



Submission

Draft Lachlan Regional Water Strategy

Background

This is a joint submission representing the position of regional groups (as listed below). There is consensus among the groups that the draft Lachlan Regional Water Strategy (RWS) does not identify the full suite of options that must be considered to ensure improved water security into the future and to ensure improvements in the Lachlan river, wetland and catchment health.

The prosperity of the region will not be achieved by compromising existing farming enterprises through changed water management in raising the Wyangala Dam wall.

The environmental health of the Lachlan river system, and especially water supply to the nationally significant lower Lachlan wetlands, should not be compromised by political desires to grow inland towns, create new employment opportunities, develop more mines, or to alleviate occasional flooding on natural floodplains.

While the regional water strategy process appears to focus on infrastructure projects, land management issues that impact on river health and water security in the Lachlan system should also be a focus.

Consultation to date seems to have been limited to vested interest groups who are water purchasing clients of the Lachlan water system, rather than the broader Lachlan community. It is noteworthy that the sibling DPIE agency, NSW Local Land Services, with responsibilities for broader rural land management, has not been consulted. Furthermore, local Lachlan indigenous community groups have not been consulted in the development of this draft strategy.

Government commitment

The Government commitment to the Wyangala Dam wall raising project in the draft Lachlan RWS refers only to the detailed business case for this project. We note the long list of considerations including costs-benefits, environmental impacts and commitments under various State and Federal legislation that must be assessed before the project viability can be understood.

The signatories to this submission consider that this project would be better presented as an option to be compared with other options that we believe are more cost-effective and achieve similar outcomes with less negative impact.

The proposal to raise the Wyangala Dam wall by 10 m increasing dam capacity by 53% to capture a further 650 GL needs detailed assessment to consider the complexities of the impacts.

The Government's own projections show the new wall will only deliver an additional 21.5 GL on average per annum, which is only 1.7% of the dam's current storage capacity. That is a very small gain for the cost and relies heavily on the capture of significant one-off large flows.

This increased capture of natural flow regimes will cause further decline in Lachlan River health including impacts on wetlands providing habitat for migratory bird species, loss of Aboriginal cultural values and a loss of recharge opportunities for groundwater sources.

Production of crops and livestock on the prime Upper Lachlan river flats will be lost through inundation caused by the raised dam wall while the productivity of the Lower Lachlan floodplains and wetlands will degrade through the loss of that same water. While it is unlikely that the dam would fill regularly should the dam wall be raised, productive land would be lost for years and the destruction of unique vegetation would occur even if inundated for only a few weeks.

The impacts of the proposed enlarged dam on existing industries and the environment will be too great and cannot be mitigated.

The fast-tracking of this project as critical infrastructure is not supported.

Missing options

The draft Lachlan RWS fails to identify a number of key options that should be included in the final strategy. These will improve water security, river health and regional sustainability. The missing options are:

- Water efficiency measures for Jemalong Irrigation District
- Reducing sedimentation flow into the Wyangala Dam
- Managing the existing significant sand slug in the river below Wyangala Dam from near Wyangala to Forbes
- Managing Town Water Supply Quality and Security

1. Water efficiency measures for Jemalong Irrigation District

A project to replace leaking channels with pipes in the Jemalong Irrigation District to deliver water orders must be a key project in the final Lachlan Regional RWS.

This project is estimated to save up to 25 GL per annum of conveyance water, without the need to capture more water in storage. It was costed at \$170m in 2009.

The proposed Wyangala Dam enlargement to capture an additional 650 GL of river flow is estimated to provide an increased annual average security to general security water licences of 21.5 GL.

The cost benefit of investing \$650m (or more) to achieve a similar outcome as the water efficiency project at Jemalong Irrigation District, costed at only \$170 million, should be a key consideration of the NSW Government.

An annual savings of 25 GL leaves more water in the current Wyangala storage for sharing between all licence holder including towns, industry and the environment. This will improve long term water security for the region without causing damage to existing landholders,

industries, Aboriginal cultural heritage or to the health of the Lachlan River, its wetlands, native fish populations and water dependent ecosystems.

2. Managing sediment loads in the catchment

The Lachlan catchment above Cowra, including the Boorowa River, Hovells Creek, the Crookwell River and the Abercrombie River has been identified as a major contributor to turbidity and adverse nutrient levels in the Lachlan River system.¹

Significant sheet, rill and gully erosion have occurred across the upper Lachlan landscape, much of it attributable to past land use, the rabbit plagues of the 1940 – 60s, and past NSW Government land settlement / occupation policies. This has increased sediment loads into Wyangala Dam and the Lachlan downstream.

A key outcome of the Lachlan (Kalare) Catchment Action Plan (2013 – 2023) was to have **clean water leaving the landscape** by increased gully stabilisation, upland wetland protection and increased groundcover across all land uses. This objective of the former Lachlan Catchment Management Authority has been carried over into the Strategic Plans of the respective (and sibling NSW Government agencies to Water NSW) South East and Central Tablelands Local Land Services (CT LLS). However, this work has either not been funded or only partially funded through the NSW Catchment Action program.

The Upper Lachlan Landcare groups, i.e. LachLandcare, Hovells Creek Landcare Group and Upper Lachlan Landcare have recommended that \$10 million p.a. for ten years be invested in an upper Lachlan catchment rehabilitation program, in collaboration with the Upper Lachlan Branch of NSW Farmers, Mulwaree Aboriginal Community and all interested landholders

This program has the potential to yield more water of higher quality, lower sediment loads and lower peak flows into both Wyangala Dam and the downstream Lachlan River system. We note that the ability to safely discharge peak flows from Wyangala, and avoid flooding in Cowra, is dependent on peak flows in the unregulated Boorowa River and Hovells Creek which join the Lachlan just downstream of Wyangala.

This will protect Wyangala Dam from further siltation impacting on water storage capacity and improve downstream river health.

Further to the above erosion issues, the Lachlan River habitat mapping project, by NSW Fisheries for CT LLS, has identified a 150 km long sediment slug in the Lachlan River caused by erosion in the Boorowa River catchment².

Future management of this huge sediment slug, its derivation from within the catchment (and not just the Boorowa River), its impact on the riverine ecology and habitat for rare and endangered species and its impact on downstream flooding (by reducing the river peak flow capacity), and potential long-term impact on the river system downstream of Forbes, warrants attention as part of this Lachlan water strategy.

Priority actions for on-ground investment in the project area include the remediation of erosion sites in the catchment to reduce sediment inputs to the Lachlan.²

¹ Lachlan (Kalare) Catchment Action Plan (2013 – 2023) support Chapter 1 ‘The Lachlan Tablelands’

² DPI Fisheries, 2017. Lachlan River habitat mapping Wyangala Dam to Cottons Weir

These strategies are not new. They were set out in the Boorowa Catchment Action Plan in 2005,³ which supplemented the ‘Integrated Catchment Management Plan for the Lachlan Catchment’, released in 2002. They have also been implemented in the Shoalhaven and Wollondilly catchments by Sydney Water.

3. Managing the sediment slug below Wyangala Dam in the River from Cowra to Forbes

There are concerns that the large sediment slug below Wyangala Dam is causing localised flooding and could cause the Lachlan River to change route at or downstream of Cowra, threatening the town, local industry and irrigation infrastructure. Recent estimates from Cowra Shire Council indicate that river flows of 4,700 ML will inundate the low-level crossing in Cowra, which has decreased substantially in the last two decades from 9,700ML in the 1990s. What happens in another 20 years of sand sediment accumulation? Can the river move because of this?

It is important for this problem to be addressed as a flood mitigation and river management issue in the Lachlan RWS. Regular peak flow flooding is required to scour out the sediment onto the adjacent floodplains and to restore the river flow capacity in the longer term – an issue for the LRWS?

The removal of flushing flows from the system through capture in a raised Wyangala Dam may exacerbate the influence of the sediment slug on downstream river flows, threatened native fish habitat and increase the flood risk that the proposed increased dam is proposed to address.

