.4 Provide greater flexibility and carryover for environmental water

The ECA has comparable status to general security licences and is forfeited if not used in the water year. This limits its strategic use for events that would help provide connectivity between pools and riffles, and for fish movement and larger flow events. This is inconsistent with environmental water provisions in other plans, for example the *Water Sharing Plan for the Border Rivers Regulated River Water Source 2009* allows unused stimulus flows to be carried over up to 8,000 ML.

Further analysis is required to assess the benefits and potential costs of being able to carryover unused ECA. Plan amendments should only be made if the analysis supports carryover of the ECA and following stakeholder consultation as part of the *Namoi Regional Water Strategy*.

5.4.5 Review cease to pump rules against the *Namoi Long Term Water Plan*

In the unregulated Cockburn River, Goonoo Goonoo Creek, Chaffey, Upper Peel tributaries, and Lower Peel tributaries water sources, options to improve environmental flows rely upon amendments to surface water access rules (see **Section 5.2**).

The adequacy of commence and cease to pump rules should be assessed based on improved understanding of environmental water requirements. This should draw on local knowledge so that the water needs of landholders are considered.

These flows will help provide baseflows to small freshes downstream and improve outcomes for a broad range of water dependent species and environmental assets. Examples of the benefits of more flow include:

- within narrow and shallow sections of upland streams that are important for Bell's turtle
- in vegetation-fringed permanent upland streams for the Booroolong frog
- for spawning and recruitment of eel-tailed catfish.

The *Namoi Long Term Water Plan* already suggests setting a higher commence to pump in upper reaches of the Peel River to protect freshes and allow water quality to improve, and to provide movement and breeding opportunities for native fish and other aquatic biota. This provision was only considered for the Upper Peel, which feeds into the Chaffey Dam. However, this could also be considered for other reaches of the system, including the Cockburn River, Dungowan Creek and Goonoo Goonoo Creek.

Setting higher commence to pump thresholds would require further studies, an assessment of social and economic impacts and consultation with water users. This could occur as part of the development of the *Namoi Regional Water Strategy*.

5.4.6 Identify ecological values and key habitat features

It will be important for the replacement water sharing plans to identify the ecological values and assets that plan provisions seek to protect and the components of flow regimes that maintain those assets and values. This could be achieved through cross-referencing the *Namoi Long Term Water Plan* which is intended to inform planning processes that influence river and wetland health outcomes, including development of water sharing plans. This change can happen in finalising the draft water sharing plans. Priority water dependent assets should be listed in plan schedules.

Knowledge gaps should also be addressed. For example, the *Namoi Long Term Water Plan* indicates that there is limited knowledge about refuge pools and fish spawning hotspots. Mapping of habitat feature such as refuge pools would assist in revising and refining environmental water requirements needed to maintain these features for the benefits of aquatic biota.

5.5 Recommendations

To improve environmental outcomes the Commission makes the following recommendations (**Table 12**). Several of the recommendations include further analysis to assess different options for improving environmental outcomes and potential social and economic impacts. This analysis and any subsequent consultation on potential plan amendments could be aligned with development of, and consultation on, the *Namoi Regional Water Strategy* (and the Dungowan Dam environmental assessment).

The *Namoi Long Term Water Plan* should be considered in the development of the *Namoi Regional Water Strategy*, as it will provide the latest information regarding the needs of environmental assets.

Table 12: Recommendations for DPIE-Water to improve environmental outcomes

Recommendations	
10 (priority)	By 1 July 2020, recognise the need to align environmental water provisions in the *Water Sharing Plan for the Peel Regulated River Water Source 2020* and *Water Sharing Plan for the Namoi and Peel Unregulated River Water Sources 2012* with the recently finalised *Namoi Long Term Water Plan*. Include amendment provisions in these plans that enable alignment to occur and set a timeframe for alignment by 1 July 2022.
11 (priority)	By 1 July 2020: a) update the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* to include an amendment clause that allows for changes to planned environmental water provisions (for example, based on environmental water requirements in the *Namoi Long Term Water Plan* or potential for carryover of the ECA). By 1 July 2022:

Recommendations	
	b) transition from shared channel capacity arrangement to prioritise release of the ECA. The Namoi-Peel Environmental Water Advisory Group should engage with stakeholders in planning for environmental releases. By 1 July 2022, ideally as part of development and consultation on the *Namoi Regional Water Strategy,* conduct studies into: c) removal of clauses 41(4) and 41(5) from the replacement *Water Sharing Plan for the Peel Regulated River Water Source 2020* (Clause 62 in the current Plan), with changes to plan provisions within one year of completion of the study d) the potential for carryover of the environmental water allowance (currently known as the ECA) to provide for more strategic use of environmental water over multiple years and amend the plan within one year of completion of this study, if warranted.
12	By 1 July 2022, review access rules (commence and cease to pump thresholds) in the *Water Sharing Plan for the Namoi and Peel Unregulated River Water Sources 2012* based on: a) improved understanding of environmental water requirements from the development of the *Namoi Long Term Water Plan* b) mapping of instream values based on the High Ecological Value Aquatic Ecosystem framework c) local knowledge of the water needs of landholders. **Note:** the review of access rules, including social and economic impacts and consultation with water users could occur as part of the development of the *Namoi Regional Water Strategy* and must be completed in time to inform replacement of the *Water Sharing Plan for the Namoi and Peel Unregulated Water Sources 2012*.
13	By 1 July 2022, address knowledge gaps regarding the location, needs and values of water dependent ecosystems (instream and groundwater dependent ecosystems) that the new water sharing plans seek to protect. This should include mapping of key habitat features, where practical. DPIE-Water should also include mapping of instream values developed from application of the High Ecological Value Aquatic Ecosystem framework as schedules in the water sharing plans. This would improve transparency and clarity about the values that the plan seeks to maintain and protect.

6 Meet the needs of water users

This chapter explores how well the Plan has met the needs of water users, particularly:

- the provision of basic landholder rights, including stock and domestic, harvestable and native title rights, in accordance with the priorities under the Act
- support for Aboriginal water values, rights and interests
- town water supply
- irrigators.

Basic landholder rights need to be clarified and afforded higher priority. Provision of native title rights can be strengthened, along with improved Aboriginal water access and use more broadly.

The Plan should address risks to environmental, social and economic outcomes and meet the needs of water users through provisions addressing the inherent risk through AWDs and providing measures that individual users can use to minimise risk. Where possible, the Plan should provide each water licence holder the tools to manage their own risk within the broader requirements to achieve the Plan's environmental, social and economic outcomes. For example, unregulated users can manage their risk profile by storing water in off river storages (potentially increasing activation and extraction), while Tamworth Regional Council can manage aspects of their risk profile by suppling town water from a combination of multiple water sources.

This chapter explores if the Plan adequately accounts for water users needs and allows individuals to adequately manage risk.

6.1 Protect basic landholder rights

There are three types of basic landholder rights to water in NSW, which are given priority under the Act and do not require water licences:[272]

- **Domestic and stock rights –** owners or occupiers of land that is overlaying an aquifer or has river, estuary or lake frontage can take water without a licence for domestic (household) purposes or to water stock. The Plan provides for domestic and stock rights estimated to total 14.12 ML per year (equivalent to about 0.01 percent of entitlements, see **Section 2.8**).[273]
- **Harvestable rights – dams –** landholders in most rural areas can collect a proportion of the runoff on their property and store it in one or more farm dams up to a certain size.
- **Native title rights –** individuals who hold native title (as determined under the Commonwealth *Native Title Act 1993*) can take and use water for a range of personal, domestic and non-commercial purposes.

The Plan includes a relevant objective to 'protect basic landholder rights',[274] with the associated performance indicator 'extent to which basic landholder rights requirements have been met'.[275]

272 Sections 52-55 of the Act.
273 Part 5, Clause 20 of the Plan.
274 Part 2, Clause 10(d) of the Plan.
275 Part 2, Clause 12(f) of the Plan.

The Act requires that sharing of water must protect basic landholder rights and extraction should not prejudice that right.[276] However, the extent to which the Plan objective and this requirement has been achieved is difficult to evaluate. The Commission did not receive any data that report against the objective for basic landholder rights or the associated performance indicator.

6.1.1 The Plan does not explicitly protect stock and domestic rights on the regulated river

Basic landholder rights are not subject to water licence rules and may be accessed at any time subject to water availability.

In response to current drought conditions, a temporary weir (block bank) and pipeline were installed in December 2019, which stopped flows in the Peel River downstream of Dungowan Village.[277] Landholders with basic landholder rights will be affected by the temporary drought works and the cessation of flows.[278] There is also one licensed water user between Dungowan and Tamworth and three downstream of Tamworth that will be affected.[279] DPIE-Water and WaterNSW have consulted with landholders and are administering a program of water carting or alternate sources such as groundwater use for those affected properties. The Commission recognises that in the current situation, measures such as this are required to extend Tamworth's town water supply.

The Commission notes that if water sharing plans are suspended under severe water shortages, the following rules apply to the making of an AWD:

a) first priority is to be given to extraction for:
   i. domestic purposes by persons exercising basic landholder rights, and
   ii. domestic purposes or essential town services authorised by an access licence
b) second priority is to be given to the needs of the environment
c) third priority is to be given to extraction for:
   i. stock purposes by persons exercising basic landholder rights, and
   ii. in the case of regulated rivers, purposes (other than domestic purposes) authorised by a regulated river (high security) access licence, and
   iii. purposes of supply of commercial and industrial activities authorised by a major utility access licence or local water utility access licence, subject to the water made available being in accordance with any drought management strategy established by the Minister for that purpose, and
   iv. purposes of electricity generation authorised by a major utility access licence, and

276 Section 5(3) of the Act.
277 WaterNSW (2020) *Regional Monthly Drought Report – 14th January 2020*. Available at https://www.waternsw.com.au/__data/assets/pdf_file/0003/152535/Regional-Drought-Report-January-2020.pdf?utm_source=Swift&utm_medium=Email&utm_campaign=NSW_drought_report.
278 WaterNSW (2019) *Peel Valley Works and Drought Update - October 14th and 15th 2019*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0010/149806/Peel-Drought-Landholders-Presentation-OCTOBER-2019.pdf
279 GHD (2019) *Report for WaterNSW - WaterNSW Peel River Drought Protection Works, 12510491*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0006/149811/Peel-River-Drought-Protection-Works-REF-Stage-1-Dungowan.PDF

v. the taking of water for purposes authorised by a domestic and stock access licence or by persons exercising any other water rights in relation to stock, and

vi. the taking of water for purposes authorised by a conveyance access licence in connection with the supply of water for any other purpose or need referred to in this paragraph

d) fourth priority is to be given to the taking of water for purposes authorised by any other category or subcategory of access licence.[280]

However, under more normal operations, the lack of end of system rules on the regulated river results in river operations that are not explicitly required to meet the needs of basic rights users along the length of the Peel River. During stakeholder engagement, one landholder near the end of the river noted that they were resigned to reasonably regular lack of flow. As shown in **Figure 12**, the flow record supports this statement, particularly since 2017. The 3 ML per day release from Chaffey Dam is insufficient to cover river losses along the entire regulated river.

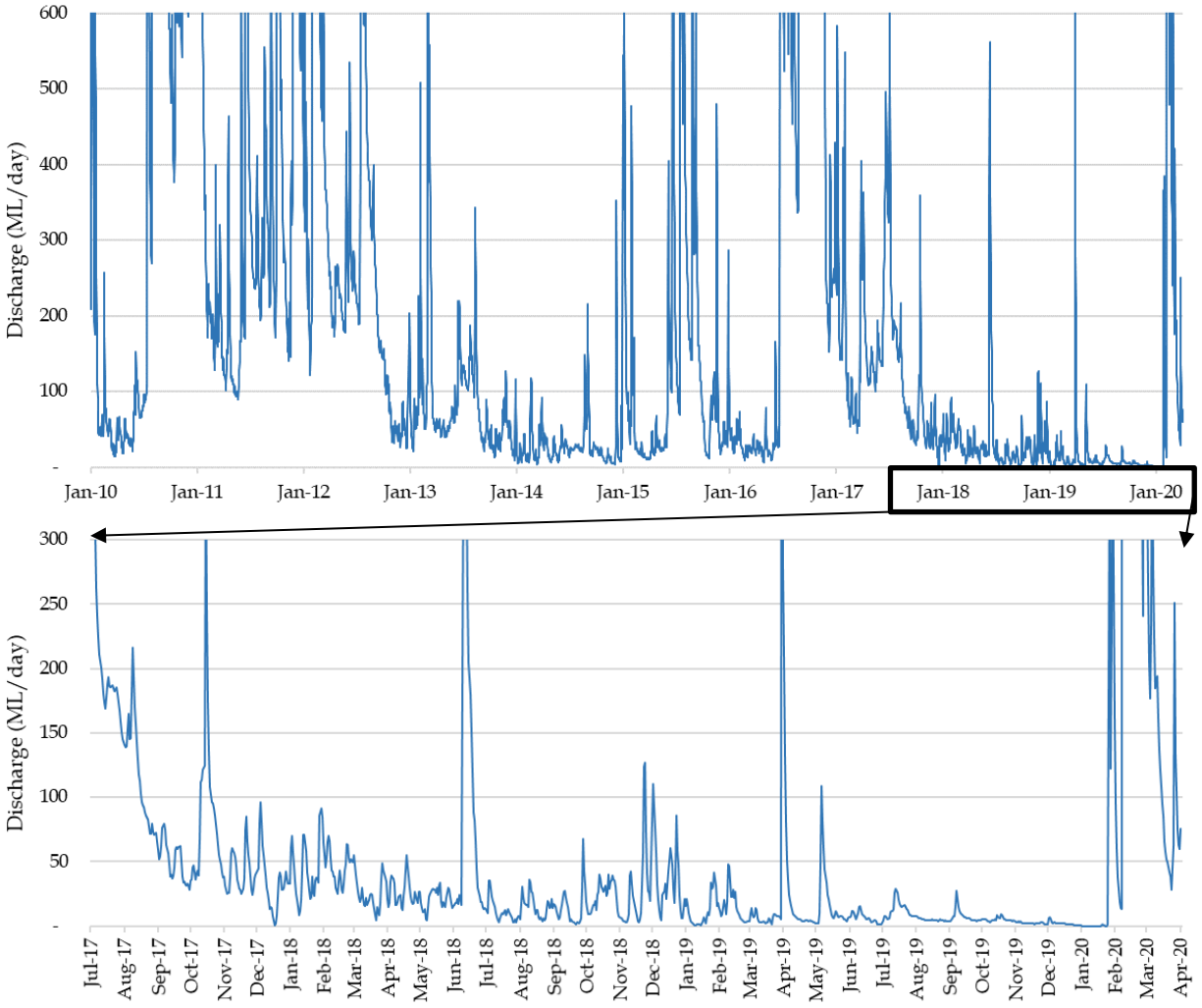

Figure 12: Flow record on the Peel River at Carroll Gap, near the end of the Plan area (note that high flows are not shown to show detail during periods of lower flow)[281]

280 Section 60(3) of the Act.

281 WaterNSW (2020) *RealTime data: Peel at Carroll Gap streamflow gauge – 419006*. Available at: https://realtimedata.waternsw.com.au/.

Many water sharing plans have end of system targets, which can ensure domestic and stock rights are considered. These end of system targets can be linked to upstream gauging stations that trigger reductions in target levels during drought. The Commission recommends that DPIE-Water consider including provisions in the replacement water sharing plans to better protect stock and domestic rights users throughout the Plan area.

Further, the draft *Water Sharing Plan for the Peel River Regulated Water Source 2020* does not appear to set aside a volume for basic landholder rights, domestic and stock licences or utility supply for the second water year (see **Section 4.3.4** for discussion around whether two years of reserve is an appropriate mechanism to secure supply). This could be a drafting error but provisions setting aside enough volume to maintain ongoing supply should be specifically written into future water sharing plans for each of these priority uses.[282]

6.1.2 Harvestable rights are provided for but excluded from the Plan

Harvestable rights are part of basic landholder rights and do not require a water licence.[283] The Commission understands they are indirectly accounted for under the Plan as part of reduced runoff in IQQM. Harvestable rights dams are only permitted on first and second order streams, meaning growth impacts downstream water users' reliability. Growth in harvestable rights should be managed under the *Basin Plan*. The Plan does not provide an estimate of this take but it should be included in the replacement water sharing plans.

6.1.3 Native title rights provisions need to be strengthened

A native title holder is entitled to take and use water without an access licence, water supply work approval or water use approval under Section 55(1) of the Act, as part of basic landholder rights. The Plan has an associated performance indicator, specifically the 'extent to which native title rights requirements have been met'.[284]

The Plan states that 'at the commencement of this Plan, there are no native title rights in these water sources; therefore the water requirements for native title rights total 0 ML per year'.[285] Although the Plan recognises that the exercise of native title rights may increase over the term of the Plan,[286] it does not include an allowance to amend this clause.

At the time of this review, there have been no native title determinations in the Plan area but there is an active native title claim in place across the Plan area (registered as NC2011/006 - NSD37/2019 - Gomeroi People, see **Section 2.4**).[287]

Potential future native title determinations and claims need to be proactively planned for and accommodated in the Plan. The replacement water sharing plans should acknowledge the likelihood of native title determinations and include a provision to allow for an amendment – this provision should specify a set timeframe in which this amendment should occur following

282 Clause 58(1)(a) of the Act.

283 Farm dams only require an access licence when: they are located on a third order (or greater) river, irrespective of capacity or purpose; they exceed the maximum harvestable right dam capacity for the property, which enables the capture of ten per cent of the mean annual run-off from the property; or they are on a permanent (spring fed) first or second order stream.

284 Part 5, Clause 12(h) of the Plan.

285 Part 5, Clause 21 of the Plan.

286 Note in Part 5, Clause 21 of the Plan.

287 National Native Title Tribunal (2019) *Maps – NSW State Map*. Available at: http://www.nntt.gov.au/Maps/NSW_ACT_JBT_NTDA_Schedule.pdf

a determination. This amended clause has been shown to be necessary due to delays experienced in other water sharing plans in addressing native title rights after native title determination.[288]

The Commission suggests that the replacement water sharing plans should include clauses with a timeframe of three months to undertake initial amendments, and enough time to undertake detailed engagement, determine water entitlements,[289] and make final plan amendments.

It is important that DPIE-Water assumes a proactive approach to native title rights. Indigenous Land Use Agreements or other agreements[290] could be used to prevent issues related to the long timeframes of native title claims and determinations, potential for native title procedural rights[291] and compensation claims[292], and extended periods of inaction in amending water sharing plans that can follow final determinations.

6.2 Proactively manage for extreme events and change

The Plan should better support management through periods of more extreme natural variability and drought, allowing for adaptation within the 10-year period to reflect updated drought information, and address changes to inflow or groundwater recharge due to climate change and an improved understanding of climate variability. The planning timeframe is limited to the recorded past, and the current knowledge around climate change and variability suggests that the historical record may not represent future risks appropriately.

Parts of the Plan have been suspended[293] under recent severe drought conditions, with NSW Government instead managing the area under the *NSW Extreme Events Policy* (see **Section 3.3**). The ability to suspend parts of water sharing plans to enable management for critical needs under extreme events is appropriate but should only apply to those outlying events, not natural variability or future likelihoods under climate change.

---

288 In a recent Commission review, this amendment clause was in place but did not result in the determined native title rights being included in the Plan in a timely manner (see Natural Resources Commission (2019) *Review of the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012*. Available at: https://www.nrc.nsw.gov.au/_literature_251193/Final).

289 Water entitlements can be an effective way to support and implement Aboriginal entitlements. A volumetric or proportional allocation of water is preferable as it helps to clarify what is achievable within the native title entitlement. However, this does vary with some native title rights providing an entitlement without a specific volume. In addition, some stakeholders have advised the Commission that the focus on a volume may detract from the process of recognising cultural entitlements due to the lengthy and complex processes involved in determining a volume.