4. Managing Town Water Supply Quality and Security

Issues include:

- Towns and villages already have the highest level of water security allocations from the river / dam for domestic use,
- They were not short of water even during the recent drought when Wyangala dam was at a very low level,
- They are also working to diversify their water supply options to enhance their water security, eg a 2020 NSW Budget \$8 million allocation to Cowra for water supply bores and pipelines,
- The cost of treating Lachlan River water supplies – resulting from excessive turbidity, sediment loads, bacterial contamination and nutrient levels –for domestic water supply is not costed,
- Options to build new pipelines to Orange and Young / Grenfell / Boorowa for domestic water supply should not rely on new or enlarged in-stream storages.
- The ability of the catchment to yield water is not unlimited. It is not getting any bigger, it is already supporting an increasing lifestyle (as opposed to farm) community and faces climate / rainfall uncertainty – so downstream demand for water needs to be appropriately tempered and water use efficiencies realised.

³ <https://hovellscreeklandcare.org.au/resources/boorowa-catchment-action-plan-2005-2010>

Conclusion

The key water security and landscape management issues raised in this submission must be incorporated and funded through the regional water strategy prioritisation process.

The current proposal to raise the Wyangala Dam wall as the panacea to fix all of the water problems of the Lachlan basin is not supported.

We support the Landcare proposal for a \$10 million pa for ten years investment in an upper Lachlan catchment rehabilitation program.

This submission is supported by:

Upper Lachlan NSW Farmers Association,
Mulwaree Aboriginal Community Inc,
LachLandcare,
Hovells Creek Landcare Group,
Upper Lachlan Landcare Group,
Lachlan Floodplains and Wetlands Association,
Inland Rivers Network,
Central West Environment Council,
Orange Field Naturalist and Conservation Society,
Environmentally Concerned Citizens of Orange,
Orange Regional Water Security Alliance.

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Submission

Draft Lachlan, Macquarie-Castlereagh and Gwydir Regional Water Strategies

Introduction

The Inland Rivers Network (“IRN”) is a coalition of environment groups and individuals that has been advocating for healthy rivers, wetlands and groundwater in the Murray-Darling Basin since 1991.

IRN welcomes the opportunity to engage in the process of developing a Regional Water Strategy for the Lachlan, Macquarie-Castlereagh and Gwydir catchments.

The management of NSW water resources is the most important responsibility of the NSW and Federal Governments. Water is a scarce resource in Australia, more than any other inhabited continent on earth.

We consider that the most appropriate approach to improving water management in NSW is to develop a State Water Strategy first, to provide the principles and guidelines for Regional Water Strategies.

IRN strongly objects to a number of infrastructure projects being identified as prior commitments in the list of options on exhibition for the Lachlan and Macquarie-Castlereagh Regions. This creates a bias in decision-making process and influences the outcomes. The opportunities to package a suite of sustainable options are diminished by this approach.

The objectives of the Regional Water Strategy process appear to be weighted towards fostering growth in water dependency rather than focussing on the sustainable use of limited available water resources.

The new climate modelling indicates that available water resources will diminish significantly into the future. The Chief Scientist review of the new climate modelling has not been released.

The process appears to counter the objectives of the NSW *Water Management Act 2000* that prioritises environmental health of water sources.

We note that the draft Regional Water Strategies identify that the overall ecological health of rivers is poor or are threatened by existing infrastructure and regulation.

IRN acknowledges the improved consultation with First Nations groups in this process.

Key Issues:

This submission will concentrate on the following issues:

1. Proposed instream infrastructure
2. Options to improve environmental health
3. Options to reduce water demand
4. Options to support First Nations cultural interests
5. Options causing environmental harm
6. Missing options

Background

1. Climate change predictions

IRN commends the Water Division of the Department of Planning, Industry and Environment (DPIE-Water) for the work undertaken to improve climate change predictive modelling for water availability in regional NSW.

We would prefer that the Chief Scientist independent review of the new modelling process was available with the release of the predictions for each region.

While the draft Regional Water Strategies claim that the climate projections provided are ‘worst case dry scenario’, other sources of climate modelling prediction could indicate that these scenarios are closer to future reality.

Whatever the case, it is imprudent for the NSW Government to be fostering growth in water use and dependency under these scenarios.

A primary issue that must be addressed is that all Regions remain over-allocated under current climate conditions.

2. Current Water Source Condition

The Status and Issues Papers released by DPIE-Water in 2016 for the development of Water Resource Plans under the Murray-Darling Basin Plan produced useful information in regard to the status of each water source. Maps included High Ecological Value Aquatic Ecosystems (HEVAE) in each surface water source and changes in water levels in the major groundwater or aquifer systems in each catchment.

IRN considers that this information would have been useful as background to the draft Regional Water Strategy process. An understanding of current condition will assist in making decisions about the resilience of the water sources.

There is an obvious relationship between surface water and groundwater sources and an overlap between HEVAE and Groundwater Dependent Ecosystems (GDEs).

The protection of the condition of high ecological values and groundwater levels must be taken into account when considering options for increasing water use and water security in the region. This is particularly important when considering increased dependence on groundwater for town water supply and industry during drought.

IRN strongly opposed the proposal to allow extraction of groundwater to reach 120% of Sustainable Diversion Limits during dry times. This would further impact on the integrity of aquifer systems over time. We are following the accreditation process of Water Resource Plans very closely.

See Appendix 1 for maps from the Status and Issues Paper for each catchment

2.1 Lachlan catchment

The draft Lachlan Regional Water Strategy identifies that *'The existing infrastructure and regulation affect the ability to meet environmental outcomes and cause the overall ecological health of the Lachlan River to be poor.'* (p58)

The Lachlan has areas of HEVAE that also overlap in many places as GDEs. At the same time, the groundwater maps indicate a permanent drawdown of water levels in the major productive aquifer systems, up to 24m in the Upper Lachlan Alluvium.

The draft report identifies that *'Governments and communities will need to continue to manage localised groundwater drawdown, particularly downstream of Hillston and in two areas above Lake Cargelligo where levels are declining.'* (p55)

The Lachlan catchment also overlies a small portion of the Murrumbidgee shallow and deep aquifer systems. Recharge and connectivity to this important water source must also be taken into account.

Additional infrastructure, regulation and increased use of Lachlan water sources is highly likely to compound these problems and cause ongoing irreparable harm to the health of the Lachlan river system and associated groundwater sources.

2.2 Macquarie-Castlereagh catchment

The draft Macquarie-Castlereagh Regional Water Strategy identifies that the fish community in the region is in poor health (p69) and that numerous constraints affect the ability to meet environmental watering objectives (p 70).

The draft report fails to describe that the condition and extent of the Ramsar listed Macquarie Marshes is declining. This is mainly due to river regulation, past water management practices and failure to regulate floodplain harvesting in the catchment.

The Macquarie-Castlereagh has areas of HEVAE that also overlap in many places as GDEs. At the same time, the groundwater maps indicate a permanent drawdown of water levels in parts of the major productive aquifer systems, greater than 1.5m in the Upper Macquarie Alluvium and greater than 3m in the Lower Macquarie deep alluvium.

The draft report identifies that *'Extensive use of groundwater has led to a decline in water levels in some areas, particularly around Dubbo and Narromine.'* (p 66)

Connectivity with the Barwon-Darling water source is also an important consideration for the Macquarie-Castlereagh. *'On average, 21% of the flows in the Barwon-Darling come from the Macquarie-Castlereagh catchment over the long term.'* (p 58)

Additional infrastructure, regulation and increased use of Macquarie-Castlereagh water sources is highly likely to compound these problems and cause ongoing irreparable harm to the health of the Macquarie-Castlereagh river system and associated groundwater sources while reducing connectivity to the Barwon-Darling.

2.3 Gwydir catchment

The draft Gwydir Regional Water Strategy identifies that there has been a *'deterioration of river health and native fish populations in the Gwydir valley.'* (p 55)

The draft report fails to describe that the condition and extent of the Ramsar listed Gwydir Wetlands has declined. This is mainly due to river regulation, past water management practices and failure to regulate floodplain harvesting in the catchment.

The Gwydir has areas of HEVAE that also overlap in many places as GDEs. At the same time, the groundwater maps indicate a permanent drawdown of water levels in the major productive aquifer systems, between 4m – 6m in parts of the Lower Gwydir alluvium.

The draft report identifies that *'the extensive use of groundwater has led to a decline in levels in some areas (up to 15 km wide) of the Lower Gwydir source—particularly between Moree and Ashley'*. (p 52)

Connectivity with the Barwon-Darling water source is also an important consideration for the Gwydir. *'The Gwydir catchment also connects to the Barwon-Darling River and contributes 6% of the long term average flow recorded at Menindee.'* (p 48)

Additional infrastructure, regulation and increased use of Gwydir water sources is highly likely to compound these problems and cause ongoing irreparable harm to the health of the Macquarie-Castlereagh river system and associated groundwater sources while reducing connectivity to the Barwon-Darling.

3. Reliability

The draft Regional Water Strategies fail to discuss the issue of declining reliability of water supply to existing water licences. The over allocation of water in the context of declining inflows must to be addressed so that long term water security can be better managed.

Key Issues

1. Proposed instream infrastructure

1.1 Lachlan Region

1.1.1 Raising Wyangala Dam

IRN strongly objects to the proposal to raise the Wyangala Dam wall by 10 m increasing dam capacity by 53% by capturing a further 650 GL. This will cause further decline in Lachlan river health including important wetlands providing habitat for migratory bird species and a loss of recharge opportunities for groundwater sources.

We note that the Government commitment in the draft Lachlan options paper refers only to the business case for this project. We also note the long list of considerations including costs-benefits, environmental impacts and commitments under various State and Federal legislation.

This project must be considered in the context of other better options to improve water security while maintaining or improving the condition of HEVAE and GDEs, native fish habitat and resilience of groundwater sources.

The climate change predictions for the Lachlan catchment indicate that this project may become a stranded asset due to the loss of rainfall runoff.

IRN considers that better management of available water determinations through allocation of water once it is in the storage and using the latest drought of record inflows for predictive modelling will provide better water security.

1.1.2 Lake Rowlands Augmentation

IRN strongly objects to the augmentation of Lake Rowlands or the construction of a new dam downstream. There are better options for securing town water supply in the Central Tablelands, some of which do not appear in the options paper.

The climate change predictions for the Lachlan catchment indicate that this project may become a stranded asset due to the loss of rainfall runoff.

Missing options or opportunities for better investment of public funding to provide more cost effective water security with less environmental damage is covered under Issue 6 in this submission.

1.2 Macquarie-Castlereagh Region

1.2.1 Macquarie River reregulating weir

IRN strongly objects to the proposal to construct a new re-regulating structure 200 metres downstream of the existing weir at Gin Gin on the Macquarie River near Narromine. This will capture planned environmental water from tributary inflows that currently reports to the Macquarie Marshes and connects with the Barwon-Darling.

We note that the Government commitment in the draft Macquarie-Castlereagh options paper refers only to the business case for this project. We also note the long list of considerations including costs-benefits, environmental impacts and commitments under various State and Federal legislation.

IRN supports that the existing weir is repaired to its current height and that the mandatory fishway approved in 2011 to offset the augmentation of Burrendong Dam is constructed with great urgency. This option should have been included in the draft options paper.

1.3 Gwydir Region

1.3.1 Enlargement of Tareelaroï reregulating weir

IRN strongly objects to the proposal to enlarge the Tareelaroï reregulating weir in the mid-Gwydir to capture 6GL. This will capture planned environmental water from tributary inflows that could report to the Gwydir Wetlands and connect with the Barwon-Darling.

We note that updated modelling is likely to change the expected benefits of this option and that a large number of other considerations are required.

1.3.2 Lower Gravesend Dam

IRN strongly objects to the proposal to build a new dam midway on the Gwydir River at Gravesend. This will capture natural tributary inflows from Warialdra Creek, Horton River, Myall Creek and Halls Creek that provide multiple environmental benefits to the Lower Gwydir and wetlands system.

This option will not meet commitments under the NSW Water Management Act 2000 or the Murray-Darling Basin Plan and should not be on the table.

Better options for solving evaporation from on farm storages are available that do not appear in the options paper.

Missing options or opportunities for better investment of public funding to provide more cost effective water security with less environmental damage is covered under Issue 6 in this submission.

2. Options to improve environmental health

IRN strongly supports the options proposed to improve the environmental health of river systems. The options to improve habitat, provide better migration opportunities and remove some of the threats to native fish populations are highly recommended.

We note that there are at least 11 fishways across NSW that are outstanding commitments of WaterNSW as offset provisions for previously approved infrastructure augmentation. These projects must be constructed as a matter of urgency, some of them being 10 years overdue.

Additional fishways will improve native fish passage to and from breeding and feeding grounds.

The removal of structures from floodplains that hinder flood flows, downstream connectivity, groundwater recharge, the transfer of nutrients and fish breeding opportunities must be given a high priority. Connectivity between rivers and floodplains is a key function for river system health.

Options to improve knowledge of groundwater sources is critical for future water management and must be adequately funded prior to any further dependence on groundwater for water security purposes. This work is long overdue and should have been a focus for investment many years ago. Current condition of the main productive aquifers in these catchments is demonstrating stress.

It is critical that options to improve environmental health are given a high priority in the final Regional Strategies to mitigate current impacts and provide resilience to withstand climate change.

IRN strongly supports the following options to improve environmental health:

2.1 Lachlan Region

- Option 11: fixing cold water pollution from Wyangala Dam
- Option 14: more fishways
- Option 15: active management to protect environmental water
- Option 16: restore water quality
- Option 17: managing structures on floodplains
- Option 18: screening pumps to protect fish from being sucked out of the river
- Option 21, 22 & 23: research into groundwater health and sustainable access

2.2 Macquarie-Castlereagh Region

- Option 12: Increasing outlet valve capacity in Burrendong Dam
- Option 14. Address channel constraints to delivering environmental flows to the Macquarie Marshes
- Option 15: more fishways

- Option 16 & 17: more variable flows to Effluent Creeks
- Option 18: constraints in Southern Marsh
- Option 19: channel sharing
- Option 20: Native Fish Strategy
- Option 21: screening pumps to protect fish from being sucked out of the river
- Option 22: cold water pollution
- Option 23: managing structures on floodplains
- Option 24: constraints on the Cudgegong River
- Option 25, 26 & 27: research into groundwater health and sustainable access
- Option 28: restore water quality
- Option 31: Connectivity with downstream systems

2.3 Gwydir Region

- Option 9: removal of constraints to delivery of environmental water. This is a project identified under the Basin Plan Constraints Measures and the Northern Basin toolkit measures. This project should be identified as a commitment.
- Option 10: improved fish passage
- Option 11: existing commitment – directing supplementary environmental flows
- Option 12: fixing cold water pollution
- Option 13: screening pumps to protect fish from being sucked out of the river
- Option 14, 15 & 16: research into groundwater health and sustainable access
- Option 17: existing commitment - active management to protect environmental water
- Option 18: managing structures on floodplains
- Option 20: restore water quality
- Option 24: connectivity with downstream systems

3. Options to reduce water demand

IRN recommends that high priority be given to options that reduce water demand. The climate change scenarios for the next 40 years predict lower rainfall runoff. This means less water in the system than currently available.

Regional Water Strategies have failed to recognise that current levels of water allocation cannot be supplied with any reliability.

Any increase in population or water dependent industries must rely on less water supply. The social impacts of changes in industry water use eg moving to corporate models rather than family farms in the irrigation industry has a flow on effect in regional communities and economies.

It is essential for the NSW Government to prioritise demand management over supply when climate predictions demonstrate that supply will diminish over time.

We note that a number of options to improve water use efficiency have been missed in the options papers. These are outlined under Issue 6.