290 There are several agreements that can be made under relevant NSW and Commonwealth legislation. For example, Indigenous Land Use Agreements or a Section 31 Deed can be used successfully to resolve native title claims proactively. These are legally binding and may include rights in relation to employment, economic development, freehold land and compensation. Aboriginal Land Agreements can also be used as an alternative to the land claims process under the *Aboriginal Land Rights Act 1983 (NSW)* and provide a broad scope for negotiating claims. Indigenous Protected Areas are also effective, encompassing areas of land and sea country owned or managed by Indigenous groups which are voluntarily managed as a protected area for biodiversity conservation through an agreement with the Australian Government as part of the National Reserve System.

291 The *Native Title Act 1993* gives native title parties certain procedural rights concerning the development on land and water where native title may exist, whether or not determined.

292 These issues have been raised in submission for other water-related reviews, including NTSCORP (2017) Submission: Proposed Amendments to the Murray-Darling Basin Plan; NTSCORP (2016) Submission: Inquiry into the Augmentation of Water Supply for Rural and Regional NSW.

293 Government Gazette of NSW Number 43 – Monday 2 March 2020. Available at https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette_2020_2020-43.pdf.

Stakeholders have called for more transparent rules and specific triggers in the Plan to:

- effectively manage the water sources under a wider range of climate conditions
- provide clarity around extraction priority and access trigger levels to mitigate predicted drought impacts
- help licensees to manage their own risks under different circumstances.

Water sharing plans should not just manage for 'normal conditions' but manage risk to mitigate future and ongoing water shortages and drought. However, the current approach is for the Plan to operate under 'normal conditions' with the *NSW Extreme Events Policy* and *Incident Response Guide* managing extreme drought. This is not appropriate in a system with a large percentage of water users that require high levels of security and a highly variable climate, where 'normal' (or average) conditions may not be very common.

6.2.1 Provide critical needs in a variable climate

The volumes of water allocated for the second year of basic landholder rights, local water utility needs and domestic and stock licences are calculated based on the supply of critical needs during the worst drought in the historical flow records held by DPIE-Water at Plan commencement in 2010 (data from 1878-2009). Recent work on climate variability indicates that there are risks associated with relying on the relatively brief observed climate record (about 100 years) for water planning, which may not represent the full range of past or longer-term variability.[294]

The current drought highlights the limitations of using data from a relatively short time period. Inflows to Chaffey Dam under the current drought (which were about 6 GL for the two years to March 2020) were less than half the previous worst two-year drought captured in the current dataset (13 GL in 1964-66).[295]

As demonstrated by the paleoclimatic record, the Plan area has a naturally highly variable climate. While annual surface runoff and groundwater projections for 2020-2039 are within the natural range of variability, seasonal changes are projected for groundwater recharge (see **Section 2.6**).

The draft *Water Sharing Plan for the Namoi River Regulated Water Source 2020* also requires operators to manage the water supply system 'in a way that water would be able to be supplied during the repeat of the worst drought'[296] but the draft *Water Sharing Plan for the Peel River Regulated Water Source 2020* defines this based on data recorded until July 1 2010, which does not consider the current drought period. Planning should not be restricted to the limited historic record. This is recognised under planning for the regional water strategies. Planning should include the best available evidence which would include the current drought, paleoclimatic records and climate change projections.

294 Zhang, L., Kuczera, G., Kiem, A.S., and Willgoose, G. (2018) 'Using paleoclimate reconstructions to analyse hydrological epochs associated with Pacific decadal variability', *Hydrology and Earth System Sciences*, 22(12), pp. 6399-6414. Available at: https://www.hydrol-earth-syst-sci.net/22/6399/2018/; Flack, A.L., Kiem, A.S., Tozer, C.R., Vance, T.R. and Roberts, J.L. (2018) *Multiproxy paleoclimate reconstructions for eastern Australia confirm instrumental records misrepresent hydroclimatic variability: implications for water resource management and planning*, Water Resources Research, In Review.

295 WaterNSW (2020) *Peel Drought – landholders' presentation*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0020/155612/Peel-Drought-Landholders-Presentation-March-2020.pdf.

296 Clause 56 of the draft *Water Sharing Plan for the Namoi River Regulated Water Source 2020.*

To address climate variability and security of supply, provisions in the replacement water sharing plans should:

- ensure the Plan can function under a range of modelled climate scenarios, drawing upon paleoclimatic studies, assessment of risks from the current drought period, and projected changes to inflow and groundwater recharge under climate change, modelled as part of the *Namoi Regional Water Strategy*
- develop mechanisms to ensure water will be shared to first protect the water source and its dependent ecosystems, second protect basic landholder rights and third be shared equitably among all other users, if scarcity and demand on the resource increases.

6.2.2 Manage risks to town water supply in the Plan

Tamworth Regional Council holds local water utility access licences totalling 22,630 ML per year across both surface and groundwater sources**,** representing about 18 percent of total entitlement.[297] Unlike some water sharing plans, the Plan has no specific town water supply objective or performance indicator, even though Tamworth is a significant user. The Commission's review identified several key risks to town water supply in the Plan area, including:

- current and future drought conditions (see **Section 2.7**)
- climate change predictions (see **Section 2.6**)
- future predictions of population growth (see **Section 2.3**).

For example, previous median climate change impacts indicates that the bulk water supply system yield could decrease from around 18,000 ML per year to around 17,000 ML per year within 20 to 30 years.[298] These projections will be updated as part of the *Namoi Regional Water Strategy* (see **Section 3.2**).

Given the priority afforded town water supply under the Act, growth in Tamworth's population and water consumption is likely to impact the reliability of general security releases in the Peel, supplementary water availability and general security licences reliability in the Namoi.[299] Irrigation stakeholders are highly concerned that any change to Tamworth's water utility access will negatively impact their reliability of access, and therefore business viability: '*Businesses will fold, [we] won't be able to grow and banks will quickly devalue the land*'.[300]

The Plan distributes 95 percent of Tamworth urban water growth in use to the Upper and Lower Namoi regulated river water sources, and 5 percent of Tamworth urban water growth is accounted within the Peel Regulated River Water Source. Water use data from Tamworth

297 See Part 5, Clause 24 of the Plan; and Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

298 Tamworth Regional Council (2015) *Tamworth Regional Council: Drought Management Plan 2015*. Available at: https://www.tamworth.nsw.gov.au/ArticleDocuments/220/2015%20Drought%20Management%20Plan%20-%20REVISION%201%20-%2012%20April%202016%20-%20PDF.pdf.aspx

299 WaterNSW (2018) *WaterNSW 20 Year Infrastructure Options Study, Rural Valleys*. Available at: https://www.waternsw.com.au/__data/assets/pdf_file/0019/132616/20-Year-Infrastructure-Options-Study-June-2018.pdf.

300 Interview: Peel Valley Water Users' Association, 12 November 2019.

Regional Council indicates that, despite significant increases in population, water consumption in Tamworth has remained relatively constant since 1990.[301]

The Plan provides no incentive for Tamworth Regional Council to implement water restrictions early as water 'saved' by water restrictions would be reallocated to regulated river and aquifer (general security) licensees via AWDs. Council advised that before 2016 when Chaffey Dam was upgraded, it would introduce Level 1 water restrictions when Chaffey Dam was at 50 percent capacity, '*which generally coincided with the time when general security allocations reduced to 0%*'.[302]

This meant that water 'saved' by town water restrictions was not re-distributed for other licences. In contrast, water restrictions were introduced 14 January 2019 and general security allocations did not drop to zero percent until Chaffey Dam was 23 percent on 1 July 2019.[303] As such, the Plan provides no mechanism for Tamworth Regional Council to proactively manage remaining risk.

Table 13 details Tamworth Regional Council's water restrictions over the current drought.

Table 13: Tamworth's water restrictions in the current drought in the context of available water determinations

Date	Action
16 August 2018	Tamworth Regional Council guaranteed under-use of their entitlement and supported its reallocation 'to assist farmers'. DPIE-Water increase AWDs to regulated river (general security), ECA and aquifer (general security) licences by 7 percent to 0.36 ML per share, 1,800 ML and 0.68 ML per share respectively. All other licences had full AWDs for 2018-19.
4 October 2018	Regulated river general security and ECA AWDs increased by 2 percent each to 38 percent of entitlement. Aquifer (general security) access licences increased by 1 percent to 69 percent of entitlement. Available water increases were based on showers in September reducing system transmission and evaporation losses.
4 March 2019	**Level 3** water restrictions applied to Tamworth town.
6 May 2019	**Level 4** (severe) water restrictions applied to Tamworth town.
1 July 2019	AWD of 100 percent for unregulated and aquifer access licences, 70 percent for regulated river utility, domestic and stock water access licences, and 0.5 ML for high security. 0.51 ML per share for aquifer (general security).
23 September 2019	**Level 5** (emergency) water restrictions applied to Tamworth, Moonbi and Kootingal.

Considerable planning and investment are underway to address the potential for reduced supply and increased demand, including the pipeline and dam infrastructure projects.

301 Tamworth Regional Council (n.d.) *Town Water Supply FAQs - How much water does Tamworth use in a year?* Available at: https://yourvoice.tamworth.nsw.gov.au/town-water-supplies.
302 Submission: Tamworth Regional Council, 27 September 2019.
303 *Ibid*.

Tamworth Regional Council[304] has been requesting that DPIE-Water increase the town's AWD from 70 percent allocated in the current year and reserved in the following year before AWDs can be made for regulated river (general security) licences, to 100 percent of entitlement.

The current Plan only addresses the risk to Tamworth's water supply within the bounds of the drought of record. Decisions concerning the volume of water reserved for Tamworth Regional Council's town water supply should be based on the relative risk to the inhabitants and businesses of Tamworth compared to the risk to other basic landholder rights and licensees. The current IQQM has limited ability to assess relative risk as it only looks at historic climate sequences. Droughts of greater magnitude will most likely occur as the current drought demonstrates.

The Commission understands that DPIE-Water is currently preparing regional water strategies that will assess risks to water security from climate change, as well as variability demonstrated by the paleoclimatic record, and may recommend future changes to water sharing plans. DPIE-Water is modelling risk by incorporating natural variability aligned with the paleoclimatic record along with climate change as part of the regional water strategies. Potential changes to inflows and evapotranspiration are modelled over a 10,000-year sequence of possible wet and dry sequences.

The *Namoi Regional Water Strategy* will consider if the risk to Tamworth Regional Council's water supply is unacceptable and the ability of additional infrastructure and altered management to reduce those risks. The actual risk to Tamworth's water supply cannot be fully assessed until the current drought has broken however the modelling should cover droughts of similar magnitude due to the use of the longer paleoclimatic record.

The *Namoi Regional Water Strategy* scenario modelling should lead to DPIE-Water developing both infrastructure and water sharing plan options. The replacement water sharing plans should be amended by July 2022 to address plan related risks to town water supply and allow Tamworth Regional Council to proactively manage its risks.

6.2.3 Use available water determinations as a tool to manage climate variability

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, DPIE-Water should expand rules for setting AWDs, allowing for more certainty and proactive management of water shortages based on findings from the modelling recommended in **Section 6.2.1**.

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'.[305] Reducing AWDs would share the reduced entitlements more equitably across all users, regardless of their relative position in each water source.

304 Submission: Tamworth Regional Council, 27 September 2019; and interview: Tamworth Regional Council, 12 November 2019.
305 Clause 10 (e) of the Plan.

As discussed in **Section 7.5**, alluvial licensees[306] in highly connected water sources are concerned around the implementation of 'hard stop' cease to pump thresholds in very low and cease to flow periods. The Commission considers there are opportunities to improve drought management responses using a combination of cease to pump thresholds and AWDs. DPIE-Water should amend the replacement water sharing plans, following investigations and stakeholder engagement on how AWDs can be used in conjunction with cease to pump thresholds to manage extraction during drought, including under predicted climate change.

6.2.4 Meet users' needs under climate change and natural variability

The sections above outline how the provisions of the current Plan do not adequately manage natural variability. As discussed in **Section 2.6**, the Plan area will also experience a changing climate over coming years. The current Plan only uses a two-year planning system that requires a volume of water to be reserved each year to meet minimum AWDs the following year.[307] This is not adequate to manage for periods of drought and water shortage that extend beyond two years.

The *Namoi Regional Water Strategy* should include a distribution of benefits study in line with the prioritisation required by the Act to assess the best way to distribute the benefit and the changes required in the Plan. This approach has already been applied in the Greater Hunter Region[308] where there are complex interactions between power stations, coal mines, urban water and irrigation.

The Commission understands that DPIE-Water is developing methods to better understand and address climatic risk to water management outcomes across NSW.[309] This includes developing methods to incorporate climate change information based on DPIE-EES' NARCliM climate modelling project, which includes a more comprehensive representation of natural variability and integrates climate change projections, especially of increased evaporative demand.[310]

As part of the *Namoi Regional Water Strategy*, DPIE-Water should ensure the Plan can function under a range of modelled climate scenarios, drawing upon paleoclimatic studies, assessment of risks from the current drought period, and projected changes to inflow and groundwater recharge under climate change.

6.3 Support Aboriginal water values, rights and use

> *'The river has a responsibility not just to us, but to plants and animals. It has a right to connect up to other waters. It's the bloodline of this country. It's like us: if our blood stops flowing, we get sick. The water, if that flow stops, we all become sick'*.[311]

306 Specifically, members of the Cockburn Water Users' Association.

307 That is, basic landholder rights and 70 percent AWD for domestic and stock entitlements, and local water utility entitlements, and 50 percent AWD for high security, as per clauses 47(4), 48(5) and 49(3) of the Plan.

308 DPIE-Water (2018) *Greater Hunter Regional Water Strategy*. Available at: https://www.industry.nsw.gov.au/water/plans-programs/regional-water-strategies/greater-hunter-region.

309 Personal communication, DPIE-Water, 28 August 2019.

310 The NARCliM project is developing regional climate projections for south-east Australia to span the range of likely future changes in climate. It is a collaboration between NSW and ACT governments and the University of NSW Climate Change Research Centre. It will be independently expert reviewed (NSW Government (n.d.) *About NARCliM*. Available at: http://www.climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/About-NARCliM); and Personal communication, DPIE-Water, 28 August 2019.

311 Ashby, Rhonda (Gamilaraay language teacher) quoted in Allam, L. and Earl, C. (2019) 'For centuries the rivers sustained Aboriginal culture. Now they are dry, elders' despair'. *The Guardian*, 22 January. Available at:

Aboriginal water values, rights and interests require further understanding and acknowledgement, in partnership with Aboriginal stakeholders. It is important that the Plan supports Aboriginal outcomes beyond just native title, through provisions that reflect objectives of the Act – to 'recognise and foster the significant social and economic benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water'.[312] The National Water Initiative also specifies that 'native title should not be solely relied upon to deliver Indigenous peoples the access and rights to their traditional waters. Water planners should consider other mechanisms for giving access and rights to water to Indigenous peoples'.[313]

To better reflect these objectives and principles for Aboriginal water, it is important that DPIE-Water adopt:

- processes that protect and support Aboriginal water values and objectives
- strategies to enable water access and a range of uses
- genuine involvement of Aboriginal peoples in water planning, leadership and management.

6.3.1 Aboriginal values, objectives and indicators need to be part of new plans

The Plan includes an objective to 'protect, preserve, maintain or enhance the Aboriginal, cultural and heritage values of these water sources', and a performance indicator to measure 'the extent of recognition of spiritual, social and customary values of water to Aboriginal people'.[314] There is no relevant vision statement recognising Aboriginal peoples custodianship of these lands and waters as is included in other water sharing plans.[315] The Commission has not received any information from DPIE-Water that reports against the objective or performance indicator.

The Plan also provides rules to protect groundwater dependent culturally significant sites near planned water supply works, to ensure sufficient distance restrictions are in place.[316] The Plan notes that culturally significant sites were to be identified as a part of an assessment undertaken by the NSW Office of Water during an application process for the granting or amending of a water supply work approval. The Commission has not been provided with any evidence of where these assessments have been undertaken and what values were identified. In other water sharing plans, groundwater dependent culturally significant sites were planned to be identified across the state by the Aboriginal Water Initiative and registered in the Aboriginal Water Initiative System (AWIS)'.[317] However, the NSW Aboriginal Water Initiative was abandoned in 2017.

The Plan's background document notes that an initial assessment into Aboriginal cultural heritage values was undertaken in the upper riparian zones of the Chaffey and Upper Peel

www.theguardian.com/australia-news/2019/jan/22/murray-darling-river-aboriginal-culture-dry-elders-despair-walgett.

312 Section 3 of the Act.

313 Council of Australian Governments (2017) *Module to The National Water Initiative (NWI) Policy: Guidelines for Water Planning and Management Engaging Indigenous Peoples in Water Planning and Management*.

314 Part 2, Clause 10(c) and 12(j) of the Plan.

315 For example, *Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources 2009; Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009.*

316 Part 10, Division 2, Clause 80 of the Plan.

317 Part 9, Clause 40A of the Plan. Note: The Aboriginal Water Initiative was abandoned in 2017.

River Tributaries water sources via a 'preliminary desktop analysis and ground reconnaissance'.[318] The assessment did not identify any harmful impacts on Aboriginal cultural heritage values within the upper extent of the water sources examined as a result of current and proposed water flow regimes in the Plan provisions.[319] However, there was very limited consultation with Aboriginal people on these water values, with input only sought during the public exhibition period for the Plan through direct liaisons with the executive of the Tamworth Local Aboriginal Land Council.[320]

In the last two years, DPIE-Water has undertaken consultation with Aboriginal peoples as part of the MDBA's water resource planning process.[321] This has been documented and published in First Nations consultation reports. The consultation undertaken with the Gomeroi Nation is relevant to this Plan and includes the identification of Gomeroi water-dependent values and uses; the impacts on and risks to these; and objectives and outcomes for their protection.

Gomeroi people value water as life – they value and use water for cultural, social, environmental, spiritual and economic practices. The key issues they identified for water planning and management spanned the following themes:

- **Healthy country and people** – there is a fundamental interconnectedness of water, land and people, with the health of rivers critical to healthy Country and people.
- **Cultural continuity and revival** – water provides significant connections to history, ancestors and identity.
- **Custodianship and jurisdiction** – knowledge and custodianship of lands and waters in the area need to be respected to help improve the health of Country – there needs to be opportunities for First Nations management of water to enable them to continue their role as custodians and to support economic development.
- **Equity, redress and compensation** – water is only known as a shared resource, with current water entitlements viewed as inequitable and unfair in prioritising business and agriculture over others – this needs to be redressed and First Nations should be compensated for their loss.

---

318 NSW Office of Water (2010) *Water Sharing Plan for the Peel Valley regulated, unregulated, alluvial and fractured rock water sources: background document*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf

319 Albertson, D. (2009) *Draft Peel water sharing plan*. Prepared for the Department Environment Climate Change & Water input, Department of Environment, Climate Change and Water, Armidale NSW (unpublished); as reported in NSW Office of Water (2010) *Water Sharing Plan for the Peel Valley regulated, unregulated, alluvial and fractured rock water sources: background document*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

320 The Plan's background document notes that no formal submissions were received from Aboriginal individuals or groups during the public exhibition of the Plan.

321 Water resource planning has involved consultation with Aboriginal nations in basin communities to identify water-related objectives, values and uses, which are presented in nation-specific consultation reports. For example, consultation with Gomeroi people took place in March and April 2018 across north western NSW. It was designed to meet the requirements of the *Basin Plan* (Chapter 10, Part 14) and conducted according to MDBA guidelines for best practice traditional owner consultation. The process was underpinned by eight principles, developed by Dhirranggal Solutions, for culturally appropriate consultation: respect for the contemporary cultural framework; flexibility; collaboration; quality assurance; clear communication; building tangible outcomes; inclusivity and accessibility; and indigenous data sovereignty. Qualitative research methods employed include participant-centred research and generic thematic analysis. See: DoI-Water (2018) *Report on culturally appropriate First Nations consultation with Gomeroi Nation*. Prepared by the Dhirranggal solutions. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/192332/ gwydir-first-nations-consultation-gomeroi-nation-report.pdf.