IRN strongly supports the following options to improve water use efficiency:

3.1 Lachlan region:

- Option 9: Reuse, recycle and stormwater harvesting
- Option 24: water efficiency opportunities
- Option 34: review drought of record and allocation process in water sharing plan
- Option 40: impact of land use change

3.2 Macquarie-Castlereagh region:

- Option 7: Reuse, recycle and storm water projects
- Option 33: Enterprise water use efficiency
- Option 34: Market measures to support Dubbo's town water supply
- Option 37: Review of accounting & allocation
- Option 41: Impact of land use changes

3.3 Gwydir region:

- Option 3: Reuse, recycle and stormwater harvesting
- Option 22: water efficiency opportunities – this option must include managing high evaporation rates from on farm storage.
- Option 28: review drought of record and allocation process in water sharing plan
- Option 32: impact of land use changes

4. Options to support First Nations cultural interests

IRN congratulates DPIE-Water for improving consultation with First Nations people. We fully support the options included in the draft Regional Strategies that recognise cultural knowledge, water rights and interests. These include the option of establishing an Aboriginal River Ranger program and securing flows for cultural sites.

5. Options that will cause environmental harm

Besides the infrastructure options outlined under Issue 1, IRN considers that a number of other options will cause environmental harm in the three river systems.

IRN strongly objects to the following options that will cause environmental harm:

5.1 Lachlan region

- Option 27: Changes to Lake Cargellico
- Option 31: removing a natural lake above Lake Cargellico
- Option 33: drought operation rules. Cutting the river off is not a good option
- Option 39: more weirs in Lower Lachlan

5.2 Macquarie-Castlereagh region

- Govt commitment 2: access dead storage from Burrendong Dam. This option was not progressed in the Gwydir region because of environmental harm
- Option 36: new drought operational rules. Cutting the river off is not a good option

5.3 Gwydir Region

- Option 26: addressing transmission losses (these are planned environmental water under the NSW *Water Management Act 2000*)
- Option 27: new drought operational rules. Cutting the river off is not a good option

6. Missing options

The draft Regional Water Strategies have failed to identify a number of important options that will improve environmental health and water use efficiency.

6.1 Removal of weirs

The identification and removal of weirs that do not provide essential services, are in poor repair or cannot support functional fishways will provide improved environmental benefits.

6.2 Floor in major storages

The benefits of maintaining a water level in storages to provide long term water security for critical human and industry needs is demonstrated in the protocols for managing Windamere Dam. This provides a buffer for climate change impacts.

6.3 Drinking water for remote communities

Investment in SOURCE Hydropanels¹ would provide stand-alone drinking water supplies for remote communities on unregulated river systems. This option could also replace the many pipeline projects proposed across all regions. Combined with water tanks this option would provide better water security with less disturbance while creating local jobs.

6.4 Lachlan region

6.4.1 Jemalong Irrigation District inefficient delivery system.

An option to fix the leaking channels in the main irrigation district of the Lachlan region has the potential to provide a similar annual average yield for general security water availability as the raising of Wyangala Dam wall. Water savings could be shared across increased town water supply security and conveyance requirements.

6.4.2 Improved downstream connectivity

An option to improve connectivity to downstream wetlands and waterbird breeding habitat is an important consideration for the mid and Lower Lachlan environmental assets.

6.5 Macquarie-Castlereagh and Gwydir regions

6.5.1 On farm storage evaporation

Control of evaporation rates from on farm storages is a key action needed to improve water use efficiency and decrease demand. The application of a number of innovations would help

¹ <https://www.source.co/>

to solve this problem. Modular floating covers are one technology being developed to prevent evaporation at a best cost/efficiency ratio ²

Another innovative solution to control on farm storage evaporation is a floating solar farm that provides the double benefit of a renewable energy source.

We note that one option for managing on farm evaporation in the Gwydir has been discarded. However, the size and scale of on farm storage in this region is significant and evaporation issues should be addressed through the Regional Water Strategy process.

6.5.2 Flood irrigation

Moving to more efficient water delivery options, such as subsurface irrigation or drip irrigation will decrease water demand across intensive cotton production areas.

6.5.3 Floodplain Harvesting

The draft Regional Water Strategies identify that floodplain harvesting makes up 13% of water use in the Macquarie-Castlereagh region and 30% of water use in the Gwydir region.

The current process for licencing and regulating floodplain harvesting in the NSW Northern Basin has failed to assess the cumulative impact of this extraction on downstream river health, groundwater recharge and water security of downstream communities.

This is a critical piece of work that must be undertaken to have a full understanding of the impacts prior to the granting of new, compensable, private property rights.

Contact

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² <https://stopevaporation.com/> , <https://www.awtti.com/>

Appendix 1 – Current condition maps

1. Lachlan region

Environmental values:

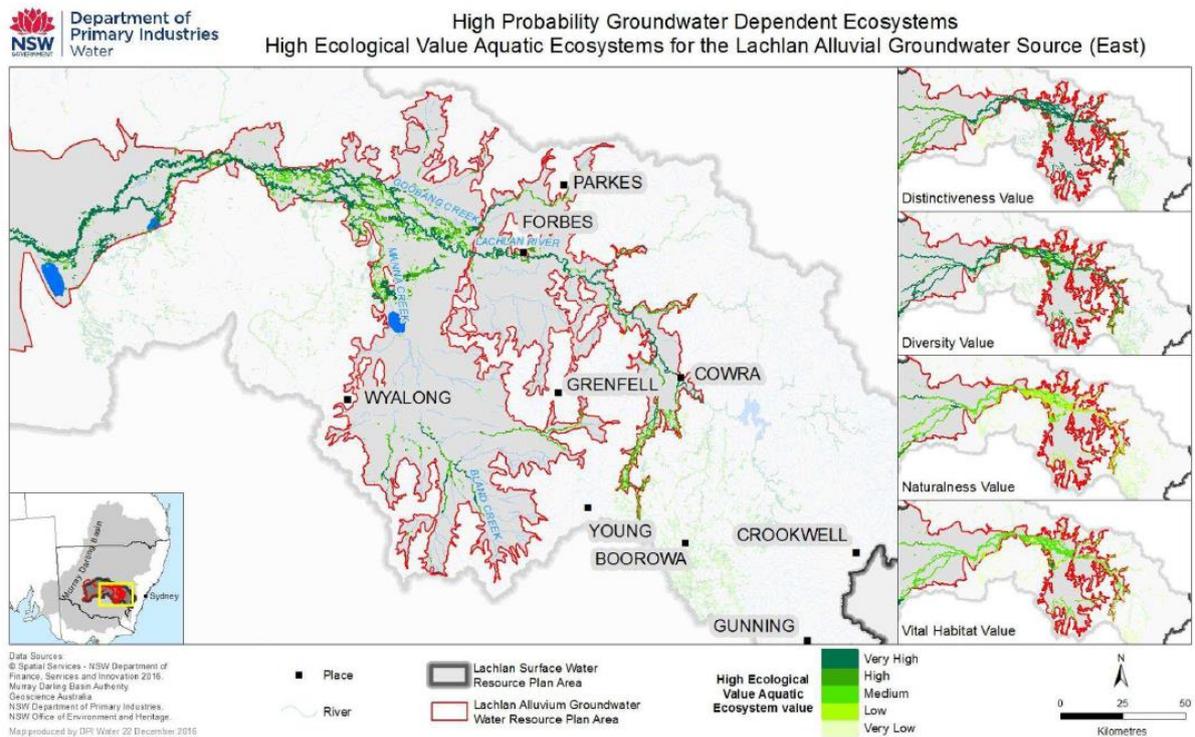
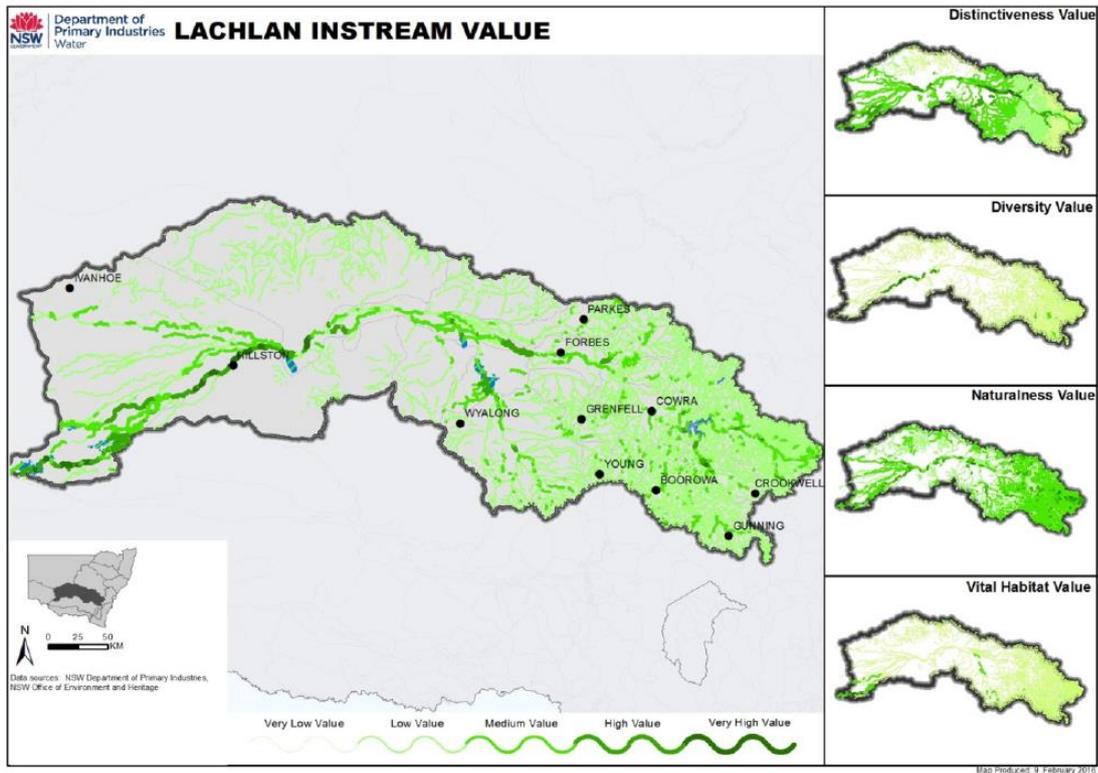


Figure 14: GDE ecological value for the Upper Lachlan Alluvial Groundwater Source.

High Probability Groundwater Dependent Ecosystems
 High Ecological Value Aquatic Ecosystems for the Lachlan Alluvial Groundwater Source (West)

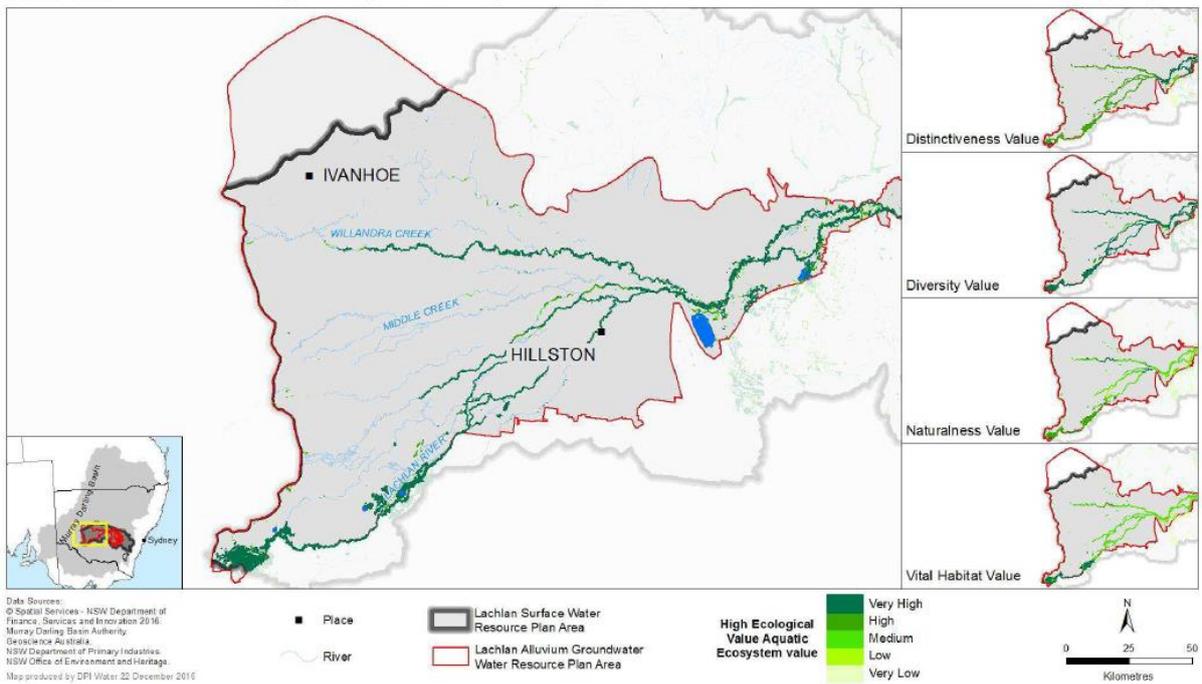


Figure 15: GDE ecological value for the Lower Lachlan Alluvial Groundwater Source.

Status of productive groundwater sources

UPPER LACHLAN ALLUVIUM

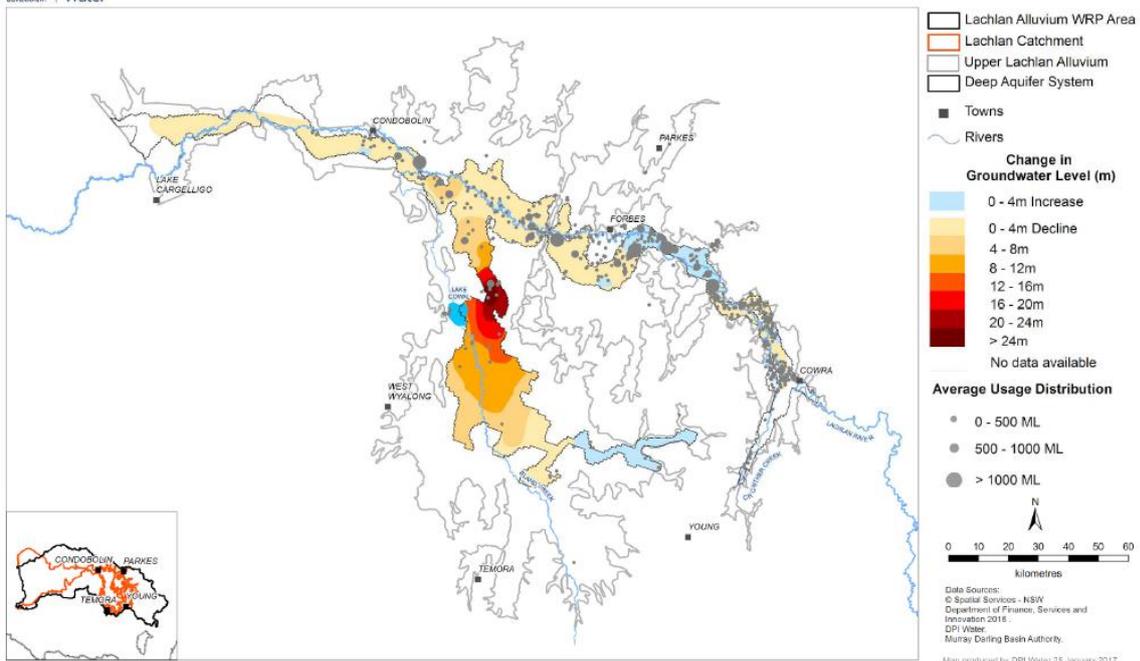


Figure 11: The change in groundwater levels during the non-pumping periods in the deep aquifer system of the Upper Lachlan from 2005-2006 compared to those of the 2015-2016 water years.