- **Partnerships and communications** – there is a general lack of cultural awareness and appropriate communication which has resulted in poor partnerships between Aboriginal peoples and governments and farmers.[322]

Although there have been some limitations in the extent and resourcing of engagement as part of water resource planning,[323] the work with Gomeroi people has largely been effective in representing key water-related values, risks and impacts. However, DPIE-Water has not provided any information or clear process for how these identified values will be used in replacement water sharing plans, nor how this engagement process will be expanded to cover those water sharing plan areas outside the Murray-Darling Basin.

As part of the new water sharing plans, DPIE-Water will need a clear process for how this extensive work with the Gomeroi Nation will be captured and adequately represented in the Plan. They will also need to expand the consultation with Aboriginal people to ensure a range of stakeholder views are captured, including Traditional Owners, Nation groups, Local Aboriginal Land Councils and other representative organisations and groups.

For example, feedback received from Aboriginal stakeholders as part of this Plan review described key cultural values and challenges in the area.[324] The findings confirm and build on many of those identified as part of the Gomeroi Nation engagement process:

- **Water and culture are inherently interconnected** – there is no distinction between different types of environmental, social and cultural water or licences for Aboriginal peoples – it is all one and the same and part of critical cultural obligations, connections and learning: '*as a child we would go and see it as a place to feed. There were fish, mussels, ducks, birds, eggs.' It was in hanging about and eating here that the teaching and cultural opportunities came from*'[325]; '*it's like a library … the river is a quiet space. Those trees are like books, full of stories of the place, it's a place of knowledge*'.[326]
- **The whole river, its tributaries and riparian environments are important –** regeneration needs to happen across the whole system and its parts, tributaries are as much value as the main river.
- **Ideology and language around water needs to change** – agricultural practices have improved but there is still an ideology that water is a right that requires compensation where it is not available. Water needs to be revalued as a shared, living entity that needs respect and protection.
- **Governance of water needs to change –** there is a need to incentivise business decisions among farmers to support the environment and longer-term economic outcomes (for example, regulate and incentivise crops and where they are located so that they are better suited to the area). This new approach must be led at a national level with a transparent

322 DoI-Water (2018) *Report on culturally appropriate First Nations consultation with Gomeroi Nation*. Prepared by the Dhirranggal solutions. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/192332/gwydir-first-nations-consultation-gomeroi-nation-report.pdf.

323 Feedback received as part of the Commission's water sharing plan reviews has noted that some Aboriginal stakeholders have felt left out of the water resource planning consultation process due to its focus on First Nations. There were also concerns raised that the consultation process was under resourced and rushed.

324 Interviews: Indigenous Land and Sea Corporation, 30 September 2019; Aboriginal Affairs NSW, 30 September 2019; NSW Aboriginal Land Council, 4 October 2019.

325 Interview: Tamworth Local Aboriginal Land Council, 23 October 2019.

326 Ashby, Rhonda (Gamilaraay language teacher) quoted in Allam, L. and Earl, C. (2019) 'For centuries the rivers sustained Aboriginal culture. Now they are dry, elders' despair'. *The Guardian*, 22 January. Available at: www.theguardian.com/australia-news/2019/jan/22/murray-darling-river-aboriginal-culture-dry-elders-despair-walgett.

and independent government agency backed by science and strict enforcements; '*humans will be humans and look after themselves – the system cannot allow for this type of discretion. People are desperate at the moment*'.[327]

- **Drought and drying are having deep and long-term impacts –** the river is dry beyond the living memory of Aboriginal people in the area, '*even if it does rain it is not going to make it to the river, it has been dry for so long*'.[328] The problem is viewed as a combination of long-term drought, climate change and greed.
- **Open up opportunities for land and water management for Aboriginal people –** through genuine partnership and ownership (for example, Aboriginal rangers, Aboriginal water); '*we've had the protests and fights and media with fish deaths and everything … now is time for partnership and resource sharing and genuine Aboriginal involvement and ownership*'.[329]
- **Develop river-based industries** – waterways are not being valued for their own productivity (for example, aquaculture). Rivers used to be a food source, but fisheries and other businesses have not been well supported; '*now rivers are just considered to be an irrigation ditch'*.[330] It can also build on the sustainable food movement and provide economic development opportunities for Aboriginal people.
- **Education on water governance is critical for Aboriginal people** – this needs to be simple and explain what Aboriginal people need to know about licences, cultural water, environmental water and opportunities for Aboriginal involvement; '*we've not had the education or resources to think about how an Aboriginal water model would work'*.[331]
- **Ensure access to waterways for Aboriginal people –** over recent decades Aboriginal people are increasingly physically excluded from the waterways (for example, private ownership, fences, security), impacting critically on cultural connections to Country.

DPIE-Water should engage further with a range of Aboriginal stakeholders in the area to better understand and support the full range of Aboriginal water values, rights and interests. This should be in line with relevant legislation and culturally appropriate approaches to supporting Aboriginal water rights,[332] including Aboriginal waterways assessments[333] and cultural flows assessments.[334] These existing approaches can be adopted to help identify values, develop objectives and outcomes, and determine required cultural flows to support both material and intangible Aboriginal water values,[335] in consultation with Aboriginal stakeholders in the Plan area.

---

327 Interview: Tamworth Local Aboriginal Land Council, 23 October 2019.

328 *Ibid*.

329 *Ibid*.

330 *Ibid*.

331 *Ibid*.

332 The Act includes a broad objective to 'recognise and foster the significant social and economic benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water' (Section 3) and associated provisions. The National Water Initiative acknowledges that 'native title should not be solely relied upon to deliver Indigenous peoples the access and rights to their traditional waters. Water planners should consider other mechanisms for giving access and rights to water to Indigenous peoples.

333 The Aboriginal Waterways Assessment Program aimed to develop a tool that consistently measures and prioritises river and wetland health so that Traditional Owners can more effectively participate in water planning and management in the Basin. (MDBA (2017) *Aboriginal Waterways Assessment Program*. Available at: https://www.mdba.gov.au/publications/mdba-reports/aboriginal-waterways-assessment-program).

334 The National Cultural Flows Research Project is driven by and for Aboriginal people to establish a national framework for cultural flows. The framework, released in 2018, provides the first guide and method for future planning, delivery, and assessment of cultural flows (MDBA (2019) *Cultural Flows*. Available at: https://www.mdba.gov.au/discover-basin/water/cultural-flows).

335 Common water-related values of Aboriginal peoples include: cultural heritage and evidence of historic occupation and use; connection to key water dependent plant and animal species; customary food, fibre and

6.3.2 Improve Aboriginal water access and use

Aboriginal-specific purpose licences are the primary mechanism to enable Aboriginal water use under the Act.[336] While the Act provides for three different types of licences, these are not available across all water sharing plans.[337] Further, all Aboriginal-specific water licences have been conditioned with limits to volumetric entitlements, restrictions to use, and prohibition of trade.[338] These features, together with limited awareness of these licences within Aboriginal communities, has meant that the actual uptake of specific purpose licences has been limited across NSW.[339]

The Plan provides for 'Aboriginal cultural' access licences, capped at 10 ML per year. As in other areas, uses of water under this licence are restricted to 'personal, domestic or communal purposes, including drinking, food preparation, washing, manufacturing traditional artefacts, watering domestic gardens, cultural teaching, hunting, fishing, gathering and for recreational, cultural and ceremonial purposes'.[340]

Despite the availability of this licence, the Commission has not been provided with any evidence or reporting on any access and use of this licence. In addition, stakeholder feedback confirms that these licences have not been applied for or used in the Plan area. Indeed, there was very limited awareness of water sharing plans and water related policy generally in Aboriginal communities. The Tamworth Local Aboriginal Land Council described a situation where they only recently discovered they own a number of water licences attached to land holdings under domestic and stock uses; '*with all the demands on LALCs and lack of resources we haven't had a chance to explore this issue really*'.[341] Further, DPIE-Water does not appear to have a clear policy or application process for Aboriginal-specific water licences, with sources describing the process as 'laborious'.[342]

---

tool production; land and water management activities and expertise; creation stories and customary lore; movement and presence of spiritual and metaphysical beings; well-being and recreation; interconnection of values as part of a broad cultural landscape (not confined only to individual sites); and economic development and opportunities See: Murray Lower Darling Rivers Indigenous Nations, Northern Basin Aboriginal Nations & North Australian Indigenous Land and Sea Management Alliance (2017) *Dhungala Baaka: Rethinking the Future of water management in Australia*. Available at: http://www.mldrin.org.au/wp-content/uploads/2018/06/Dhungala-Baaka.pdf.

336 Section 3 of the Act includes a broad objective to 'recognise and foster the significant social and economic benefits … to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water'.

337 Aboriginal cultural access licences (available in all surface water and groundwater management areas); Aboriginal community development access licences (only available in water sources where water extraction is not yet over allocated - largely in coastal areas); and supplementary (Aboriginal environmental) water access licence (only available in the Barwon-Darling area).

338 An unregulated river (subcategory 'Aboriginal community development') access licence is a specific purpose access licence and as such can only be the subject of limited trade that is consistent with the purpose for which the licence was granted. Aboriginal communities, enterprises and individuals are encouraged to seek financial assistance from funding bodies to purchase other categories of access licence if they require fully tradeable licences.

339 Hartwig, L.D., Jackson, S. and Osborne, N. (2018) 'Recognition of Barkandji Water Rights in Australian Settler-Colonial Water Regimes', *Resources*, 7(1), pp. 16-32.

340 Part 8, Clause 54(3) of the Plan.

341 Interview: Tamworth Local Aboriginal Land Council, 23 October 2019. Note that a 2016 survey of Aboriginal water interests in the Basin also found that only 16 percent of the sample group had some ownership of a water licence, most of which were stock and domestic licences. Licences varied from 5 to 2,000 ML, with half the respondents not knowing their entitlement. See: Goff, S. (2016) *A survey of Aboriginal water interests in the Murray–Darling Basin – A summary report*. Prepared for the MDBA. Available online: https://www.mdba.gov.au/sites/default/files/pubs/Survey-aboriginal-water-interests.pdf

342 Hartwig, L.D., Jackson, S. and Osborne, N. (2018) 'Recognition of Barkandji Water Rights in Australian Settler-Colonial Water Regimes', *Resources*, 7(1), pp. 16-32; Tan, P.L. and Jackson, S. (2013) 'Impossible dreaming —

Across the whole state, meaningful access to water for Aboriginal peoples has been precluded by concepts of water tenure and property rights, and the narrow definitions of cultural values and the use of water for 'traditional purposes' only.[343] In the case of water sharing plans, this limitation is reinforced both as part of cultural water access licences, and under native title and other land-based rights and agreements (see **Section 6.1.3**). These issues have been acknowledged in the most recent independent assessment of social and economic conditions in the Basin, which recommends doing more to 'increase First Nations communities' access to water for cultural and economic purposes', including funding Aboriginal groups to 'work with experts in valuing ecosystem services at culturally significant sites'.[344]

DPIE-Water should address the significant barriers to Aboriginal people accessing and using water in a range of ways. DPIE-Water should consider actions to simplify Aboriginal licence categories and processes – this may include the simplification of licence categories and removal of unnecessary restrictions on the purpose of water use.[345] Any attempts to address Aboriginal water access through these means needs to be part of the co-designed, state-wide Aboriginal Water Framework (see **Section 9.2**).

6.4 Recognise the social and community benefits of in-stream water

River flows provide water for communities. Environmental and connectivity flows also support social, cultural and recreational values. The benefits of a healthy river system are enjoyed by the whole community, but the Plan does not explicitly consider the community benefits of the riverine environment. Riparian and wetland ecosystems require instream flows to provide ecosystem services which provide value to communities and economies. Examples of ecosystem services include:

- provisioning services – water availability, food and fibre, genetic resources
- regulating services – water quality, moderating extreme events such as flood, erosion regulation, carbon sequestration
- cultural and social services – recreation, physical and mental health, spiritual connection and sense of place, visual enjoyment
- supporting services – nutrient cycling, habitat provision, soil formation and retention, air quality.[346]

Does Australia's water law and policy fulfil Indigenous aspirations?', *Environment and Planning Law Journal*, 30, pp. 132–149; Moggridge, B.J., Betterridge, L. and Thompson, R.M. (2019) 'Integrating Aboriginal cultural values into water planning: a case study from New South Wales, Australia', *Australasian Journal of Environmental Management*, 26(3), pp. 273-286.

343 Marshall, V. (2017) Overturning Aqua Nullius: Pathways to National Law Reform. In Levy, R., O'Brien, M., Rice, S., Ridge, P. and Thornton, M. (Eds.) *New directions for law in Australia: essays in contemporary law reform*. Australian National University Press, Acton ACT.

344 Independent Panel for the Assessment of Social and Economic Conditions in the Murray–Darling Basin (2020) *Panel report: Independent assessment of social and economic conditions in the Basin*. A draft report prepared for The Hon. Keith Pitt MP, Minister for Resources, Water and Northern Australia.

345 The restrictions on the purposes and dealings of licences held by Aboriginal peoples are unnecessary and should be removed. No other category or sub-category of licence is subject to the specification of the purpose of take.

346 Department of the Environment, Water, Heritage and the Arts (2009), *Ecosystem services: key concepts and applications*. Available at: https://www.environment.gov.au/system/files/resources/b53e6002-4ea7-4108-acc8-40fff488bab7/files/ecosystem-services.pdf; and Liu, S., Crossman, N.D., Nolan, M., Ghirmay, H. (2013) 'Bringing ecosystem services into integrated water resources management', *Journal of Environmental Management*, 129:92-102.

The value of ecosystem services should be assessed to improve planning and enable robust decision making around environmental, social, cultural and economic trade-offs from ecosystem service loss.[347]

High-level water restrictions impact quality of life (see **Figure 13** for key limits on use). The level of water restrictions has increased over the course of the drought in line with Tamworth Regional Council's *2015 Drought Management Plan*[348] (see **Section 6.2.4**). Other towns such as Nundle, Attunga, Manilla, Barraba and Bendemeer have been on varying levels of water restrictions and are all currently on permanent water conservation measures or higher.

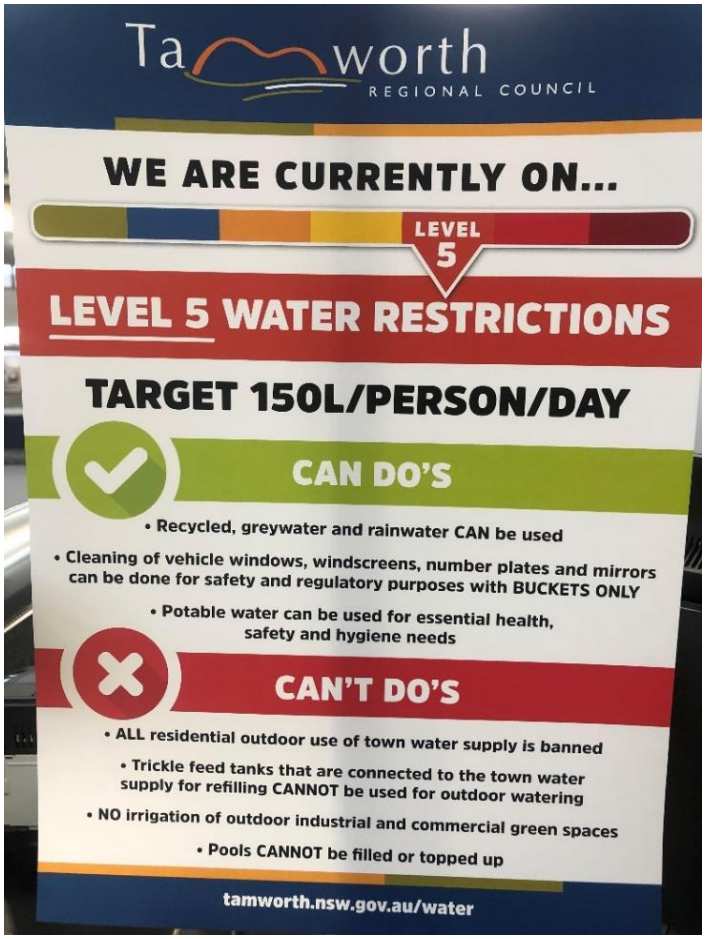

Figure 13: An example of water use limits under level 5 water restrictions in Tamworth

Activities that usually contribute to positive mental health outcomes and social cohesion are impacted by water restrictions, such as sporting activities. Tamworth's playing fields are maintained using groundwater (aquifer (general security) access licences) which has retained 51 percent AWD during drought. Tamworth Regional Council has two local pools. Under current (Level 5) water restrictions, both pools should be closed to conserve water but the significant impact this has on residents' quality of life has led the Council to keep the 'less leaky' pool open and top it up using groundwater as required.[349] Nundle was forced to close its

347 Banerjee, O., Bark, R., Connor, J. and Crossman, N.D. (2013) 'An ecosystem services approach to estimating economic losses associated with drought', *Ecological Economics*, 91:19-27.

348 Tamworth Regional Council (2015) *Tamworth Regional Council: Drought Management Plan 2015*. Available at: https://www.tamworth.nsw.gov.au/ArticleDocuments/220/2015%20Drought%20Management%20Plan%20-%20REVISION%201%20-%2012%20April%202016%20-%20PDF.pdf.aspx

349 Interview: Tamworth Regional Council, 12 November 2019.

only pool in March 2020, when it reached Level 4 water restrictions, as both the town and the pool rely on bore water.[350] This has meant a 100 kilometre round trip for residents in this area for training and recreation.

While Tamworth town has levy banks between major access points from the town towards the river, the Peel River provides amenity and recreation opportunities to residents and visitors.[351] These river services will have been stopped due to the construction of block banks to extend Tamworth's town water supply by blocking the Peel River. It is not just Tamworth that benefits from the presence of the river, communities throughout the Plan area benefit from the presence of flows. Somerton is located on the Peel River near the bottom of the Plan area, about 20 kilometres upstream from the confluence with the Namoi River. The flow record nearby at Carroll Gap shows no flow periods during the current drought (see **Figure 12**), impacting landholders: '*Residents in Somerton [are] not happy about that the river dried all the way along. The concern was that residents felt like they haven't been consulted*'.[352]

DPIE-Water should include Plan objectives recognising the amenity and quality of life services provided by water sources to the Plan area, including water-based recreation and enjoyment for residents and visitors (see **Section 2.3**).[353]

The NSW Government should investigate additional measures and funding to mitigate the impacts of drought and the need to cut flows down the Peel River on ecosystem services such as quality of life and amenity in the Plan area. DPIE-Water should include these costs in a cost benefit analysis carried out for the *Namoi Regional Water Strategy* when assessing options (see **Section 8.4**).

6.5 Recommendations

To better meet the needs of water users and improve environmental, social and cultural, and economic outcomes, the Commission makes the following recommendations (**Table 14**) and suggested actions (**Table 15**).

Table 14: Recommendations for DPIE-Water to better meet the needs of water users and improve social and cultural outcomes

	Recommendations
14	By 1 July 2022: a) include provisions to better protect stock and domestic basic landholder rights throughout the Plan area b) set aside a defined volume of water to maintain ongoing supply for basic landholder rights, domestic and stock, and local water utility licences, considering the findings of the *Namoi Regional Water Strategy*.

350 Link, M. (2020) 'Tamworth Regional Council: Nundle Pool closes early due to Level 4 Water Restrictions' *The Northern Daily Leader*, 10 March. Available at: https://www.northerndailyleader.com.au/story/6671432/relentless-drought-forces-early-closure-of-nundles-community-pool/?cs=14480.

351 Interview: Tamworth Regional Council, 12 November 2019.

352 Murphy, J. and McArthur, J. (2019) 'Episode 6: when the river runs dry, you will return to the scene of the crime', Water Pressure Podcast, 20 December 2019. Available at: https://www.northerndailyleader.com.au/story/6552758/water-pressure-podcast-when-the-river-runs-dry-return-to-the-scene-of-the-crime/.