LOWER LACHLAN ALLUVIUM

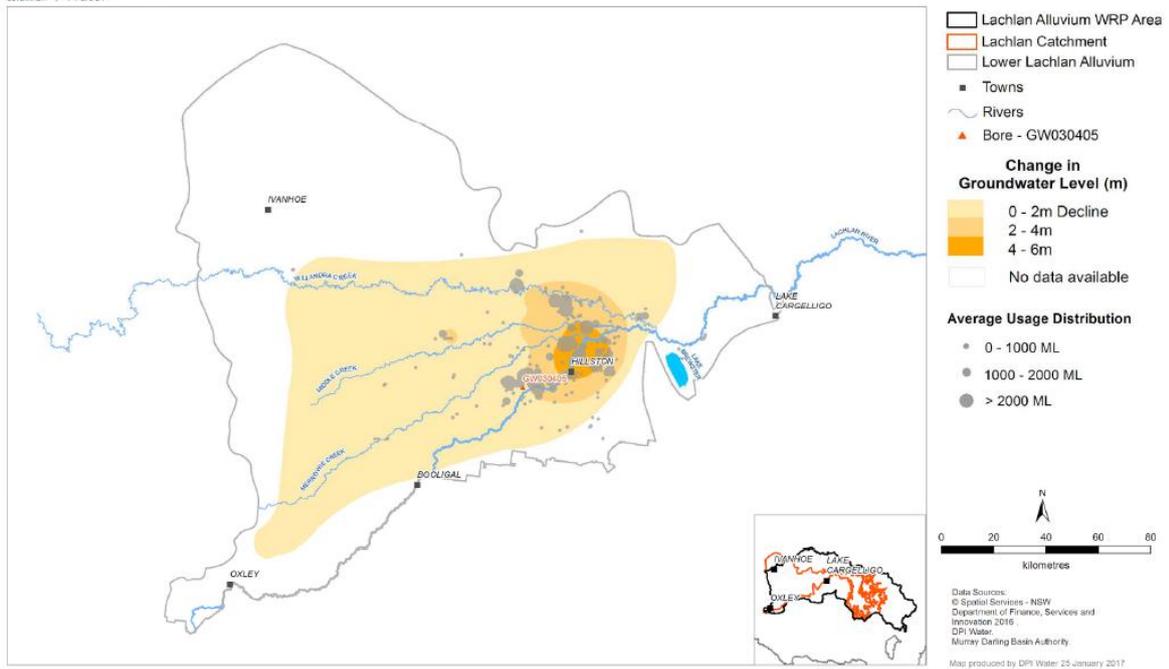
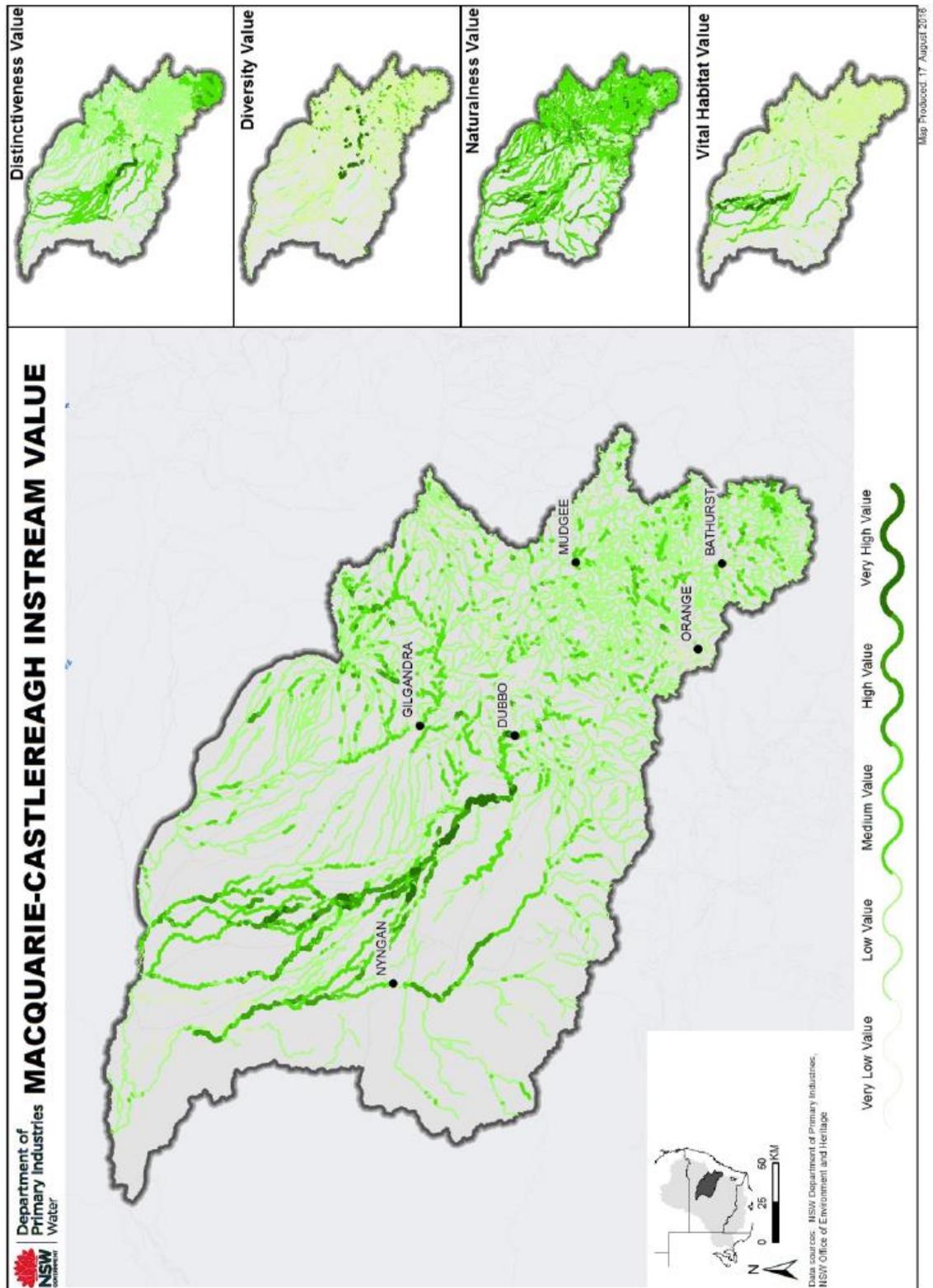


Figure 12: The change in groundwater levels during the non-pumping periods in the deep aquifer system of the Lower Lachlan from 2005-2006 compared to those of the 2015-2016 water year.

Macquarie - Castlereagh region

Environmental Values

Figure 2: Map of HEVAE assessment outcomes for the Macquarie-Castlereagh Water Resource Plan Area:



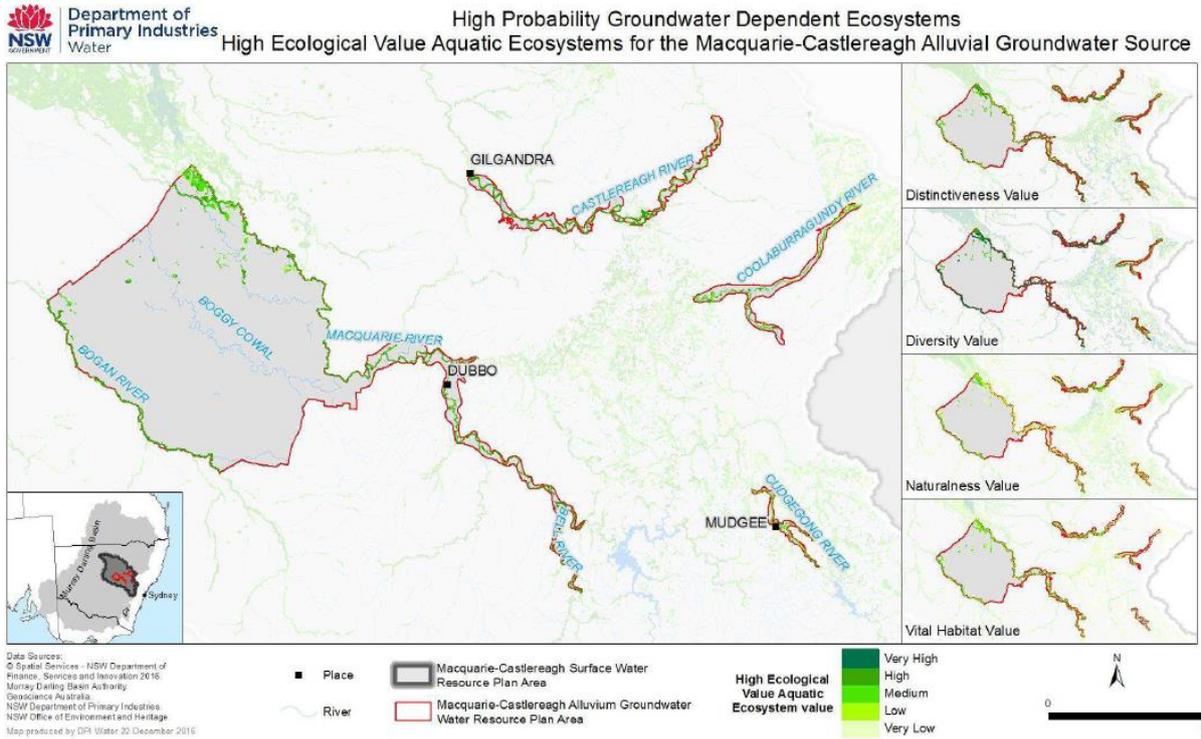


Figure 11: GDE ecological value for the Macquarie-Castlereagh Alluvium Water Resource Plan
Status of productive groundwater sources

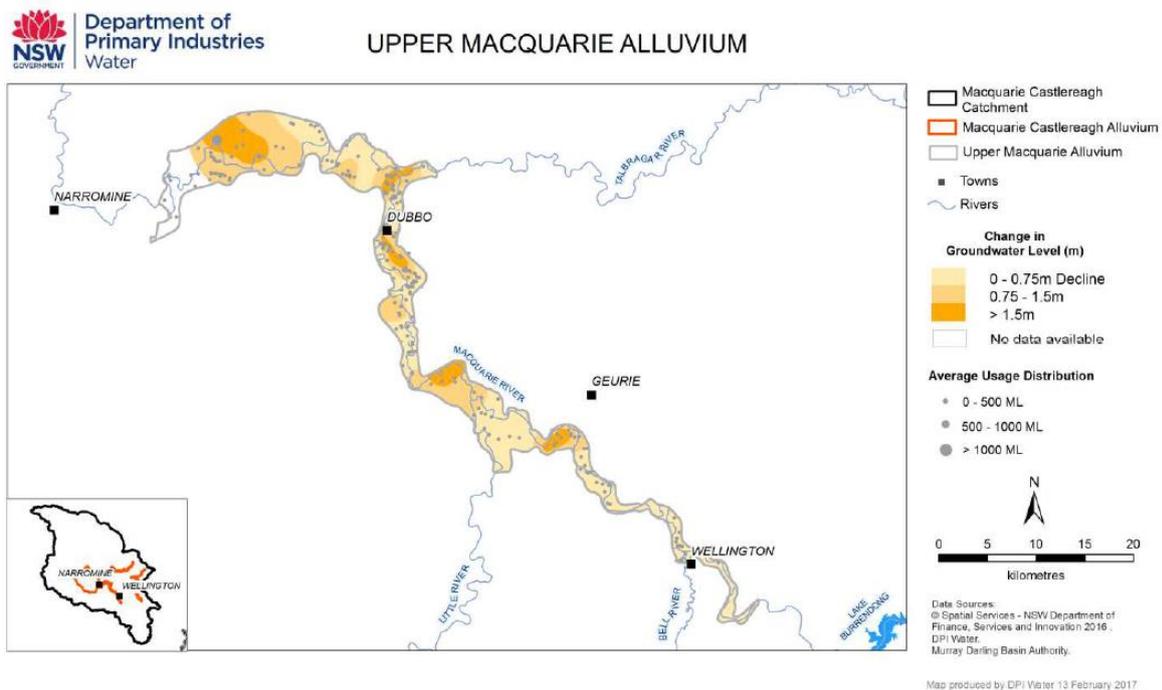


Figure 8: The change in groundwater levels in the Upper Macquarie Alluvium over a 14-year period between 2001 – 2002 to 2015 – 2016.



LOWER MACQUARIE ALLUVIUM

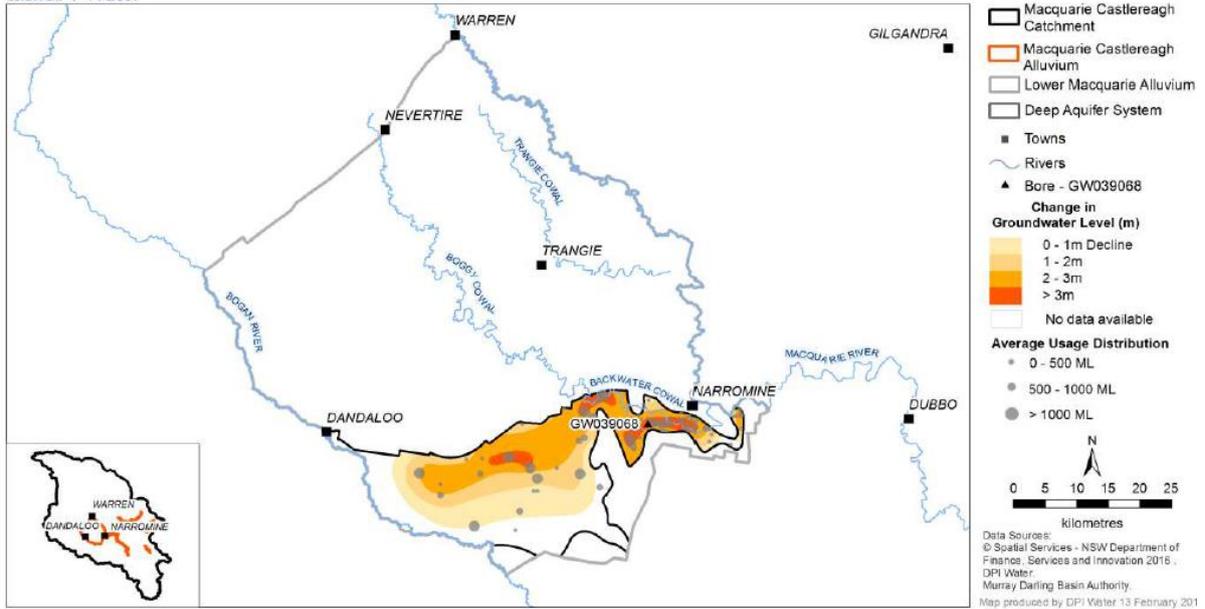
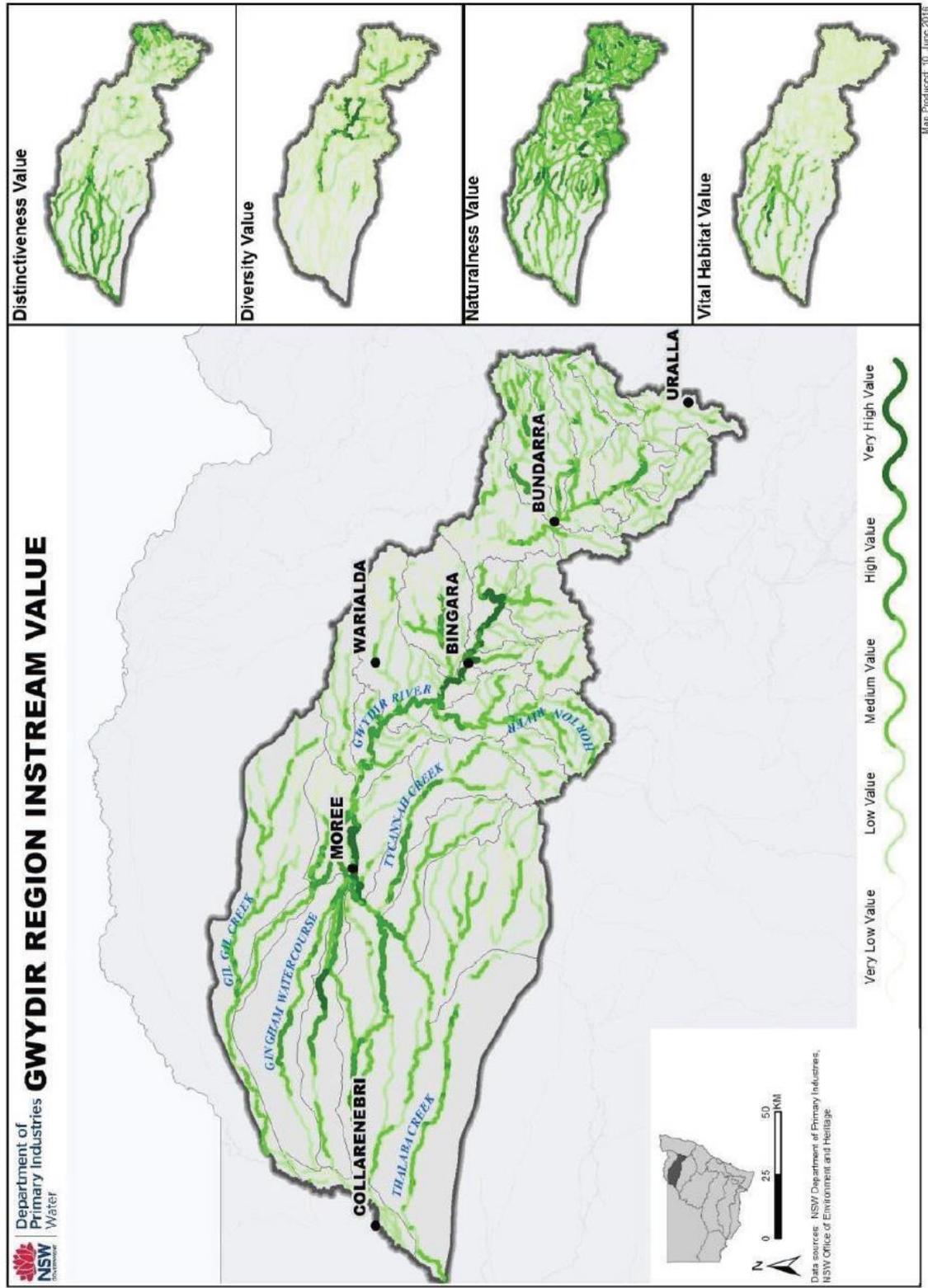