353 Interview: Tamworth Regional Council, 12 November 2019.

Recommendations	
15	By 1 July 2020, amend the draft plans to include a provision to amend native title rights, with a timeframe of three months to undertake initial amendments of the new plans following native title determinations and other land or water use agreements, and enough time to undertake the detailed engagement, final amendment and entitlement process.
16	Complete the following actions, incorporating stakeholder engagement, by 1 July 2022: a) as part of the *Namoi Regional Water Strategy*, model how Plan provisions function under a range of modelled climate scenarios, drawing upon paleoclimatic studies, assessment of risks from the current drought period, and projected changes to inflows and groundwater recharge under climate change b) based on the results from (a), develop mechanisms to ensure water will be managed to protect the water source, its dependent ecosystems and basic landholder rights, and be shared equitably among all other users, in that order, if scarcity and demand increases c) amend the Plan to address Plan-related risks to town water supply identified in (a), noting that amendments should allow Tamworth Regional Council to proactively manage its risks d) expand rules for setting AWDs, allowing for more certainty and proactive management of water shortages based on results from (a) (see also **Recommendation 26** on clear, defined triggers) e) use AWDs in conjunction with cease to pump thresholds to manage extraction during drought, including under predicted climate change.
17	By 1 July 2022 amend the replacement plans to include Aboriginal values and uses, clearly linked objectives and outcomes, and flow entitlement in the Plan area, using a strengthened NSW Aboriginal Water Framework (see **Suggested action B**).
18	Co-design licences or other water access options with Aboriginal stakeholders that meet identified needs (for a range of cultural, environmental, social and economic uses) and include these in the new plans by 1 July 2022, using a strengthened NSW Aboriginal Water framework (see **Suggested action B**).

Table 15: Suggested actions for DPIE-Water to better meet the needs of water users and improve social and cultural outcomes

Suggested action	
A	Recommence processes to develop the *Reasonable Use Guidelines* for basic landholder rights by 31 December 2020. The agreed standards should be reflected in amendments to the replacement water sharing plans.
B	Continue development of a NSW Aboriginal Water Framework by 31 December 2020 to provide consistent and transparent guidelines and resourcing for Aboriginal involvement in water planning and management. At a minimum, the framework should consider: a) relevant guidelines and legislation, including any need for legislative reforms b) Aboriginal water values and its uses c) processes for allocating water for Aboriginal interests including cultural, environmental, social and economic purposes

Suggested action

d) processes for improving Aboriginal water access and use, through simplified licencing or other identified mechanisms

e) clear requirements for including native title determinations and proactive processes for undertaking other land/water use agreements

f) strengthened Aboriginal engagement processes across the state to expand on the Murray-Darling Basin engagement process, broaden the stakeholder base (to include Traditional Owners, Nations, Local Aboriginal Land Councils and other relevant groups), and increase Aboriginal staff with capacity to lead and maintain engagement

g) appropriate Aboriginal-led governance and decision-making arrangements, such as an Aboriginal Water Holder

h) adequate resources including dedicated Aboriginal staff with capability in water planning and management, and funding, such as an Aboriginal Water Trust.

7 Manage the Peel Valley as a connected system

This chapter focuses on the extent to which the Peel Valley water sources are being managed as a connected system. The splitting of the Plan into four water sharing plans as part of the water resource planning process poses a risk to the future effective integrated management of the connected Peel Valley surface and alluvial water sources.

The four replacement water sharing plans must include carefully linked and appropriately cross-referenced provisions to enable effective management of connected water sources and avoid fragmentation. There should also be greater clarity about which water sources are connected.

This chapter outlines opportunities for strengthening the replacement water sharing plans to allow for improved management of connected water sources, including:

- more active management of connected water sources
- improved understanding of the extent and variability of surface water and groundwater connectivity, particularly in relation to contested water sources such as the Cockburn River alluvium and surface water.

River connectivity is also examined, specifically the need for improved recognition and management of lateral and longitudinal connectivity, including to the Namoi River. The current Plan does not explicitly recognise the role or value of lateral or longitudinal connectivity.

7.1 Manage connectivity and associated outcomes

Water sources in the Peel Valley display varying degrees of connectivity, with some water sources being highly connected and others disconnected.

At the state scale, the Act does not explicitly identify the consideration of connectivity between water sources within its objects or water management principles. However, the National Water Initiative's *Water Planning Guidelines* state that 'surface and groundwater should be managed in an integrated manner'.[354] According to these guidelines:

- connected systems should ideally be managed as a single resource under a single plan, or at least through integrated plans that refer to each other
- water should be allocated and accounted for once, considering surface and groundwater connectivity
- separate surface and groundwater entitlements are possible in connected systems, but the impact of one form of extraction on the other needs to be quantified and factored into transactions
- a conservative or precautionary approach should be used when granting access to water in shared systems where the degree of connectivity is relatively unknown or there is insufficient information to quantify the impact.[355]

354 Council of Australian Governments (2010) *National Water Initiative Policy Guidelines for Water Planning and Management*. Available at: https://www.agriculture.gov.au/water/policy/nwi/guidelines-water.
355 *Ibid*.

Although the *Basin Plan* came into effect after the Plan, it is relevant to replacement water sharing plans and requires states to have regard to and incorporate appropriate management rules in water resource plans for:

- surface water – groundwater connectivity[356]
- longitudinal surface water connectivity (significant hydrological connection).[357]

When the Plan was developed, the Interagency Regional Panel recognised that linked management rules should be used to recognise connectivity between water sources, where appropriate, and that all Peel Valley water sources should be covered in the one plan. Subsequently, the Plan included an objective to 'provide recognition of the connectivity between surface water and groundwater'.

The Plan includes linked access rules and AWDs to support the management of inter-connected water sources. These rules include:

- linked AWDs for the Peel Regulated River Alluvium Water Source to the Peel Regulated River Water Source
- access rules that link groundwater access to associated streams (groundwater cease to flow rules) – these rules have a time lag linked to flows in connected perennial streams and apply to the Cockburn River Alluvium Management Zone and Goonoo Goonoo Creek Alluvium Management Zone.[358]

These Plan provisions relate to surface water – groundwater connectivity. The Plan also includes provisions for hydrological connectivity within and between surface water sources. These include planned environmental water and access rules in unregulated rivers, which are discussed in **Section 5.2**.

The groundwater cease to pump rules were designed to recognise the changing degree of connectivity with distance from the river and travel time and storage capacity of the alluvial aquifers.[359] Lag times vary from 14 to 28 days. These access rules do not account for areas where there is disconnection or the potential for alternate and additional water sources supplying the groundwater aquifers, for example, via up-welling from aquifers beneath the alluvial sediments.

There is currently limited information to assess the effectiveness of the rules. Connectivity in the Cockburn River was examined by DPIE-Water but assessing the effectiveness of groundwater cease to pump rules was not the primary driver for this investigation.[360] In the Cockburn River, these rules were scheduled to commence four years after Plan commencement. However,

356 MDBA (2019) *Statement of expectations for managing groundwater*, p.13. Available at: https://www.mdba.gov.au/sites/default/files/pubs/Statement-of-expectations-for-managing-groundwater-in-the-MDB.pdf.

357 Chapter 10, Section 10.05 of the *Basin Plan*.

358 Clauses and Division 4 of the Plan.

359 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

360 DPIE-Water (2019) *A Review of Groundwater-Surface Water Connectivity in the Cockburn Alluvium Management Zone*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/232175/cockburn-hydrogeological-review.pdf.

implementation of these access rules was deferred until year seven of the Plan.[361] The Plan audit indicated there was an administrative error in implementing these access rules.[362] The access rules have since been reviewed by DPIE-Water as part of the water resource plan process. Long-term monitoring is required to assess the effectiveness of these rules in maintaining connectivity.

7.2 Provide for connected water sources

Due to the variable connectivity of the Peel River system, a significant amount of water is lost annually from the Peel River, recharging the Peel Alluvium Water Source.[363] With some areas having high connectivity between surface and groundwater (see **Section 2.1.1**), alluvial extraction can impact surface water flows. Chaffey Dam only regulates a small component of inflows to the Peel Regulated River Water Source, with medium to high flows from unregulated rivers contributing to its mid to lower reaches. Flows from the Cockburn River catchment contribute around 40 percent of the average annual discharge measured at Carroll Gap (end of the Peel River), while Goonoo Goonoo and Dungowan Creeks each contribute about 10 percent to the average annual discharge.[364]

Extraction from alluvial aquifers in these areas is understood to have reduced tributary inflows to the Peel River in recent years. Tributary inflows are an important source for baseflows and groundwater dependent ecosystems, particularly in dry times as rainfall and unregulated water source access decrease. At these times, extraction can increase and poses a greater risk to baseflows. This has the potential to impact connectivity, water quality and drought refugia in the unregulated and regulated rivers.

The risk assessment for the *Namoi Alluvial Water Resource Plan* found that the risk of groundwater extraction from the Peel Alluvium Water Source causing local drawdown and impacting on groundwater dependent ecosystems was medium, and high for impacting instream ecological values.[365] It is therefore important to strengthen Plan provisions to maintain and protect connectivity for the health of the Peel Valley water sources and their water dependent ecosystems. This would involve:

- actively managing connected water sources, particularly highly connected alluvial aquifers
- addressing knowledge gaps around the sustainability of groundwater LTAAELs and groundwater extraction
- improving knowledge regarding the extent and variability of connectivity.

361 DPIE-Water (2019) *A Review of Groundwater-Surface Water Connectivity in the Cockburn Alluvium Management Zone*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/232175/cockburn-hydrogeological-review.pdf.

362 Alluvium and Vista (2019) *Audit report: audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.

363 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

364 *Ibid*.

365 DPIE-Water (2019) *Namoi Alluvium Water Resource Plan*, p.29. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0007/192337/draft-namoi-alluvium-wrp.pdf.

7.3 Improve management of connected water sources

Aquifer access licensees in the unregulated system are currently given 100 percent AWDs with no regard for climatic conditions, recharge or surface water flows. This poses a risk to the surface water sources by potentially affecting connectivity, including throughflows.

To address potential impacts on surface water flows, AWDs for aquifer licences in highly connected systems should be managed actively with long term planning based on climatic sequences and short-term operational planning based on surface water risks.

The current linked arrangements for aquifer (general security) licences within the Peel Regulated River Alluvium Management Zone are a potential model for unregulated aquifer licences in highly connected systems. For this licence type, 51 percent of the AWD is based on the aquifer access licence determination, with the remaining 49 percent equivalent to the regulated river (general security) access licence. However, in instances where surface water general security licences have zero percent AWDs, this arrangement still allows extraction within the connected system via alluvial access licences.

Given there are varying levels of connectivity between the alluvial aquifers and relevant surface water sources, it would be important to understand the degree of connectedness in setting alluvial AWDs.

7.4 Understand the extent and variability of connectivity

To adequately protect groundwater sources, the Plan needs greater clarity regarding connectivity of surface water and alluvial groundwater sources. This could be achieved through:

- strengthening the evidence base regarding the extent and spatial variability of connectivity through on ground studies and mapping
- consideration of temporal variation in connectivity in water rules
- a broadened definition of connectivity, including recharge from surface waters and shallow groundwaters.

7.4.1 Clarify the extent and spatial variation of connectivity

The hydraulic connectivity of the individual water sources was assessed from monitoring bore data in 2009.[366] While the Plan provides for water sources classified as highly connected, the evidence supporting their classifications is contested by some stakeholders, for example:

> *'The Plan assumes the extent to which groundwater and surface water are connected but no formal studies have been undertaken. It is a source of community concern and licence holders have given evidence that there is no link'.*[367]

The classification of the Cockburn Alluvium Management Zone as being highly connected is particularly contentious (see **Section 7.5**). A recent review of surface water - groundwater

366 O'Rourke, M. (2009) *Peel Valley Groundwater Management Area 005 Groundwater Status Report – 2009 Status Report No. 2*, prepared for the NSW Office of Water (unpublished). Provided by DPIE-Water.
367 Submission: individual, 14 August 2019.

connectivity for this management zone was published by DPIE-Water in 2019[368] and other studies are underway to assess connectivity.

Further, on-ground studies to clarify the extent of connectivity and potential areas of disconnection should be completed and made publicly available for the benefit of water users. This is consistent with the intent of the *Water Reform Action Plan* in improving transparency.[369] Plan maps should also clearly identify the extent of connectivity or disconnection to avoid confusion going forward.

7.4.2 Address temporal variation in connectivity

The Plan provides for surface water and groundwater sources to be managed as connected water sources. This is a sound approach and should be retained. The Plan also indirectly acknowledges that alluvial systems will have greater resilience and are not necessarily dependent on current or recent rainfall and should be managed at different timescales to surface waters.

Groundwater access rules for the Peel Alluvium Water Source specifically address the management of connectivity and consider time lags for connected water sources (see **Section 7.1**). The rules state that from year four of the Plan, certain bores in Goonoo Goonoo Creek Alluvium and Cockburn River Alluvium management zones will have access rules related to the flow in the corresponding unregulated water source applied through a delayed cease to pump. However, it is unclear whether these groundwater access rules adequately address the potential temporal variability in groundwater sources. Also, given delays in implementation of these rules, it is difficult to assess whether they are effective and time lags are appropriate.

7.4.3 Improve and expand the definition of connectivity within the Plan

Connectivity in the existing Plan refers to input of base flow from groundwater to surface water systems but does not consider the consequences of leakage from surface waters to shallow groundwaters.

Freshwater recharge to shallow groundwaters is a vital source of useable water that can help provide for local stock and domestic supply. As such, connectivity should also relate to interactions from surface to groundwaters, particularly where flows are strongly influenced by recharge via the river during high flow floods. During these periods, enhanced connectivity of losing streams becomes important. High levels of interaction have been identified throughout the Plan area with varying levels of confidence due to varying levels of monitoring.

Connectivity in the Plan requires a clearer definition that is specific to the Peel Alluvium Water Sources, and is consistent with terminology used in other instruments, including the *Namoi Long Term Water Plan*. Consideration of both directions of flux should be included in the Plan with the river and the alluvial system managed as a connected and single water source.

368 DoI-Water (2019) *A review of groundwater-surface water connectivity in the Cockburn Alluvial Management Zone*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/232175/cockburn-hydrogeological-review.pdf.

369 Department of Industry (2017) *Securing our water: NSW Government Water Reform Action Plan.* Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0016/136204/nsw-government-water-reform-action-plan.pdf.

7.5 Resolve connectivity issues in the Cockburn River Alluvium

Water users in the Cockburn River area dispute the classification of the Cockburn River surface water source as being highly connected to the alluvium. DPIE-Water has completed multiple studies and is undertaking further research into impacts of groundwater pumping on pool levels. Rule implementation has been delayed for close to a decade and certainty is required for all users and downstream beneficiaries.

In 2019, DPIE-Water reviewed groundwater access rules for the Cockburn River Alluvium Management Zone, which forms part of the Peel Alluvial Water Source.[370] Groundwater in the alluvial aquifer is considered highly connected to the surface water of the Cockburn River and extraction poses a risk to the health of the Cockburn River Water Source (and potentially the Peel Regulated River Water Source). This study informed a decision to change the cease to pump triggers for the Kootingal Bridge Gauging Station (on the Cockburn River) from river height to flow and resulted in relocation of the gauging equipment used to monitor flow.

7.6 Support lateral and longitudinal connectivity

The *Namoi Long Term Water Plan* states that 'restoring lateral and longitudinal connectivity throughout the catchment is fundamental to supporting many of the priority ecosystem functions in the Namoi'.[371]

The current Plan does not explicitly recognise the role or value of lateral or longitudinal connectivity. It is not mentioned in Plan objectives and thus not mapped with management strategies. Lateral connectivity is critical for linking the riverine environment with the floodplain. Longitudinal connectivity is important for connecting aquatic environments along the length of a river, supporting nutrient and sediment transport, organism dispersal and movement, and water quality.[372] There is also no clear intention in the Plan to enhance connectivity with the Namoi River (or the greater Murray-Darling Basin).

Connectivity in and between the Peel Valley water sources is constrained by Chaffey Dam and affected by current Plan provisions. The dam's outlet capacity restricts delivered flows to the range of baseflow and small to medium freshes immediately downstream of the dam. Larger flows can only be achieved if releases from Chaffey Dam coincide with tributary flows downstream of the dam. Further, lack of protection of environmental water, as discussed in **Section 5.1.3,** may limit the extent that planned environmental water (and held environmental water when used conjunctively) can provide for connectivity.

There are significant stakeholder concerns around the lack of protection for environmental water releases beyond the junction with the Namoi River. Once it enters the Namoi River, the ECA is reregulated as water available for meeting downstream water orders. Held environmental water released from Chaffey Dam may also be taken, even though it would not have been previously available for extractive use. This is counter to several NSW Government

370 DoI-Water (2019) *A review of groundwater-surface water connectivity in the Cockburn Alluvial Management Zone*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/232175/cockburn-hydrogeological-review.pdf.

371 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* Available at: https://www.environment.nsw.gov.au/research-and-publications/publications-search/namoi-long-term-water-plan-part-a-catchment-draft.

372 MDBA (2014) *Basin-wide environmental watering strategy*. Available at: https://www.mdba.gov.au/sites/default/files/pubs/basin-wide%20environmental%20watering%20strategy%20November%202019.pdf.

commitments to better manage environmental water as set out in the *Water Reform Action Plan*[373] and the *Northern Basin Toolkit* measures.

Stakeholders have called for environmental water to be protected through the Peel and Namoi rivers to maximise benefits and support hydrological connectivity. They suggested the draft *NSW Active Management Policy* as a potential mechanism to provide for protection of environmental water between and within Peel and Namoi water sources. However, this would require expansion of the scope of this draft policy to include regulated rivers. Another option is to expand Prerequisite Policy Measures implemented in the southern connected Basin that seek to protect the flow of held environmental water along and between connected regulated rivers.

Given several species that inhabit the river system require significant migration throughout their lifecycle and migration pathways are reliant on connectivity, it would be beneficial to ensure Plan provisions provide for improved connectivity. For example, the Lower Darling Aquatic Community Endangered Ecological Community occurs in the Plan area. The Priority Action Statement for this Endangered Ecological Community specifically states:

> '*Advocate appropriate allocation and improved management of environmental flows, particularly in areas known to support remnant natural populations of threatened species and reduced diversion volumes during spawning and larval period*'.

Connectivity to the Namoi River and hence the Barwon River should be considered to support this Priority Action Statement action.

The draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* includes a targeted environmental objective to protect and, where possible, enhance: 'the longitudinal and lateral connectivity within and between water sources to support target ecological processes'. This is commendable. It also notes that this objective relates to target ecological processes, including fish movement across major barriers and clarifies that connectivity may be within the Peel regulated river water source, between the water source and other Namoi valley water sources.

To meet this new objective and improve connectivity, the following measures could be taken:

- review of the adequacy of cease to pump thresholds for unregulated rivers and enforcing those rules (see **Section 5.4.5**)
- review of the adequacy of minimum daily releases from Chaffey Dam
- investigation of end-of-system flow options and scenario modelling to improve connectivity with the Namoi River
- effective management of alluvial groundwater use to improve throughflows to the Peel Regulated River
- explore if the northern Basin toolkit measures or draft *NSW Active Management Policy* can be modified to provide for protection of environmental water between regulated rivers or if Prerequisite Policy Measures from the southern connected Basin can be expanded
- increased protection of environmental water from extraction (see **Section 5.4**)
- complementary actions outside of the Plan, including removal of barriers to fish movement (see **Section 9.5**).

373 Department of Industry (2017) *Securing our water: NSW Government Water Reform Action Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0016/136204/nsw-government-water-reform-action-plan.pdf.

7.7 Recommendations

To better manage the Peel Valley as a connected system, the Commission makes the following recommendations (**Table 16**) and suggested actions (**Table 17**).

Table 16: Recommendations for DPIE-Water to better manage the Peel Valley as a connected system

Recommendations	
19 (priority)	By 1 July 2020, ensure relevant settings are cross-referenced in the water sharing plans and there is ongoing monitoring of these connected water sources to determine if provisions to provide for and protect connectivity are effective.
20	By 1 July 2022 amend the water sharing plans to: a) include definitions for groundwater terms, including connectivity, ecological value, potential and type. Connectivity should include both discharge of groundwater to surface water and surface water to groundwater systems b) provide greater clarity regarding variability in surface water-groundwater interactions in the plans by including schedules and maps and acknowledge this in any trading rules. Make these publicly available to improve transparency.
21	By 1 July 2022: a) undertake targeted monitoring to assess the adequacy of access rules that link groundwater access in the Cockburn River Alluvium Management Zone and Goonoo Goonoo Creek Alluvium Management Zone to associated unregulated streams b) map areas of surface water recharge and discharge to alluvial and other shallow groundwater systems, dependent on climatic conditions and improve knowledge on the degree of groundwater – surface connections in the Plan area c) where applicable, link AWDs between surface water and alluvium to reflect connectivity of these water sources.
22	Complete the current study of connectivity in the Cockburn River and report findings to stakeholders as soon as practical. Amend access rules based on the findings of this study and identify any areas that require further research or community consultation.
23	Commission studies to provide for lateral and longitudinal connectivity between the Peel and Namoi rivers and improve environmental outcomes: a) investigate end-of-system flow options and scenario modelling to improve connectivity with the Namoi River, implementing any plan amendments by 1 July 2022 b) identify complementary actions outside of the Plan (see **Suggested action G**) to facilitate connectivity by 1 July 2021, including improving fish passage through removal of barriers.

Table 17: Suggested actions for DPIE-Water

Suggested actions	
C	By 1 July 2022, examine the most effective way of protecting environmental water between regulated rivers (including Peel and Namoi) – expanding *Prerequisite Policy Measures from the Southern Basin* or the draft *Active Management Policy*.

8 Provide economic outcomes and trade opportunities

This chapter looks at how the Plan has:

- supported economic outcomes through ability to trade
- provided opportunities for trade, both within and outside of the Peel Valley
- allowed for flexible account management.

The Commission notes there is some interest in increasing trade flexibility, particularly through temporary intervalley trades. However, the Commission cautions against proposed licenced conversions based on potential risks and the existing volume of entitlement in the Peel Valley water sources.

8.1 Support economic outcomes

One of the Plan objectives is to provide for the continuation of a viable irrigation industry within these water sources.[374] Stakeholders repeatedly raised serious concerns regarding the Plan's impact on their economic viability. Stress, mental health and income issues were all attributed to the Plan. Stakeholders related to the irrigation industry were particularly concerned with the economic outcomes:

- '*Families have endured stress levels that should never be perpetrated on citizens of the state*'.[375]
- *'Crop failures since the introduction of access rules has seen a big decline in agricultural employment and income since 2007… The plan has caused the total abandonment of irrigated cropping and has cost farmers their income. This has of course flowed on to the wider community, with a wide range of related and non-related industries seeing a decline in customer spending*'.[376]
- '*[The Plan] has contributed to negative social outcomes for licence holders. Morale is low, with irrigators no longer enthusiastic about their industry and making a living from farming. When not able to pump for extended periods of time and having to watch crops die*'.[377]

However, other stakeholders recognised that the economic issues may not be caused by the Plan:

- '*Economic impacts have been caused by the increased competition for water access through the growth in town water supply. The failure to limit growth in use in this water source is the key issue*'.[378]
- *'Limited benefits have been achieved to date; possibly because well below average rainfall & recent severe drought. No doubt all residents of our local communities are looking for improvements in security of water, maintaining better river flows, maximising storage dam capacities whilst still delivering water to all users….We are currently experiencing the worst drought on record over the whole of NSW; and the ability of farmers to manage this disastrous situation has been intensified by huge increases in water demand from growing rural towns, the delivery better environmental outcomes…*'.[379]

As discussed in **Section 6.2.4**, the *Namoi Regional Water Strategy* should include a distribution of benefits study. This would include cost-benefit analysis. Together, they provide a framework

374 Clause 10(k) of the Plan.
375 Submission: individual, 20 September 2019.
376 Submission: individual, 16 September 2019.
377 Submission: individual, 8 September 2019.
378 Submission: Nature Conservation Council, 15 November 2019.
379 Submission: individual, 13 September 2019.

for considering how the social, economic, cultural and environmental impacts of proposed changes affect stakeholders and how benefits are distributed through the community (who is better or worse off and by how much).

The Plan's key mechanisms to support economic outcomes are by permitting trade and providing certainty for investment. Issues with Plan clarity, implementation and certainty for stakeholders are discussed in detail in **Chapter 9**. This section focusses on trade.

An objective of the Plan is to provide opportunities for market-based trading of access licences and water account balances within sustainability and system constraints.[380] The Plan sets access licence dealing rules (trading rules) to encourage the movement of water access licences to the highest value use, while protecting environmental values of water sources and preventing transfers into hydrologically stressed water sources.

These rules were developed in line with the *Access Dealing Principles Order 2004* and principles in the Plan's background document. The *Access Dealing Principles Order 2004* requires rules to meet environmental requirements,[381] and prevent adverse impacts on basic landholder rights and features of major cultural, heritage or spiritual significance.[382]

8.2 Provide opportunities for trade

8.2.1 Trade within the Peel Valley

The Commission has found that the Plan provides for trade opportunities, but activities have been limited. Water trading is intended to encourage the movement of water licences to high-value uses.[383] The trade of water access licences or associated shares generally occurs on a permanent basis, while the trade of annual account balances allows for trade on a temporary basis.

In general, trading is permitted within each water source. Trading within the Peel Regulated River and Peel Alluvium water sources is allowed. For the Cockburn River, Lower Peel River Tributaries, Goonoo Goonoo Creek and the Peel Fractured Rock water sources it is allowed with conditions, summarised below:

- Goonoo Goonoo Creek Water Source does not allow trades between management zones within the water source, except for from Upstream Boiling Creek, subject to assessment and no net gain, to prevent increases in extraction in upstream tributaries.
- in the Cockburn River Water Source, trade is only allowed from the Cockburn River Tributaries to the Cockburn River management zone.

380 Clause 10(f) of the Plan.

381 Clause 7 of the *Access Licence Dealing Principles Order 2004* states that trades should:
- not adversely affect environmental water and water dependent ecosystems identified in the Plan
- be consistent with any strategies to maintain or enhance water quality
- not increase commitments to extract from water sources identified in the Plan as high conservation value
- not increase commitments to extract above sustainable levels identified in the Plan.

382 The *Access Licence Dealing Principles Order 2004* states that trades should:
- be consistent with any strategies to maintain or enhance water quality
- not adversely affect geographical and other features of major cultural, heritage or spiritual significance
- not adversely affect the ability of a person to exercise their basic landholder rights.

383 Commonwealth of Australia (2018) *National Water Initiative*. Available at: http://www.agriculture.gov.au/water/policy/nwi.

- Lower Peel River Tributaries Water Source allow no net gain trades within the system, with trades allowed into or upstream of the water source. An exception to this rule is that no trade is allowed into the Moore Creek Management Zone.
- in the Peel Fractured Rock Water Source, no trading is allowed into the water source but is allowed within the water source, subject to assessment of potential impacts on other users and the environment.

According to the publicly available *NSW Water Register*, 1,068 trades occurred during the Plan period (**Table 18**). These trades have a total reported value of $29.2 million, although DPIE-Water has previously indicated that the available pricing data are incomplete and unreliable on a grouped basis.

The three types of trades that have occurred over the Plan period are:

- **transfer trades** – transfer to an access licence from one licence holder to another[384]
- **share assignment trades** – transfer of all or part of the share component of one access licence to another
- **allocation assignment trades** – transfer of all or part of the water account balance from one access licence to another.

The most common type of trade in terms of number of transactions and volume of entitlement traded was transfer trades (71M) of aquifer access licences[385] (**Table 18**), within both the Peel Alluvium and Fractured Rock water sources. About 46 percent of the entitlement for transfer trades (71M) was traded in the Peel Alluvium Water Source, accounting for about 65 percent of the total volume of water traded, while the Peel Fractured Rock Water Source trading accounted for 45 percent of the aquifer trade by number of trades and 35 percent of the volume of water traded.[386] Regulated river (general security) licences only accounted for about 25 percent of trades by water volume, all within the Peel Regulated River Water Source.

Table 18: Summary of water access licence trades, 2009-10 to 2018-19[387]

Trade type	Number of transactions	Total volume (ML) or share component (units)	Total reported price
Transfer trade (71M)	471	51,486	$24.7 million
Transfer trade (other)	101	8,565	$0
Transfer trade (71X)	4	1,126	$0
Share assignment (71Q)	68	5,906	$3.2 million
Allocation assignment (71T)	419	23,373	$1.1 million
Total	*1,063*	*90,456*	*$29 million*

384 The *NSW Water Register* includes data on three categories of transfer trades: (1) sale or transfer of a water access licence or a holding in a water access licence from one holder to another under Section 71M of the Act; (2) action taken by a security interest holder to transfer the water access licence (or holding in the licence) by default under Section 71X of the Act; and (3) other forms of transfers such as transmissions and court orders.

385 WaterNSW (2019) *NSW Water Register*. Available at: https://waterregister.waternsw.com.au/water-register-frame.

386 *Ibid*.

387 WaterNSW (2019) *NSW Water Register*. Available at: https://waterregister.waternsw.com.au/water-register-frame.

The second most common type of trade under the Plan in terms of number of transactions and volume of water traded was allocation assignment (71T) (**Table 18**). These trades accounted for 40 percent of the total trades in the Peel since 2009, 77 percent of these were regulated river (general security) access licences. The average price of these trades was about $65 per ML; however, 40 percent of trades had zero values, which may skew the actual value of trades. When zero values are removed the average value is $86 per ML.

Supplementary data provided by WaterNSW also indicate that dealings occurred over the Plan period to subdivide, consolidate, move and convert access licences. There were also dealings to amend licences to nominate alternative supply works. These dealings may be used in combination with other types of trades between licence holders, and therefore contribute to supporting opportunities for trade in the Plan area. For example, a party may choose to acquire a licence via a transfer trade and then nominate an alternative supply works.

Data from the *NSW Water Register* and DPIE-Water indicate that all trades occurred within the same water sources and management zones (excluding the temporary trade trial period from the Peel to the Lower Namoi valleys).

About 61 percent of trades had no value ($0) recorded against them. While this is not uncommon in some water markets,[388] it limits the availability of information to the market, which in turn impacts on the effectiveness and efficiency of the water market. Reasons for price variation or absence may include prices being recorded incorrectly due to data entry errors, confusion about form requirements or because the price included other assets, such as land. In some cases, there are other legitimate reasons for trades appearing with zero dollars recorded against them, such as transfers between related entities or family businesses, although it may also reflect a reluctance for price disclosure by the water holders.

The NSW Land Register Service is responsible for maintaining the *Water Access Licence Register* to keep a record of all water access licences. As part of this process, NSW Land Register Service records prices of water licence transfers.[389] Where prices are provided by the transacting parties, these can sometimes bundle the price of land and water when both types of assets are included in the same sale. DPIE-Water advised that in these cases, it can be difficult to separate out the price paid for the water licence(s) which makes the transfer price data presented in the *NSW Water Register* less reliable.

Given transfer trade (71M) price data in the *NSW Water Register* may be unreliable due to the bundling of land and water when both assets are included in the same sale, DPIE-Water noted that a better indication of the price of water can be obtained from share assignment (71Q) trades. The average price across the Plan area was $546 per ML for these trades, based on a sample size of 68; however, 40 percent of these trades have values of $0. Trades with values greater than zero had an average price of $765 per ML. WaterNSW advised that it and DPIE-Water should decide if the applicant must provide the price of the water paid per ML for 71Q and 71T trades. The Commission supports this collaboration between agencies and potential for additional transparency it would provide the water market.

388 In its 2016-17 *Australian Water Markets Report*, ABARES reported that 74 percent of entitlement trade transactions in unregulated surface water systems outside the Basin record a $0 transaction, while all allocation trade transactions in unregulated surface water systems outside the Basin record a $0 transaction.

389 NSW Land Registry Services (2020) *Water Access Licence Register*. Available at: https://www.nswlrs.com.au/Public-Register/WAL-Register.

8.2.2 Intervalley trade

Given the current trade rules and conditions, some regulated and unregulated licence holders expressed interest in increased flexibility for water trade. Requests for greater trade flexibility focussed on the reinstatement of temporary intervalley trading to the Lower Namoi. Permanent trading between these valleys is permitted on an ongoing basis.

Permanent trades are permitted from the Peel to the Lower Namoi valleys, with the cancellation of the access licence in the Peel Regulated River Water Source, and the issue of a new licence in the Lower Namoi Regulated River Water Source which is equal to 0.4 times the share component of the access licence in the Peel.[390] Permanent intervalley entitlement trades (71R) occurred in 2011-12 and 2017-18, consisting of trades of 140 and 793 shares respectively.[391]

Prior to the enlargement of Chaffey Dam in 2016, permanent intervalley trade was limited to 7,500 ML minus (the sum of water allocations already dealt under Clause 86(4) in that water year multiplied by 1.75) of Peel entitlement.[392] Once the dam expanded, the limit increased to 15,000 ML minus (the sum of the water allocations already subject to a dealing under Clause 86(4) in that water year multiplied by 1.75). An intervalley share component trade account was to be established when trade exceeded 3,000 ML but this value was not exceeded, and the creation of the account was not triggered.[393]

In 2014, DPIE-Water announced a trial period for temporary trades from the Peel Regulated River Water Source to the Lower Namoi Regulated Water Source to:

> '*assess the effectiveness of the market in improving cost recovery and reducing water charges in the Peel Valley, and will have the added benefits of increasing income for Peel licensees and making more water available for production in the Namoi Valley*'.[394]

This trial was intended to be short term but due to a drafting error a sunset clause was not included.[395] Five temporary trades (totalling 3,592 ML and $235,000) took place during the trial, with four taking place in 2016-17 and the remaining trade taking place in 2017-18.[396] Stakeholders advised the Commission that they valued the ability to trade in this manner and that '*trading only happened when water was in the Peel and licensees in the Namoi wanted it, which isn't a common occurrence*'.[397] The average value of traded water was $59 per ML. In its initial year (2014-15) a conversion factor of 0.7 was applied (as opposed to the conversion factor of 0.4 applied to permanent intervalley trades).[398]

---

390 Clause 85(2) of the Plan. DPIE-Water proposed amending the conversion factor from 0.4 to 0.5 to more accurately reflect transmission losses and ensure alignment with the Basin Plan requirements (see DPIE-Water (2019) *Namoi Surface Water Fact Resource Plan Fact Sheet: proposed changes to the Water Sharing Plan arrangements in the Peel Regulated River Water Source*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0003/279012/proposed-changes-wsp-arrangements-peel-reg-river-water-source.pdf). While the DPIE-Water fact sheet refers to a revised conversion factor of 0.5, Clause 50(2) of the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* retains the conversion factor of 0.4.

391 Advised by DPIE-Water, 2 March 2020.

392 Clause 85(3) of the Plan

393 Clause 32 of the Plan

394 DPI-Water (2014) *Temporary trade trial – Peel to Namoi Valley*. Available at http://www.water.nsw.gov.au/__data/assets/pdf_file/0007/547261/temporary-trade-trial-peel-namoi-valley.pdf.

395 Advised by DPIE-Water, 29 April 2020.

396 WaterNSW (2019) *NSW Water Register*. Available at: https://waterregister.waternsw.com.au/water-register-frame.

397 Interview: Peel Valley Water Users' Association, 12 November 2019.

398 DPI-Water (2014) *Temporary trade trial – Peel to Namoi Valley*. Available at http://www.water.nsw.gov.au/__data/assets/pdf_file/0007/547261/temporary-trade-trial-peel-namoi-valley.pdf.

The trial was discontinued despite support from some stakeholders in the Peel Valley.[399] Work by DPIE-Water as part of the water resource planning process identified impacts on other water users in the Namoi Valley as the traded water was sourced from the Namoi system rather than transferred from the Peel Valley.[400] There were opposing stakeholder views on intervalley trades.[401] Peel Valley stakeholders were critical that the reasons for suspending the trading trial were not well communicated.[402] DPIE-Water advised that the removal of the clause was supported by Lower and Upper Namoi water user groups.[403]

DPIE-Water stated that there were concerns in 2016 regarding transparency around how changes to temporary trades were handled, with accusations the NSW Government communicated with the Lower Namoi users and not the Peel users. As a result, the NSW Government put in place a market sensitivity and transparency policy.[404] The Commission also heard of concerns about the impacts on water availability and prices in the Peel Valley; '*[Trade] will reduce the volume available in the Chaffey and push availability downstream, [it] has potential to raise prices in the Peel as availability will decrease permanently*'.[405]

DPIE-Water should engage with Peel Valley stakeholders to outline the reasons behind the removal of temporary intervalley trading between the Peel Valley and the Lower Namoi, with the findings made publicly available.

8.3 Discourage licence conversions in over-allocated systems

The draft *Water Sharing Plan for the Peel River Regulated Water Source 2020* includes an amendment provision to allow the conversion of high security licences in the regulated river system to access licences in connected upstream unregulated water sources.[406] No further detail is provided, such as which upstream water sources conversions would be allowed into, or any conversion factors, and it does not appear to have been raised as a key issue by stakeholders. An earlier draft noted that the option 'would enable some additional water to be taken in upstream areas without affecting water availability in the downstream storage/s'.[407]

The draft *Namoi Water Resource Plan* identifies the current access in the unregulated rivers has resulted in 'not tolerable' risk of having zero flow periods and insufficient base flow across each of the five unregulated water sources in the Peel Valley.[408] Further, as described in **Section 4.3.1**, the unregulated water sources already have a high level of entitlement to their LTAAEL. DPIE-Water further observed that the risk cannot be addressed during water resource plan development as 'NSW planning principles minimise change for WSPs within their initial ten year period to provide certainty for water users'.[409]

399 Interview: Cockburn Valley Water Users Association, 12 November 2019.
400 Advised by DPIE-Water, 29 April 2020.
401 Advised by DPIE-Water, 2 March 2020.
402 Interview: Peel Valley Water Users Association, 18 February 2020.
403 Advised by DPIE-Water, 29 April 2020.
404 Interview: Peel Valley Water Users Association, 18 February 2020.
405 Interview: Cockburn Valley Water Users Association, 12 November 2019.
406 Clause 67(1) of the final draft *Water sharing plan for the Peel Regulated River Water Source 2020*. Available at https://www.industry.nsw.gov.au/__data/assets/pdf_file/0006/291993/final-draft-wsp-peel-reg.pdf.
407 Part 9.42 (Access licence dealing rules) of the draft *Water Sharing Plan for the Peel River Regulated Water Source 2020*.
408 DPIE-Water (2019) *Namoi Surface Water Resource Plan Risk Assessment.* Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/273118/schedule-d-namoi-sw-wrp-risk-assessment.pdf.
409 *Ibid*.

The proposed conversions may have unintended environmental, social or economic impacts. They could impact water dependent ecosystems and reduce connectivity between unregulated and regulated systems. The Commission suggests that due to the existing high likelihood of extraction impacting ecological values in unregulated rivers,[410] any increase in licences as a result of conversion into unregulated rivers would result in poor outcomes and should be modelled and assessed in detail before being brought to stakeholder consultation to be considered for inclusion in future water sharing plans.

8.4 Expand the scope of economic dependence classifications

The Plan was developed recognising the economic benefits of commercial extraction by irrigators and industry to the region.[411] When considering the economic dependence of water sources, DPIE-Water should assess the full range of economic benefits and impacts of both the extraction of water and presence in-stream, such as:

- benefits and impacts of secure water supply and time on water restrictions for town water supplies including residential and industrial uses
- benefits and impacts of flow and water quality on industries and water uses such as tourism, recreational fisheries, ecosystem services and community activities (see **Section 6.4** for discussion of ecosystem services).