Figure 9: The change in groundwater levels in the deep alluvial aquifer system of the Lower Macquarie over a 10-year period between 2005/2006 and 2015/2016 non-pumping season.

Gwydir region

Environmental values

Figure 2: Map of HEVAE assessment outcomes for the Gwydir Water Resource Plan Area



High Probability Groundwater Dependent Ecosystems
High Ecological Value Aquatic Ecosystems for the Lower Gwydir Groundwater Source

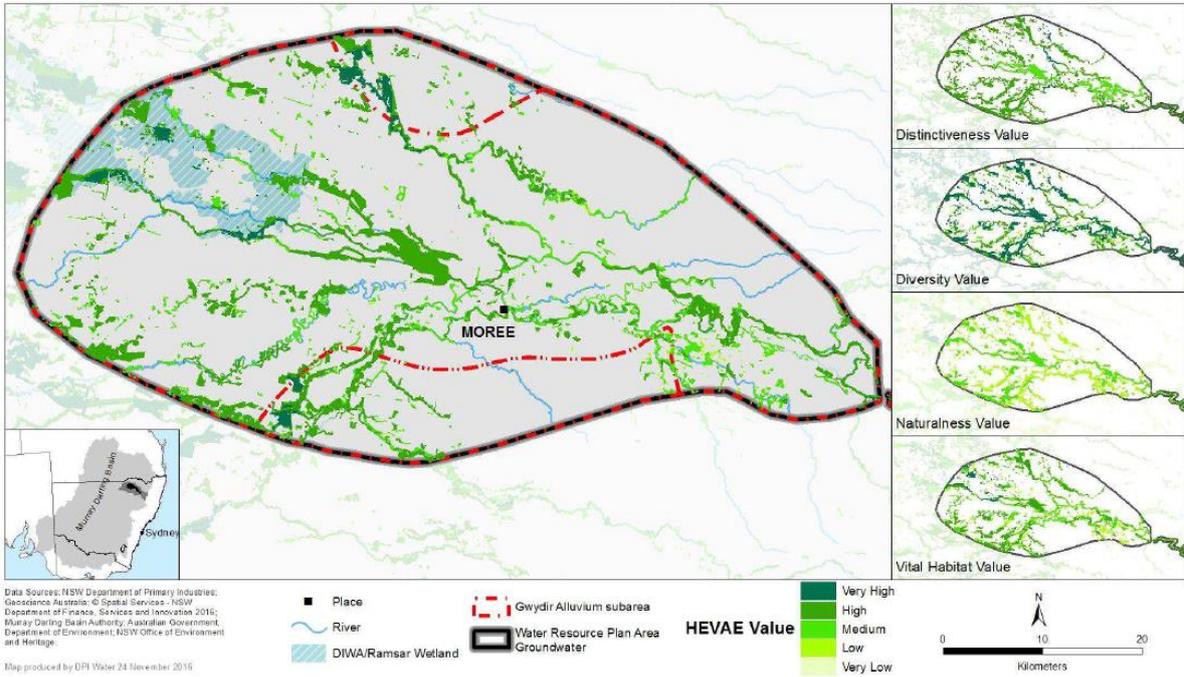


Figure 10: GDE ecological value for the Lower Gwydir Groundwater Source.

Status of productive groundwater sources

LOWER GWYDIR ALLUVIUM

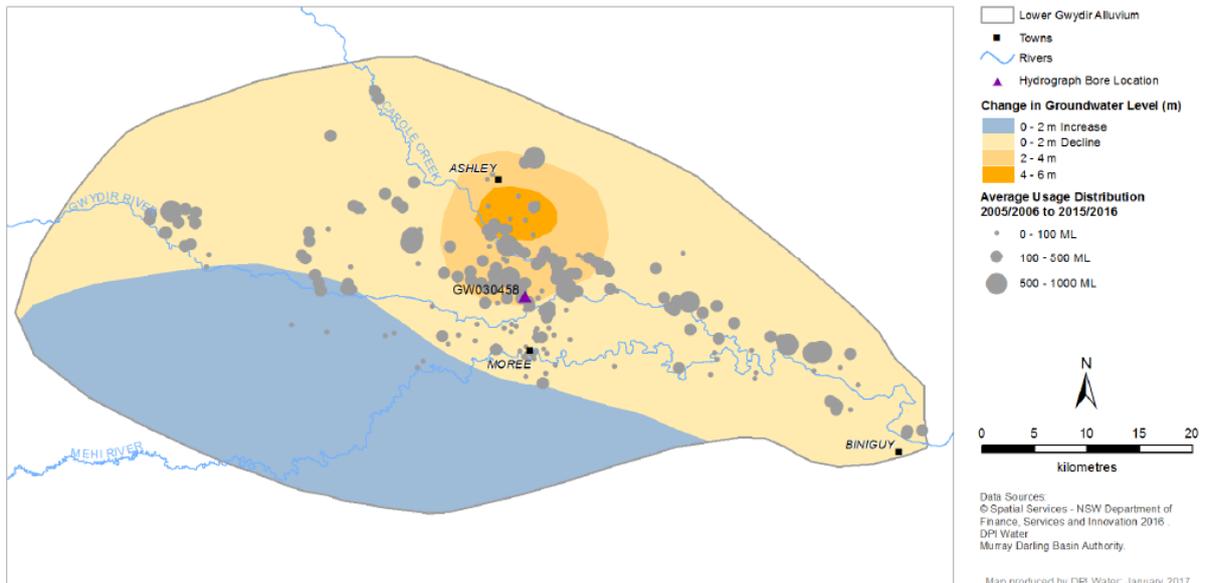


Figure 6: Lower Gwydir Alluvium map showing the change in groundwater levels in the deep aquifer system from; non-pumping period 2005/2006 water year compared to the groundwater levels during the non-pumping period of 2015/2016 water year.