Water shortages can severely impact economic output related to extractive industry through the effects on hydrological ecosystem services:

- directly, by affecting the supply and quality of water for town, industry and agricultural uses
- indirectly, by reducing economic output and affecting dependent businesses and industries.[412]

Stakeholders raised various economic concerns beyond the immediate use of Plan water by irrigation licences, for example:

- there are '*mechanics with 10 employees coming out to service lucerne machinery, dairy farms; all businesses tied in*'[413]
- construction is being delayed because concrete and construction required significant water use.[414] In 2018-19, construction was the fourth most valuable industry for the local government area ($210 million in value add), after agriculture, forestry and fishing (see **Section 2.5**)[415]

410 DPIE-Water (2019) *Namoi Surface Water Resource Plan Risk Assessment.* Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/273118/schedule-d-namoi-sw-wrp-risk-assessment.pdf.

411 NSW Office of Water (2010) *Water Sharing Plan for the Peel Valley regulated, unregulated, alluvial and fractured rock water sources: background document*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

412 Banerjee, O., Bark, R., Connor, J. and Crossman, N.D. (2013) 'An ecosystem services approach to estimating economic losses associated with drought', *Ecological Economics*, 91:19-27.

413 Interview: Peel Valley Water Users' Association, 12 November 2019.

414 Interview: Tamworth Regional Council 12 November 2019.

415 .id Demographic Resource Centre (2020) *Tamworth Regional Council – value added*. Available at: http://economy.id.com.au/tamworth/value-add-by-industry

- Tamworth Regional Council needs water to build and maintain roads but cannot access enough water to do so,[416] which has flow on impacts to community and transport.

Due to the cessation of the Peel River downstream of Dungowan Village, Tamworth Regional Council have trialled the release of treated effluent from the Westdale Wastewater Treatment Plant into the Peel River downstream of the weir to supply high security licensees.[417] While the abattoir relies on town water, the Commission understands the poultry farms supplying the abattoir rely on surface and alluvial entitlements, with six high security licence holders in the Peel Regulated River Water Source among those cut off.[418] The trial was not successful but highlighted the need to consider impacts of water loss to high value industries and the flow on effects to the regional economy.

Aspects such as these, and the value of various ecosystem services, should be strategically considered as part of the *Namoi Regional Water Strategy* and the environmental assessment, design and operating rules of the replacement Dungowan Dam.

8.5 Recommendations

To better support economic outcomes and trade, the Commission makes the following recommendations (**Table 19**) and suggested action (**Table 20**).

Table 19: Recommendations for DPIE-Water to better support economic outcomes and trade

Recommendations	
24	By 1 July 2020, publish guidance that the provision in the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020* would only be implemented based on detailed modelling and assessment of environmental, social and economic impacts and benefits of proposed changes, and with broad stakeholder consultation.
25	As part of the *Namoi Regional Water Strategy* and the environmental assessment, design and operation of the replacement Dungowan Dam, assess the full range of economic benefits and impacts of both the extraction of water and presence in-stream, including: a) benefits and impacts of secure water supply and time on water restrictions for town water supplies including residential and industrial uses b) benefits and impacts of flow and water quality on industries and water uses such as tourism, recreational fisheries, ecosystem services and community activities.

Table 20: Suggested actions for DPIE-Water to better support economic outcomes and trade

Suggested action	
D	By 31 December 2020, engage with Peel Valley stakeholders to outline the reasons behind the removal of temporary intervalley trading between the Peel Valley and the Lower Namoi, with findings made publicly available.

416 Interview: Tamworth Regional Council 12 November 2019.
417 Tamworth Regional Council (2019) *Media release - Friday 13 December 2019 - Effluent redirection trial to commence.*
418 Interview: Tamworth Regional Council 12 November 2019 and follow up information provided by Tamworth Regional Council 18 February 2020.

9 Improve Plan development and implementation

As part of this review, the Commission has identified several opportunities to improve Plan development and implementation, including:

- strengthening stakeholder engagement and communication
- implementing clear and consistent governance
- accounting for significant potential Plan amendments
- considering risks outside the Plan that may impact on Plan outcomes.

9.1 Increase stakeholder engagement and communication

9.1.1 Improve communication of the Plan

Improved understanding of the Plan, or the four new plans, needs to be supported through effective stakeholder engagement and communication. Some stakeholders felt that the Plan language could be simplified, as noted by one stakeholder; '*many in the community don't fully understand the Plan … there is a lack of transparency*'.[419] A simplified, plain English approach will help improve clarity and transparency of the Plan and increase stakeholder understanding.

Plan provisions and licence conditions should be drafted to enable licensees to comply with the rules, and the Natural Resources Access Regulator should be able to enforce those same rules. Plan provisions, and mandatory licence conditions and approvals should be carefully drafted and codified, and licensees subsequently notified of those conditions promptly.

The Plan audit found errors in the application of the mandatory conditions that apply to water access licences and there was a delay in notifying licensees of conditions, meaning those conditions were not given effect upon Plan commencement.[420] The audit also found that if these conditions were not implemented, there was a high likelihood of not meeting the Plan's intended objectives.[421] The audit noted that mandatory conditions relating to extraction from the Peel Alluvium Water Source[422] were not applied to the relevant licences in either the Cockburn River Alluvium Management Zone or the Goonoo Goonoo Creek Alluvium Management Zone, but the issue was later addressed.[423] WaterNSW supports resolution of ongoing issues with the mandatory conditions currently applied to licences and approvals, and the significant discrepancies between conditions applied to licences and approvals compared to Plan requirements.[424]

In addition, licence rules and changes have been poorly communicated in the Plan area despite established requirements of the Act.[425] This can lead to possible cases of variability and distrust,

---

419 Submission: NSW Irrigators Council, 25 October 2019.

420 Alluvium and Vista (2019) *Audit of the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*, pp26-29. Available at: https://www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/water-sharing-plan-audits

421 *Ibid*.

422 Clause 69 of the Plan.

423 Alluvium and Vista (2019) *Audit of the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*, pp26-29. Available at: https://www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/water-sharing-plan-audits.

424 Advised by WaterNSW, 6 May 2020.

425 Licensees must be notified in writing of conditions applied to their licence after it has been granted. While the 'take of water' conditions on the NSW Water Register water access licences may include updated provisions,

as described by one stakeholder; *'The current start of season rules for the Peel Valley are loose and subject to differing interpretation'*.[426] Regular and clear communication can help to support compliance with licence condition requirements and planned environmental water provisions.

Stakeholders also expressed confusion about the proposed changes included in draft water sharing plans. For example, even though DPIE-Water has been undertaking a significant amount of work to improve the objectives of the draft Plan and associated MER (see **Chapter 10**), the lack of clear communication of these has resulted in some stakeholders raising questions such as *'what is trying to be achieved…can we base the rules on something factual'*.[427]

The Commission notes that DPIE-Water has been working to improve the use of simple and concise language and structure, including for objectives and outcomes, as part of the proposed Plans. It will be important to continue these efforts and provide supporting communication, particularly to clarify the reasoning, assumptions and limitations of the Plan clearly and transparently. This approach should be undertaken during plan development and implementation to help to build stakeholder understanding and support for the Plan into the future, as well as improve broader understanding of water sharing principles.

9.1.2 Strengthen stakeholder engagement

It is important that stakeholder engagement mechanisms are used to support these communication efforts. DPIE-Water currently uses a stakeholder advisory panel to engage with water users in the Plan area. Recent media reports indicate that stakeholders consider the stakeholder advisory panel is skewed towards a selection of extractive water users and not representative of the broader community.[428] In addition, some panel members felt that local views and experience were not adequately valued, as one stakeholder explained:

> *'If a revised plan is to be respected for its integrity it must have been created with the benefit from the genuine contributions of those whose anecdotal, lived, operational and environmental knowledge of the valley is without peer'*.[429]

The stakeholder advisory panel should be reviewed to ensure stakeholder engagement is equitable and effectively captures stakeholders with a range of water interests and local knowledge. This should include members from the community, various industries and environmental interest groups that are representative of the spectrum of needs and values associated with the Peel Valley water sources.

The aim of the stakeholder advisory panel should be to consider what is equitable water sharing from a community perspective and align this with the priorities set out in the Act. To do this, the revised panel should focus on improving the understanding of community water values through the following foundational activities:

- identifying key water-dependent social values, objectives and outcomes for the Plan
- describing risks to these values, objectives and outcomes
- outlining mechanisms to maintain or improve stated social values and uses

---

they do not come into effect until the licensee is notified. In the absence of notification, licence holders in the Plan area can operate under water rules as specified at the Plan's commencement. See Section 67(1) of the Act.

426 Submission: Peel Valley Water Users Association, 23 October 2019. Also raised in an individual submission, 14 August 2019.

427 Interview: Cockburn Valley Water Users' Association, 12 November 2019.

428 Calver, O. (2020) 'Closed water talks criticised', *The Land*, 19 March.

- agreeing priorities for equitably sharing available water.

Any changes to plan provisions beyond those already identified by DPIE-Water would require additional consultation with the revised panel.

Further, an environmental water advisory group (EWAG) has been lacking in the broader Namoi Valley (including the Plan area). The Commission supports DPIE-Water's approach to addressing this gap by including a provision for an EWAG in the draft *Water Sharing Plan for the Peel Regulated River Water Source 2020*. This will:

- improve governance arrangements for the transparent management of environmental water in the regulated Namoi and Peel rivers
- provide for strategic and coordinated use of environmental water
- assist effective integration and use of Commonwealth environmental water holdings (held environmental water) in partnership with NSW
- align with cultural water values and requirements where possible
- bring together local knowledge and experience to support planning and delivery of environmental water.

The Namoi-Peel EWAG will be created by the NSW Environmental Water Manager (DPIE-EES). DPIE-EES intend to form this group as soon as possible and has commenced engagement around an EWAG, including informal engagement on the ECA release in 2019. DPI-Fisheries supports establishing the EWAG.

Stakeholder feedback also indicates strong support for an EWAG to help overcome barriers to the effective delivery of environmental water. As one stakeholder explained:

> '*In the other catchments where EWAGs exist, they are helpful and are good for community understanding and education as well. Constructive conversations can be difficult but this improves over time with an EWAG. Getting the opportunity to work with the river operators more closely through an EWAG is beneficial for achieving outcomes and delivering more effectively*'.[430]

The EWAG will need to include a range of community and government representatives and effectively communicate information on environmental watering to stakeholders, to help build awareness and understanding of the value of environmental water.

The Commission acknowledges that DPIE-Water has limited resources to undertake active and sustained engagement but the benefits of these approaches in communicating the Plan's objectives and achieving its outcomes should not be underestimated. DPIE-Water should strengthen and further detail the stakeholder engagement strategy developed as part of the *Water Reform Action Plan*[431] to target efforts, effectively use resources and maximise the benefits of stakeholder engagement. This work should include an area-specific stakeholder engagement plan which details the forums for engagement, maps out key touchpoints and identifies the range of stakeholders with diverse interests and local water knowledge.

430 Interview: CEWO, 19 February 2020.

431 DoI-Water (2018) *Water Stakeholder and Community Engagement Policy*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/148529/IND-I-245-Water-Stakeholder-and-Engagement-Policy.pdf

9.2 Strengthen Aboriginal involvement, capability and leadership

Meaningful and consistent engagement is required to achieve the Act's outcomes and Plan objectives for Aboriginal peoples (see **Section 6.3**). The Plan's background document notes that there has been very limited consultation with Aboriginal people on the Plan, with input only sought during the public exhibition period through direct liaisons with the executive of the Tamworth Local Aboriginal Land Council.[432] Indeed, there is no evidence of meaningful and ongoing attempts to educate Aboriginal people in planning and water management.[433]

Stakeholders consulted as part of this review confirmed there has been very limited engagement with Aboriginal stakeholders in the Plan area. Issues that were identified included that:

- **engagement has focused only on Traditional Owners –** to date, government consultation has taken a Traditional Owner perspective, with limited NSW and Local Aboriginal Land Council involvement, which does not represent everyone in the community and *'also means there's no coming together on this issue and we need to as it impacts on everyone'*[434]
- **there is general scepticism of government consultation –** in the Aboriginal community generally – *'water seems like yet another issue where governments want to look to be doing something but never actually deliver or deliver in ways that are not what the community need or want or have control over'*[435]
- **engagement has not been properly resourced –** the current approach to engagement through the water resource planning process has been viewed by some as under-resourced and as having a reliance on Aboriginal Elders to support the process[436]
- **there is a lack of Aboriginal education and awareness –** the understanding and capability in water planning and management is very low across all Aboriginal communities currently, except where individuals take a personal interest.[437]

Aboriginal stakeholders noted that these efforts could be improved by:

- **broadening the engagement approach –** across different part of the Aboriginal community, not just Traditional Owners – *'we need to bring the community together'*; and across different water types – *'Aboriginal people do not have an ideology which compartmentalises like non-Indigenous ideology, water is a living entity and provides for a range of uses – you cannot just consult with us on 'cultural' uses'*
- **simplifying education and awareness-building efforts –** to provide a 'Water Management 101' specifically for Aboriginal people, noting that understanding and capability is currently low, including clarity around licences and use

---

432 Office of Water (2010) *Water Sharing Plan for the Peel Valley regulated, unregulated, alluvial and fractured rock water sources: background document*. Available online: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf

433 A survey of Aboriginal water interests in the Basin found that 67 percent of respondents did not have information about how the government manages water in the Basin. 84 percent of those who did know about water management did so because they were interested in the river systems and environmental health and not because of government sources of information. See: Goff, S. (2016) *A survey of Aboriginal water interests in the Murray–Darling Basin – A summary report*. Prepared for the MDBA. Available online: https://www.mdba.gov.au/sites/default/files/pubs/Survey-aboriginal-water-interests.pdf

434 Interview: Tamworth Local Aboriginal Land Council, 23 October 2019.

435 *Ibid*.

436 Interviews: Aboriginal Affairs NSW, 30 September 2019; and NSW Aboriginal Land Council, 4 October 2019.

437 Interviews: Aboriginal Affairs NSW, 30 September 2019; and NSW Aboriginal Land Council, 4 October 2019; Tamworth Local Aboriginal Land Council, 23 October 2019.

- **advocating genuine Aboriginal involvement in water leadership and management –** tokenistic efforts in engagement will further compromise the health of Country and people – a shift to Aboriginal owned and led water management and economic development opportunities need to be supported.[438]

In previous water sharing plan reviews, the Commission has consistently recommended a state-wide approach to improving the engagement and involvement of Aboriginal peoples in water planning and management. This needs to be consistent and transparent, led by an overarching NSW Aboriginal Water Framework with supporting policy, governance, staff and resources – building on those initiatives in place previously under the Aboriginal Water Initiative (2012-17)[439], the supporting guide *Our Water Our Country*,[440] and the Aboriginal Water Trust (2000-09).[441] The Commission has also identified valuable examples of such approaches in other water sharing plan reviews.

The Commission is aware that DPIE-Water is making significant progress on this state-wide framework in consultation with a NSW Peak Aboriginal Bodies water reference group.[442] It is also noted that DPIE-Water has increased its Aboriginal liaison staff[443] and made significant efforts to improve Aboriginal engagement as part of the water resource planning process. [444]

The Commission strongly supports these efforts and recommends that DPIE-Water continue to drive the state-wide changes required to adequately address Aboriginal water issues comprehensively across legislation, policy, programs and processes by the end of 2020. Any efforts need a consistent policy framework and associated funding to support ongoing Aboriginal involvement and leadership in water management in NSW, beyond the water sharing plan processes.

---

438 Interviews: Aboriginal Affairs NSW, 30 September 2019; and NSW Aboriginal Land Council, 4 October 2019; Tamworth Local Aboriginal Land Council, 23 October 2019.

439 The aim of the Aboriginal Water Initiative was to 'build Aboriginal peoples' capacity to participate as water users, protect their rights to water, maintain a healthy environment, and take full advantage of economic opportunities'. It was resourced with experienced Aboriginal staff who understood water management. The supporting guide provided detailed information and a DVD outlining the way water is managed in NSW and opportunities for Aboriginal people to be involved in the water sharing process. Since the initiative was disbanded in 2017, there has been little resourcing and a reliance on Aboriginal Elders with limited experience in water management to support this role (see Taylor, K.S., Moggridge, B.J. and Poelina A. (2017) Australian Indigenous Water Policy and the impacts of the ever-changing political cycle, *Australasian Journal of Water Resources*, 20(2), pp. 132-147).

440 NSW Office of Water (2012) *Our Water Our Country: An information manual for Aboriginal people and communities about the water reform process*. NSW Department of Primary Industries, Office of Water, NSW. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0004/547303/plans_aboriginal_communities_water_sharing_our_water_our_country.pdf.

441 This statutory trust was established under the Act and operated until 2009. It provided specific purpose grant funding for water infrastructure (such as irrigation, pumps), and offered opportunities to establish water-based commercially viable enterprises. It provided funding to 16 Aboriginal communities. Stakeholders identified the Trust as an important body for representing the interests of Aboriginal people in terms of economic policy and commercial developments. See: www.water.nsw.gov.au/__data/assets/pdf_file/0004/547303/plans_aboriginal_communities_water_sharing_our_water_our_country.pdf.

442 Interview: DPIE-Water, 28 February 2020.

443 Interview: DPIE-Water, 1 October 2019.

444 This has involved consultation with Aboriginal nations in Basin communities to identify water-related objectives, values and uses, which are presented in nation-specific consultation reports. For example, NSW Department of Industry (2018) *Report on culturally appropriate First Nations consultation with Gomeroi Nation*. Prepared by Dhirranggal Solutions. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0020/192332/gwydir-first-nations-consultation-gomeroi-nation-report.pdf.

9.3 Implement clear and consistent governance

There are several instances where the Plan and supporting actions have not been implemented. It is important that planned actions are supported with clear governance – particularly well-defined roles, responsibilities and timeframes for actions – which is lacking in the current Plan provisions. Recent water sharing plan audits, including of the Plan, support this finding and consistently recommend that roles and procedures are documented so that provisions are fully and consistently implemented and there is accountability.[445] Water sharing plans should identify responsible agencies and roles where appropriate, which can then be supported by implementation plans and the MER framework.

Stakeholders across NSW considered that governance of water is confusing with *'all the different and changing agencies that water users have to deal with. There are too many plus a lack of communication and flexibility to communicate between the agencies'*.[446] In June 2018, the NSW Government released a brochure titled *Roles of Water Management Agencies in New South Wales* to improve clarity about the roles and responsibilities of different agencies (see **Section 1.1** for an outline).[447] All relevant agencies should continue to engage with water users and stakeholders to clarify and explain their related roles in water management.

Historically, DPIE-Water has developed implementation plans for water sharing plans but one does not appear to have been developed for the Plan. An implementation plan should be developed for all water sharing plans outlining clear roles, actions, timeframes and ensuring increased accountability and clear agency lines of responsibility.

Transparent governance is important to help reduce uncertainty, and importantly, rebuild stakeholder trust in water governance in NSW.[448] Given the updated governance and review arrangements between DPIE-Water, WaterNSW, NRAR and the Commission are still relatively new, it is important that the roles of each of these bodies is clearly stated and integrated in all revised water sharing plans and associated documentation.

9.4 Consider the implications of infrastructure upgrades and the *Namoi Regional Water Strategy*

The Plan should consider new infrastructure and the *Namoi Regional Water Strategy* to ensure any required changes are adequately permitted in the Plan provisions and the impacts and benefits are considered for the environment, basic landholder rights and other water users.

445 Alluvium and Vista Advisory (2019*) Audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.

446 Interview: Hunter Valley Water Users' Association, 21 October 2019.

447 NSW Government (2018) *Roles and responsibilities for water management in New South Wales*. Available: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/166024/Roles-of-water-management-agencies-in-NSW.pdf

448 Matthews, K. (2017) *Independent investigation into NSW water management and compliance*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0019/131905/Matthews-final-report-NSW-water-management-and-compliance.pdf.

In October 2019, the NSW Government announced $480 million in funding for a new Dungowan Dam (see **Section 2.1.1**).[449] During consultation, several stakeholders identified that the Plan needs to be updated to account for the proposed Dungowan Dam expansion:

- *'The Plan should not be reviewed until impacts on entitlements and costs from the expansion are publicly available or should be reviewed again once this information is known'.*[450]
- *'The MDBA encourages the Commission to consider future implications of this project on the achievement of environmental, social and economic outcomes in the Peel Valley and in downstream areas'.*[451]
- *'The recent announcement to extend the capacity of Dungowan Dam…will effectively remove 16 million GL of water from the unregulated to the regulated water sharing arrangements of the Peel Valley WSP. Whether the Peel Valley WSP is able to meet its environmental targets with this readjustment of water needs full assessment by the Commission. It is likely there will be a reduction in available water for the environment'.*[452]

The impacts of this upgrade are unclear, as information on the specifications and operation of the planned dam has not been released. It poses an additional risk for the unregulated water sources (the physical impact on flow) and regulated water source (the LTAAEL). As such, plan provisions will need to:

- provide for releases from the upgraded Dungowan Dam for environmental needs and basic landholder rights while improving local water utility security
- demonstrate and give effect to no loss in planned environmental water (as required by the *Basin Plan*)
- accommodate any change in provisions relating to local water utility supply.

Ideally, the potential impacts of these changes should be modelled as part of a distribution of benefit study under the *Namoi Regional Water Strategy*. However, the NSW Government has committed to starting construction of the Dungowan Dam[453] around the time the *Namoi Regional Water Strategy* is due for release in late 2021, and it appears the processes are being managed separately.

WaterNSW is leading the dam replacement while DPIE-Water is developing the *Namoi Regional Water Strategy*, with the strategy including only assumptions about the dam upgrade. A distribution of benefit study would assess the best way to manage the new dam and any changes required in the replacement water sharing plans.[454] DPIE-Water should commit to undertaking this study as part of the *Namoi Regional Water Strategy* and subsequently amend the water sharing plans to incorporate the findings.

Further, the *Namoi Regional Water Strategy* and the Dungowan Dam upgrade environmental assessment should consider and address the full range of socio-economic risks and impacts, including to the environment (such as water quality), basic landholder rights, other water

449 WaterNSW (n.d.) *Webpage: New dams for NSW - Dungowan Dam*. Accessed 25 February 2020. Available at: https://www.waternsw.com.au/projects/new-dams-for-nsw/dungowan-dam.
450 Submission: Peel Valley Water Users Association, 23 October 2019.
451 Submission: MDBA, 4 November 2019.
452 Submission: individual, 25 October 2019.
453 Minister Pavey at NSW Budget Estimates on 10 March 2020, pg. 10-11. Available at: https://www.parliament.nsw.gov.au/committees/pages/budget-estimates.aspx
454 DPIE-Water (n.d.) *Development of Regional Water Strategies*. Available at: https://www.industry.nsw.gov.au/water/plans-programs/regional-water-strategies/development

access licence holders, and to non-consumptive users. This would require further stakeholder engagement.

The assessment should also specifically consider the provision in the replacement *Water Sharing Plan for the Peel Regulated Water Source 2020* that the storage operator of Chaffey Dam 'leave the storage as full as possible' and 'ensure that the general rate of increase of outflow does not exceed the rate of increase and inflow'.[455] This change has the potential to impact environmental watering requirements and Plan outcomes.

9.5 Adopt an integrated catchment management approach

While some environmental risks can be addressed through the Plan, the ecological condition of Plan water sources is also impacted by issues outside of the Plan provisions. The Plan area has been highly modified, with significant native vegetation clearing. Less than 3 percent of the Tamworth Regional Council area is protected in conservation reserves.[456] Poor tree cover in riparian zones reduces habitat, biodiversity and shade protection, as well as impacting bank stability and water quality. The greatest impacts are seen in the Goonoo Goonoo Creek Water Source and the lower reaches of the Peel River between Somerton and Carroll Gap.[457]

Pressures from introduced species such as carp, increased fishing pressure and habitat degradation resulted in population densities of native fish being significantly lower than historical levels.[458] These impacts are currently being exacerbated by the severe drought.

WaterNSW and DPI-Fisheries have installed aerator units in key aquatic refuge holes to help maintain water quality and reduce the likelihood of fish deaths during the current drought. DPI-Fisheries has also removed some native species from the river to keep as brood stock and reintroduce following the drought.[459] While these short-term measures are important, these issues will continue to impact on Plan aquatic ecosystems, longer-term strategies are also needed.

Stakeholders also raised concerns about the impacts of gravel mining operations on the Cockburn River.[460] While these operations have ceased, they were observed to have caused lowering of the riverbed and ongoing erosion.

Using the principles of integrated catchment management, DPIE-Water should work collaboratively with other agencies including DPIE-EES, DPI-Fisheries, WaterNSW,[461] Local Land Services and local government, as well as relevant non-government organisations to

455 Clause 57(b) of the draft *Water Sharing Plan for the Peel Regulated Water Source 2020*.

456 Tamworth Regional Council (2011) *State of the Environment Report 2010-2011*. Available at: https://www.tamworth.nsw.gov.au/Environment/Environment--Sustainability-and-Climate-Change/State-of-the-Environment-Report/State-of-the-Environment-Report/default.aspx.

457 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

458 *Ibid*.

459 WaterNSW (2020) *Regional Monthly Drought Report – 14th January 2020*. Available at https://www.waternsw.com.au/__data/assets/pdf_file/0003/152535/Regional-Drought-Report-January-2020.pdf?utm_source=Swift&utm_medium=Email&utm_campaign=NSW_drought_report.

460 Submission: individual, 5 April 2020.

461 For example, the need for effective collaboration and engagement was highlighted by WaterNSW, who noted that its management of dealings and the assessment of new or amended water supply works is based on up to date information on ecological values such as groundwater dependent ecosystems, threatened species and communities.

consider risks and complementary measures outside of the Plan that will increase overall resilience at the landscape scale. This will be particularly important as climate change places additional pressures on environmental, social and economic outcomes.

DPI-Fisheries raised concerns regarding the impacts of cold water pollution, including the effectiveness of Chaffey Dam's multi-level offtake and the need to identify measures to mitigate the impacts of cold water pollution on aquatic biota, as well as pump screening. The dam has historically suffered chronic toxic blooms of both *Microcystis sp*. and *Anabaena sp*., preventing optimal use of the multi-level offtake.[462] Issues such as this should be added to research and greater emphasis placed in MER (see **Section 10**) to guide improved management options.

Key issues for water sharing that are more effectively addressed at the landscape scale include:

- **improving water quality and aquatic habitat –** through water quality monitoring and management, refuge restoration, removal of barriers to fish passage, reinstatement of instream woody habitats
- **protecting and restoring riparian zones –** minimising over-clearing and poor management practices, implementing buffer zones, riparian fencing and native revegetation
- **addressing regional pressures and risks –** feral weeds and animals, increasing population, drought and climate change.

These issues should be considered in the replacement water sharing plans, drawing on available evidence during development and applying adaptive management throughout implementation.

9.6 Improve transparency

9.6.1 Clarity of water sharing under wider range of conditions

Parts of the Plan have been suspended under recent severe drought conditions,[463] with the NSW Government managing the area under the *NSW Extreme Events Policy* (see **Section 3.3**). The ability to suspend parts of water sharing plans to enable management for critical needs under extreme events is appropriate and a significant improvement on ad hoc suspensions during the Millennium Drought. The Plan suspensions outlined in the *NSW Extreme Events Policy* should only apply to those specific outlying events, not natural variability or future likelihoods under climate change.

Stakeholders have called for more transparent rules and specific triggers in the Plan to:

- effectively manage the water sources under a wider range of climate conditions
- provide clarity around extraction priority and access trigger levels to mitigate predicted drought impacts
- help licensees to manage their own risks under different circumstances.

The Plan should outline rules to manage the water sources under a wider range of conditions and expand understanding and clarity around priority of extraction and trigger levels for

462 Advised by DPI-Fisheries, 28 April 2020.

463 NSW Government (2020) *Government Gazette of NSW Number 43 – Monday 2 March 2020*. Available at: https://gazette.legislation.nsw.gov.au/so/download.w3p?id=Gazette_2020_2020-43.pdf.

managing access. Having transparent rules tabulated in the Plan will help licensees to manage their own risks. WaterNSW have indicated support for these measures.[464]

Rules could include:

- expanding the AWD rule set beyond those already in the Plan (where for example, general security access licences cannot be given available water until local water utilities have full AWDs or linking AWDs to town water restrictions) to provide additional guidance and triggers
- optimising extraction and management of Dungowan and Chaffey Dams and providing action triggers as dam levels lower or increase
- addressing connectivity between surface and alluvial water (see **Section 7.4**)

These triggers and rules should manage natural variability beyond the limited historic rainfall record and use findings from the *Namoi Regional Water Strategy*.

DPIE-Water should include triggers and rules for water sharing under a wider range of conditions relating to water availability (in both Chaffey and Dungowan dams) and management measures (such as AWD reduction) to improve transparency, reduce uncertainty and help licensees manage their own risk under all climatic conditions.

9.6.2 Transparent available water determinations

During the current drought, AWDs have been adjusted based on operator discretion to account for losses and re-allocation of under-use (the latter of Tamworth Regional Council's local water utility licence in August 2018, see **Section 2.7**). Transmission loss exceeded the budgeted loss by about 50 percent (or 6,000 ML), exacerbating the severe water shortage situation.[465] The water shortages have:

- contributed to reduced river flows
- limited the provision of basic landholder rights access
- reduced water availability to Tamworth Regional Council
- impacted on the ECA.

Stakeholders are concerned regarding inconsistent administration of the Plan rules leading to insecurity for licensees:

> *'The current Plan is open to loose interpretation leading to inconsistent administrative decision making which deprives … water users with the year to year security to operate their enterprises with surety.'*[466]

Stakeholders are also frustrated that they are no longer provided with calculations explaining determinations and the process has changed without adequate explanation:

> *'The rules should be unambiguous…. Years ago, used to get actual calculation of the allocation figure from the Department, but that doesn't happen anymore. Now it isn't*

464 Advised by WaterNSW, 6 May 2020.
465 DPIE-Water (2020) *Peel Valley Water Allocation Statement – 15 April 2020*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/294943/WAS-peel-20200415.pdf
466 Submission: Peel Valley Water Users Association, 23 October 2019.

transparent, can't tell how it's calculated'.[467]

Accounts have also been credited in periods of record low inflow so water can be extracted if it becomes available.[468] This raises expectations from licensees and the general community that water will be made available to extract.

The Plan does not provide adequate detail on the process of assigning AWDs, and there are also no publicly available documents detailing this.[469] The Plan should more clearly outline the process to determine available water and DPIE-Water should publish the method for the AWD calculations and the basis of its recommendations.

9.6.3 Clear and simple trade rules

There are also calls for clarifying and simplifying trading rules. For instance, stakeholders have reported that '*trade rules within the Peel itself could benefit from being clearer and simpler*'.[470] Stakeholder meetings with WaterNSW identified that many community members do not fully understand the Plan, and there is a perceived lack of transparency and understanding of the Plan.[471] Stakeholders support the use of user-friendly, standalone rule sheets to improve clarity.

DPIE-Water should revisit the draft water sharing plans to ensure trade rules are simple and clear to follow and provide standalone rules sheets once plans are implemented. Rule sheets should be written in plain English and carefully prepared to align with the Plan. In addition, careful attention and resourcing is needed to ensure that mandatory conditions on water access licences and water supply works approvals are issued to licence holders in a timely way.[472]

9.6.4 Reasonable use guidelines for basic landholder rights

The Plan does not require DPIE-Water to monitor basic landholder rights which makes it difficult to quantify what impact these extractions are having on water sources or may have with increases in population (see **Section 2.3**). The Plan notes that domestic and stock rights must be exercised in accordance with any mandatory guidelines established under the Act with respect to the taking and use of water for domestic consumption or stock watering.[473]
The NSW Water Renewal Taskforce and DPIE-Water planned to introduce reasonable use guidelines for stock and domestic consumption as part of the NSW Government's *Water Reform Action Plan*. It was expected that this process would involve a stakeholder consultation process in 2019.[474]

DPIE-Water has acknowledged stakeholder concerns about the nature and scope of basic landholder rights to take water for stock and domestic purposes and is preparing options for

467 Interview: Peel Valley Water Users Association, 12 November 2019.
468 Interview: WaterNSW, 18 February 2020.
469 Noting that DPIE-Water has published some information on the process, available at: https://www.waternsw.com.au/__data/assets/pdf_file/0008/155636/Regional-water-availability-re_rt-weekly-edition-20200330-pdf.PDF and https://www.industry.nsw.gov.au/__data/assets/pdf_file/0009/291951/WAS-Namoi-20200306.pdf
470 Interview: WaterNSW, 18 February 2020.
471 *Ibid*.
472 As outlined in Alluvium and Vista Advisory (2019*) Audit of the Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0004/289498/Peel-Valley,-Regulated,-Unregulated,-Alluvium-and-Fractured-Rock-Water-Sources-2010.pdf.
473 Part 5, Clause 20, Note (2) of the Plan.
474 DoI (2018) *NSW Non-Urban Water Metering Policy*. Available at: www.industry.nsw.gov.au/__data/assets/pdf_file/0017/205442/NSW-non-urban-water-metering-policy.pdf.

addressing these concerns and will engage with the community on any proposed changes. The Commission supports progression of this as soon as feasible and suggests consultation with other relevant government agencies, including WaterNSW, as part of the process.

9.7 Recommendations

To better support Plan development and implementation, the Commission makes the following recommendation (**Table 21**) and suggested actions (**Table 22**).

Table 21: Recommendation for DPIE-Water to improve Plan development and implementation

	Recommendation
26	By 1 July 2020, commit to: a) investigate significant plan amendments due to the current drought works, proposed expansion of Dungowan Dam and recommendations from the *Namoi Regional Water Strategy*, by 1 July 2022 b) include triggers and rules for water sharing in a wider range of conditions, relating to water availability (in both Chaffey and Dungowan dams) using findings from the *Namoi Regional Water Strategy* by 1 July 2022. To complement this, by 31 December 2020, publish the current method for the AWD calculations and basis of recommendations, and update this as required.

Table 22: Suggested actions for DPIE-Water to improve Plan development and implementation

	Suggested actions
E	Continue to engage with the Stakeholder Advisory Panel and the broader community throughout Plan implementation and on subsequent water sharing plan reviews. In parallel, by 31 December 2020: a) review the existing stakeholder engagement strategy and opportunities to align stakeholder engagement with the development and implementation of the *Namoi Regional Water Strategy* b) expand membership of the Stakeholder Advisory Panel to be more representative of stakeholder groups, including environmental interests, Aboriginal communities and a representative spread of industry c) establish and develop terms of reference for a Namoi-Peel Environmental Water Advisory Group, including the role of this group in enhancing stakeholder engagement and improving understanding and awareness of the value of water for the environment d) map out touchpoints for engaging with the community to ensure that stakeholders are regularly informed of key aspects of plan implementation and adaptive management e) develop explanatory material to improve understanding of Plan provisions and their implementation.
F	By 1 July 2021, define and implement clear and consistent governance processes, roles and responsibilities, and timelines across the water sharing plans as part of the MER framework, adaptive management and stakeholder engagement activities (see **Recommendation 27**).
G	By 1 July 2021, use the principles of integrated catchment management to consider risks and identify complementary measures in addition to Plan provisions that will help to meet Plan objectives and outcomes. Identify areas for collaboration or additional funding.

10 Increase monitoring, evaluation and reporting

This chapter presents the Commission's findings regarding MER activities under the current Plan. The current Plan lacks suitable objectives, strategies and performance indicators to support MER and limited MER activities have occurred to date.

DPIE-Water has progressed environmental MER plans for both Namoi groundwater[475] and surface water[476] and intends to develop cultural and socioeconomic MER plans. This should address some of the issues identified in the Plan, but further actions are required to ensure key risks are managed and that MER is adequately resourced and transparently reported. There are also opportunities to strengthen the Plan's knowledge base, ensure all forms of extraction are monitored and improve the Plan through strategic adaptive management.

10.1 Monitoring, evaluation and reporting has been limited

An appropriately designed and adequately resourced MER framework is required to:

- clearly and cost effectively assess progress against Plan objectives and outcomes
- facilitate the coordination of monitoring activities across multiple agencies to leverage relevant skillsets, broaden knowledge and avoid potential for duplication
- meet *Basin Plan* reporting requirements
- inform timely decision making, for example around environmental water provisions
- support ongoing adaptive management
- provide transparency for stakeholders (through publicly availably reporting).

When the Plan commenced, a framework for water sharing plan specific MER plans was under development.[477] However, there is no evidence that this framework was finalised or applied.

The Plan includes standard performance indicators that were intended to be consistently monitored during implementation.[478] These included hydrological, economic, social and ecological indicators. Inclusion of these performance indicators in the Plan established a legal requirement for MER. However, these indicators are not clearly linked to Plan outcomes or designed to be specific, measurable, achievable, relevant and time-bound (SMART). There has also been limited data collected against indicators, as there are no clearly stated procedures or designated responsibilities for measuring them. The Commission understands that MER activities were limited by a lack of available resources.

475 Department of Industry (2018) *NSW Groundwater Environmental Water Monitoring, Evaluation and Reporting Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0017/201932/Schedule-H-Draft-groundwater-Monitoring-Evaluation-and-Reporting-Plan.PDF.

476 DPIE-Water (2019) *Namoi Surface Water Monitoring, Evaluation and Reporting Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0017/273122/schedule-j-namoi-merp.pdf.

477 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.

478 Part 2, Clause 12 of the Plan.

Examples of MER activities during Plan development and implementation include:

- a 2006 scoping paper for a program framework for ecological monitoring and reporting of water sharing plans of unregulated rivers[479]
- irrigator surveys to monitor social and economic changes in the Plan area in 2009 and 2013, as part of a broader state-wide program (reported in 2015)[480]
- identification of known ecological features and their flow priorities for the regulated Peel River in 2009 to inform environmental water and access rules[481]
- a 2010 pilot study to establish a baseline to understand the impact of environmental flows rules on aquatic macroinvertebrates and benthic periphyton and inform the Plan's environmental review[482] – further macroinvertebrate surveys were undertaken, but not interpreted or publicly reported
- a 2011 assessment of the ecological and socioeconomic performance of water sharing plans for the Namoi Valley, which was published[483] but no further assessment occurred
- fish monitoring in the regulated Peel River and its tributaries between 2015 to 2019 under the *Basin Plan*'s Environmental Outcomes Monitoring Program[484]
- targeted studies of the Cockburn River, including a hydrogeological investigation of surface-groundwater interactions[485] and a review of freshwater catfish[486] – water users contest the findings of the connectivity study and have commissioned their own studies. DPIE-Water is also undertaking a further study to assess connectivity. The report on freshwater catfish recommended further research on the effects of pool drawdown but this has not been funded.[487]

Additional programs in the Peel include:

- **a fish and flows report –** which is currently in draft form undergoing final review. DPI-Fisheries plans to release the reports as a package at the end of the calendar year
- **water quality condition monitoring** – this was reported for Peel surface water sources as part of the water resource planning process. Data was compared against *Basin Plan* water

479 Chessman et al. (2006) *Program framework for ecological monitoring and reporting of water sharing plans for unregulated rivers: scoping paper.* Department of Natural Resources.

480 Department of Trade and Investment, Regional Infrastructure and Services (2015) *Monitoring economic and social changes in NSW water sharing plan areas - Irrigators' Surveys 2009/2010 and 2013 - A statewide comparison*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0010/548362/irrigators_survey_report_2013.pdf

481 Foster, N. and Lewis, A. (2009) *Ecological features for the Regulated Peel River*, prepared for the Peel Interagency Regional Panel, Department of Water and Energy, NSW (unpublished). Provided by DPIE-Water

482 DPI (2012) *Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sharing Plan 2010-2011 progress report – Assessment of environmental flow rules developed for the Regulated Peel River*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/549422/imef_peel_valley_water_sharing_plans_progress_report.pdf.

483 DPIE-Water (2011) *Environmental flow response and socio-economic monitoring. Namoi Valley - progress report 2009.* Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0011/146288/EFR-socio-economic-monitoring-namoi-valley-report-2009.pdf.

484 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* NSW Department of Planning, Industry and Environment – Environment, Energy and Science, Parramatta, NSW.

485 DoI-Water (2019) *A Review of Groundwater-Surface Water Connectivity in the Cockburn Alluvium Management Zone*.

486 Boys, C., Rourke, M., Robinson, W., Gilligan, D. and Thiebaud, I. (2011) *Status of freshwater catfish populations and their habitat within the Cockburn River*. Final report prepared by the NSW Department of Primary Industries–Fisheries for the Namoi Catchment Management Authority.

487 *Ibid*.

quality targets for environmental, social, cultural and economic benefits. This analysis informed the development of the *Namoi Water Quality Management Plan*

- **stygofauna impact assessment** – DPIE-Water is collaborating with Macquarie University on the impacts of drawdown on stygofauna
- **alluvial aquifer health monitoring** – a health index for alluvial systems is being developed but hasn't yet been built into water resource plan MER plans
- **drought refuges analysis** – as part of the drought response, DPI-Fisheries has undertaken a refuge analysis, but results have not yet been reported.

The Commission supports the continuation of ongoing studies. Information on these studies and outcomes should be publicly reported.

Given the limited reporting on the Plan's performance indicators or objectives, the extent to which outcomes are being achieved and the effectiveness of the Plan cannot be determined.

Stakeholders have raised concerns about the limited information available to the public to demonstrate how provisions are being implemented, whether the Plan objectives are being met and what, if any, adaptive management may be required:

> *'There appears to be a lack of reporting on the implementation of the Plan. It is unclear whether a number of significant amendments for the unregulated river have been implemented or carried over to the new amended plans'*.[488]

The Commission recognises that a lack of quality MER is a significant and recurring issue across water management in NSW that has been repeatedly highlighted in previous Commission reviews, as well as by the National Water Commission.[489]

10.2 Support new monitoring, evaluation and reporting plans

DPIE-Water is developing environmental MER plans for surface[490] and groundwater[491] resources as part of the water resource plan process (see **Section 2.7**). These aim to coordinate MER activities across multiple agencies (such as DPIE-EES, DPI-Fisheries and WaterNSW) and should address some of the Plan's MER limitations.

The *Namoi Surface Water Monitoring, Evaluation and Reporting Plan* is a valley-specific MER plan for the greater Namoi Valley (including the Peel). It focuses on environmental outcomes, and includes objectives, strategies and management actions. It is designed to assess relevant objectives from water sharing plans and management actions align with the *Namoi Long Term Water Plan*.[492]

488 Submission: Nature Conservation Council, 15 November 2019.

489 National Water Commission (2014) *The National Water Planning Report Card 2013*, p. 11. Available at: http://www.agriculture.gov.au/SiteCollectionDocuments/water/2013-national-water-planning-report-card.pdf.

490 DPIE-Water (2019) *Namoi Surface Water Monitoring, Evaluation and Reporting Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0017/273122/schedule-j-namoi-merp.pdf.

491 DoI-Water (2018) *NSW Groundwater Environmental Water Monitoring, Evaluation and Reporting Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0017/201932/Schedule-H-Draft-groundwater-Monitoring-Evaluation-and-Reporting-Plan.PDF.

492 DPIE-Water (2019) *Namoi Surface Water Monitoring, Evaluation and Reporting Plan*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0017/273122/schedule-j-namoi-merp.pdf.

The *NSW Groundwater Environmental Water Monitoring, Evaluation and Reporting Plan* covers all groundwater water resource plans in the Basin and includes objectives, performance indicators and corresponding sites. It aims to report on environmental outcomes every 5 years.

DPIE-Water has advised that these plans can be scaled to the local level to support water sharing plans. The Commission supports the development of these MER plans and their use to drive MER for the new water sharing plans and notes the following areas for further improvement:

- The surface water MER plan does not include intervention monitoring that may be needed on an event basis to assess planned environmental water events (an area of stakeholder concern, see **Section 5.3.3**).
- Some proposed monitoring activities in the surface water MER plan may be of limited use in reporting against objectives. For example, aerial waterbird monitoring survey at a single location may not give insight into changes in waterbirds across the valley.
- Surface-groundwater connectivity needs ongoing monitoring and investigation to be better understood (see **Section 10.4**).
- The groundwater MER plan does not include proposed monitoring of vegetation communities for the Peel Alluvium.
- As noted in both MER plans, MER needs to be supported by adequate resources. Stakeholders raised concerns about lack of identified funding for MER under the water resource plan process.[493] The cost of MER should be proportionate to the risk to the resource of over extraction, supported by a risk assessment and prioritisation process.
- MER information, including data and evaluation outcomes, should be made publicly available in a timely and accessible manner to support knowledge sharing and strategic adaptive management. For ecological monitoring, there is potential to publish results on DPIE-Water's Environmental Water Hub.[494]

The Commission understands that DPIE-Water will develop cultural and socioeconomic MER plans for the Basin, but these do not appear to have progressed at this stage. Established guidelines for social and economic impact assessment[495] should be used to develop a socio-economic baseline to better understand risks and impacts in the Plan area. The baseline should inform the Namoi MER framework to identify key social and economic indicators for ongoing monitoring. A socio-economic impact management plan would help to ensure that the baseline is monitored, and mitigation strategies are implemented as planned.

493 Interview: DPI-Fisheries, 26 February 2020.

494 DPIE-Water (2020) *Environmental Water Hub*. Available at: https://www.industry.nsw.gov.au/water/environmental-water-hub.

495 An array of best-practice methods and standards available for social and economic impact assessment are commonly used nationally and internationally. DPIE-Water adopts a range of guidelines to help state significant development application impact assessments, including for social and economic impact assessment (available at: https://www.planning.nsw.gov.au/Policy-and-Legislation/Under-review-and-new-Policy-and-Legislation/Social-Impact-Assessment; and https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines/key-guidance/economic). There are also some recent examples where social and economic risk and impact assessments for large-scale natural resource management issues, such as the Marine Estate Management Authority's program of work (available at: https://www.marine.nsw.gov.au/marine-estate-programs/threat-and-risk-assessment).

10.3 Improve objectives and targets in the new plans

Clearly defined outcomes and links between outcomes, objectives, strategies and performance indicators are the foundation of robust MER frameworks. The current Plan does not clearly specify environmental, social and economic outcomes that are prioritised in line with the Act. It also does not provide suitable, well-defined objectives, strategies and performance indicators in line with best practice approaches or present a clear logical flow between these components. The performance indicators are also high-level and impractical to evaluate against.
The absence of robust MER has made it difficult to effectively review the Plan. However, DPIE-Water is improving objectives in water sharing plans as part of MER plans developed through the water resource planning process. DPIE-Water advised that it aims to build a stronger, logical connection between objectives, strategies and performance indicators, and clearly distinguish between environmental, economic, social and Indigenous cultural objectives.

10.4 Strengthen the Plan's knowledge base

Except for high priority groundwater dependent ecosystems in Schedule 4, the Plan lacks information on the water dependent environmental assets that require protection or the flows that are needed to sustain ecological values. When the Plan was developed, DPIE-Water had a limited understanding of the water needs of environmental assets.[496] As such, a precautionary approach was recommended, supported by adaptive management to improve evidence.[497]

The Plan's background document advised that further studies may be undertaken within agencies or by external organisations that may assist in informing the review of Plan provisions.[498] Many of these studies were not carried out due to limited resources.[499]

Environmental water requirements are now better understood through the development of the *Namoi Long Term Water Plan*[500] and are based on best available information. The recently finalised plan includes environmental assets and environmental water requirements and should underpin replacement water sharing plans.

The Commission understands that DPIE-Water is prioritising key knowledge gaps based on materiality. Key knowledge gaps to prioritise and fund may include:

- assessing the effectiveness of environmental water provisions
- resolving ongoing issues around surface-groundwater connectivity
- ongoing testing and strengthening of environmental water requirements in the *Namoi Long Term Water Plan* as new information becomes available
- ongoing fish monitoring, including river blackfish distribution and abundance, and population trends

496 Foster, N. and Lewis, A. (2009) *Ecological features of the regulated Peel River*. Report prepared for the Peel Interagency Panel (unpublished, provided by DPIE-Water).
497 *Ibid*.
498 Office of Water (2010) *Water Sharing Plan – Peel Valley regulated, unregulated, alluvial and fractured rock water sources – Background document.* Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548045/wsp_peel_valley_background.pdf.
499 Advised by DPIE-Water.
500 DPIE-EES (2020) *Namoi Long Term Water Plan Part A: Namoi catchment.* Available at: https://www.environment.nsw.gov.au/research-and-publications/publications-search/namoi-long-term-water-plan-part-a-catchment-draft.

- drought refugia persistence and condition
- impacts of cold water pollution
- socio-economic analysis of impacts of the Plan on water users.

DPIE-Water is also investigating technologies to improve water regulation compliance and environmental water management, which may incorporate spatial data and analysis.[501]

10.5 Monitor and report on all forms of extraction

Metering across the Peel Valley water sources is highly variable, with most extraction (excludes basic landholder rights) monitored in the regulated river and alluvium. All licenced extraction (excludes basic landholder rights) in the Peel Alluvium Water Source requires a meter as DPIE-Water has categorised it as an at-risk groundwater source because it is over-allocated, and the entitlement and account rules combined can result in extraction exceeding the LTAAEL. [502]

However, use in the Peel Unregulated River Water Sources is unmetered and has not been monitored each year of the Plan (logbook data is not collated). Uncertainty around levels of extraction in the unregulated surface water system makes it difficult to assess current extraction levels, changes over time and likely impacts. It is also difficult to assess how extraction in the Peel Unregulated River and Peel Fractured Rock water sources may be affecting water availability in the regulated river and connected alluvial system (noting, for example, that the Cockburn River normally contributes about 40 percent of the streamflow of the Peel River[503]).

Based on available data,[504] it appears that only around a third of licences in the unregulated rivers will be required to be metered under NSW's *Non-Urban Water Metering Policy*.[505] Extraction in the unregulated rivers may impact the connected alluvium and regulated river (see **Chapter 7**). This in turn could impact environmental, social and economic outcomes in these water sources. Increasing metering would enable compliance with the LTAAEL to be tracked more effectively and potential risks identified. Based on the risks due to over-entitlement and the connected nature of the systems, DPIE-Water should consider listing the Peel Unregulated River Water Sources as at-risk water sources.

501 DPIE-Water (n.d.) *Water Pilot Technology Program*. Available at: https://www.industry.nsw.gov.au/water-reform/water-pilot-technology-program.

502 DoI-Water (2018) *NSW non-urban water metering Policy*. Available at: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0017/205442/NSW-non-urban-water-metering-policy.pdf.

503 Green, D., Petrovic, J., Moss, P. and Burrell, M. (2011) *Water resources and management overview: Namoi catchment*. Prepared for the NSW Office of Water. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0003/549300/catchment_overview_namoi.pdf.

504 Based on the works approvals for Plan licences, provided by WaterNSW 18 October 2019. This does not consider the proportion of entitlement captured under works approvals.

505 The NSW Government's new metering framework for non-urban water meters began on 1 December 2018 and will be delivered in a staged process. This framework requires that the following users are metered: all users already required to meter or measure; surface water works of 100 mm and above; groundwater works of 200 mm and above; multiple works if capacity is equivalent to specified size thresholds; and all works in at-risk groundwater sources regardless of size. See, DoI-Water (2018) *NSW non-urban water metering framework*. Available at: https://www.industry.nsw.gov.au/water-reform/metering-framework).

10.6 Support strategic adaptive management

Consistent with requirements of the Act and the National Water Initiative,[506] the need for adaptive management in response to new information was recognised when water sharing plans were developed.[507] Regular assessment of Plan performance and adaptative management activities are particularly important due to limitations in the Plan's knowledge base, planned dam upgrades and predicted climate changes, particularly increasing and intensified droughts.

The Plan includes some provisions for adaptive management, including amendments to add or remove sensitive environmental areas or high priority groundwater dependent ecosystems to relevant schedules, and to provide for floodplain or stormwater harvesting. These provisions are intended to allow the Plan to be improved over time and incorporate new information, such as updated mapping and modelling. However, the Plan lacks amendment provisions for the ECA, AWDs or account management rules.

Cease to pump provisions in the Plan for the Cockburn Valley are being changed from height to flow based. This is largely driven by stakeholder consultation activities associated with the water resource planning process and not part of a regular process underpinning the Plan.

The replacement water sharing plans should better support adaptive management and allowances for amendments in response to new information being generated, particularly regarding:

- climate change and climate variability modelling
- the *Namoi Long Term Water Plan* and environmental and flow studies
- updates in High Ecological Value Aquatic Ecosystems Assessment mapping
- drought data and management plans
- land-use data including current infrastructure to inform modelling
- updated policies for example reasonable use guidelines
- current hydrological datasets
- ecological datasets and modelling (for example, SEED Portal[508], Directory of Important Wetlands[509], listed threatened species, monitoring of vulnerable habitats, fish sampling)
- Saving our Species program threatened species data[510]
- targeted research projects to fill knowledge gaps and inform ongoing decision making
- socio-economic risk and impact assessments.

---

506 National Water Commission (2014) *The National Water Planning Report Card 2013*, p. 65. Available at: https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/water/2013-national-water-planning-report-card.pdf.

507 Office of Water (2011) *Macro water sharing plans – the approach for unregulated rivers. A report to assist community consultation*. Available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/548153/macro_unreg_manual_web.pdf.

508 NSW Government (n.d.) *SEED Sharing and Enabling Environmental Data*. Available at: https://www.seed.nsw.gov.au/edphome/home.aspx.

509 Department of the Environment and Energy (n.d.) *Directory of Important Wetlands*. Available at: http://www.environment.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands.s

510 DPIE-EES (n.d.) *Saving our Species program*. Available at: https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/saving-our-species-program.

10.7 Recommendations

To improve monitoring, evaluation and reporting, the Commission makes the following recommendations (**Table 23**).

Table 23: Recommendations for DPIE-Water to improve monitoring, evaluation and reporting

	Recommendations
27	Define a MER framework for the replacement water sharing plans, supported by adequate resources and building on the following actions: a) strengthen, finalise and implement the *Namoi Surface Water Monitoring, Evaluation and Reporting Plan* and *NSW Groundwater Environmental Water Monitoring, Evaluation and Reporting Plan* following accreditation of water resource plans. b) by 31 December 2020, establish an interagency group to identify resourcing requirements, opportunities for collaboration across government agencies and use of technology to efficiently implement the MER plans c) develop NSW Murray-Darling Basin-wide cultural, social and economic MER plans by 1 July 2022 d) identify and address critical knowledge gaps including, but not limited to: i) river blackfish distribution and abundance, and population trends ii) drought refugia persistence and condition iii) impacts of cold water pollution. e) allow for periodic assessment of knowledge gaps for adaptive management and inclusion in future water sharing plans reviews.
28	By July 2021 consider listing the Peel Unregulated River water sources as at-risk water sources, requiring metering of all licenced extraction. It will also be important to monitor active use and any growth during Plan implementation.

Appendix A

Table 24: Objectives and indicators used for the Commission's evaluation

Plan objective	Plan strategy	Plan performance indicator	Primary outcome
10(a) manage the Peel Valley in a single water sharing plan that recognises the interaction between these water sources	-	-	All
10(b) protect, preserve, maintain and enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources	11(a) establish environmental water rules 11(e) establish rules that place limits on the availability of water for extraction 11(f) establish rules for making available water determinations	12(a) change in low flow regime 12(b) change in moderate to high flow regime 12(c) change in groundwater extraction relative to the long term average annual extraction limit 12(e) change in, or maintenance of, ecological value of key water sources and their dependent ecosystems	Environmental
10(c) protect, preserve, maintain and enhance the Aboriginal, cultural and heritage values of these water sources	*No specific strategies to achieve this objective. Plan limits the share component of Aboriginal cultural access licences to 10 ML/year* 11(c) identify water requirements for access licences 11(b) identify water requirements for basic landholder rights	12(j) extent of recognition of spiritual, social and customary values of water to Aboriginal people 12(h) extent to which native title rights requirements have been met	Social/cultural
10(d) protect basic landholder rights	11(b) identify water requirements for basic landholder rights	12(f) extent to which basic landholder rights requirements have been met	Social
10(e) manage these water sources to ensure equitable sharing between users[511]	11(a) establish environmental water rules 11(b) identify water requirements for basic landholder rights 11(c) identify water requirements for access licences	12(e) change in, or maintenance of, ecological value of key water sources and their dependent ecosystems 12(f) extent to which basic landholder rights	Social

511 DPIE-Water advised (27 March 2019) that equitable sharing between users relates to the appropriate prioritisation of different licences classes under the Act.

Plan objective	Plan strategy	Plan performance indicator	Primary outcome
	11(d) establish rules for granting of access licences and approvals 11(h) establish rules which specify the circumstances under which water may be extracted	requirements have been met 12(g) extent to which local water utility requirements have been met 12(h) extent to which native title rights requirements have been met	
10(f) provide opportunities for market based trading of access licences and water allocations within sustainability and system constraints	11(i) establish access licence dealing rules 11(e) establish rules that place limits on the availability of water for extraction 11(f) establish rules for making available water determinations	12(d) change in local water utilities access 12(e) change in, or maintenance of, ecological value of key water sources and their dependent ecosystems 12(i) change in economic benefits derived from water extraction and use	Economic
10(g) provide sufficient flexibility in water account management to encourage responsible use of available water	11(g) establish rules for the operation of water accounts 11(f) establish rules for making available water determinations	12(d) change in local water utilities access 12(e) change in, or maintenance of, ecological value of key water sources and their dependent ecosystems 12(i) change in economic benefits derived from water extraction and use	Economic
10(h) contribute to the maintenance of water quality	11(a) establish environmental water rules 11(e) establish rules that place limits on the availability of water for extraction 11(f) establish rules for making available water determinations 11(h) establish rules which specify the circumstances under which water may be extracted	12(e) change in, or maintenance of, ecological value of key water sources and their dependent ecosystems 12(g) extent to which local water utility requirements have been met 12(i) change in economic benefits derived from water extraction and use	All
10(i) provide recognition of the connectivity between surface water and groundwater	*No specific strategies, noting that rules may account for connectivity*	-	Environmental
10(j) adaptively manage these water sources	*Performance indicators are established by the Plan but they do not specify values from which to assess performance*	-	All

Plan objective	Plan strategy	Plan performance indicator	Primary outcome
10(k) provide for the continuation of a viable irrigation industry within these water sources	11(d) establish rules for granting of access licences and approvals 11(c) identify water requirements for access licences 11(i) establish access licence dealing rules 11(f) establish rules for making available water determinations 11(h) establish rules which specify the circumstances under which water may be extracted 11(e) establish rules that place limits on the availability of water for extraction	12(i) change in economic benefits derived from water extraction and use	Economic
10(l) contribute to the environmental and other public benefit outcomes identified under the Water Access Entitlements and Planning Framework in the *Inter-Governmental Agreement on a National Water Initiative* (2004)	11(a) establish environmental water rules 11(e) establish rules that place limits on the availability of water for extraction 11(f) establish rules for making available water determinations	12(e) change in, or maintenance of, ecological value of key water sources and their dependent ecosystems 12(f) extent to which basic landholder rights requirements have been met 12(g) extent to which local water utility requirements have been met 12(h) extent to which native title rights requirements have been met 12(i) change in economic benefits derived from water extraction and use	All