THE BASIN PLAN IMPLEMENTATION

Lachlan Alluvium Water Resource Plan

GW10 Water Resource Plan area

NSW Department of Planning and Environment | dpe.nsw.gov.au

dpie.nsw.gov.au

Title: Lachlan Alluvium Water Resource Plan

Subtitle: GW10 Water Resource Plan area

First published: April 2019

Updated: August 2022

Department reference number: INT21/149584

Acknowledgements

Department of Planning and Environment would like to thank NSW Department of Planning and Environment - Environment and Heritage Group, NSW Department of Primary Industries—Agriculture, Local Land Services, Water NSW, which have provided input into this water resource plan.

Department of Planning and Environment would like to thank representatives of the Murray Darling Basin Authority, NSW Irrigators Council, NSW Nature Conservation Council, Murray Lower Darling Rivers Indigenous Nations (MLDRIN), Northern Basin Aboriginal Nations (NBAN), Inland Rivers Network, NSW Minerals Council, Local Government NSW representatives and other members of the Groundwater Stakeholder Advisory Panel who have all provided input into this water resource plan.

Department of Planning and Environment would like to thank Nathan Peckham who provided the artwork in this water resource plan.

Acknowledgement of Traditional Owners

NSW acknowledges Aboriginal people as Australia's First Peoples practicing the oldest living culture on earth and as the Traditional Owners and Custodians of the lands and waters.

We acknowledge that the people of the Barkandji and Maljangapa, Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations hold a significant connection to the lands in which the Lachlan Alluvium exists.

The Lachlan Alluvium is of spiritual, cultural and economic importance to the first nation people, and NSW recognises the connection of the people of these nations to water.

We recognise the intrinsic connection of Traditional Owners to country and acknowledge their contribution to the management of the Lachlan Alluvium landscape and natural resources.

Department of Planning and Environment understands the need for consultation and inclusion of Traditional Owner knowledge, values and uses in water planning to ensure we are working towards equality in objectives and outcomes.

Department of Planning and Environment is committed to continue future relationships and building strong partnerships with our First Nation People.

We thank the Elders, representatives of the Barkandji and Maljangapa, Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations and Aboriginal community who provided their knowledge throughout the planning process.

Artist's Acknowledgement

As a proud Tubba-gah man from Dubbo in the Wiradjuri Nation, I respectfully acknowledge all nations which the NSW DPIE operates on. I acknowledge this artwork will be viewed off my home country of the Tubba-gah people and therefore ask you accept this artwork as an offering on behalf of my family as a gesture of continuing the legacy of the knowledge of our ancestors.

I would also like to pay respect to all traditional custodians of the country whose ancestral lands we all walk upon. I thank the Elders for their wisdom, courage, and sacrifice and pledge my commitment to preserving their legacy for future generations.

- Nathan Peckham

Glossary

Abbreviation	Description
AAT	Annual Actual Take
ANZECC	Australian and New Zealand Guidelines for Fresh and Marine Waters
APT	Annual Permitted Take
AWD	Available Water Determination
CEWH	Commonwealth Environmental Water Holder
Cth	Commonwealth
DIWA	Directory of Important Wetlands in Australia
DWMS	Drinking water management system
EMPLAN	NSW State Emergency Management Plan
GDE	Groundwater Dependent Ecosystem
HEVAE	High Ecological Value Aquatic Ecosystem
HEW	Held Environmental Water
IAP2	International Association of Public Participation
LTAAEL	Long-Term Annual Average Extraction Limit
LTWP	Long-Term Water Plans
MDBA	Murray–Darling Basin Authority
MER	Monitoring, Evaluation and Reporting Plan
PEW	Planned Environmental Water
QAL	A qualitatively assessed risk outcome
Ramsar	Ramsar convention on Wetlands of International importance
SAP	Stakeholder Advisory Panel
SDL	Long-Term Average Sustainable Diversion Limit
SEED	NSW Sharing and Enabling Environmental Data (Portal)
WMA 2000	*Water Management Act 2000*
WQMP	Water Quality Management Plan
WRP	Water Resource Plan
WRPA	Water Resource Plan Area
WSP	Water Sharing Plan

Contents

Schedules

Appendices

Boxes

Figures

Tables

How to read this document

This document is set out with the following structure and form:

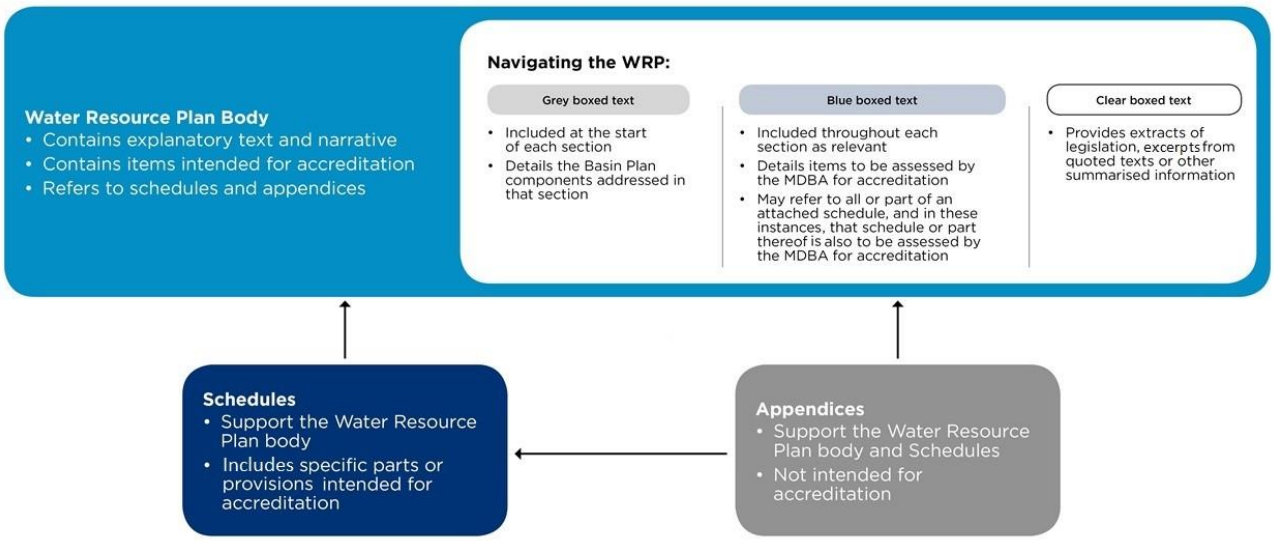


Diagram 12. Water resource plan structure

Water resource plan body:

This water resource plan (WRP) has eight sections:

- Introduction
- Identification of WRP area and other matters
- Risks to water sources
- Environmental water, cultural flows and sustainable management
- Take for consumptive use
- Water quality management
- Measuring and monitoring
- Information used to prepare the WRP.

Grey boxed text for Basin Plan components

Grey boxed text is included at the start of each section and details the Basin Plan components addressed in that section.

Blue boxed text for MDBA accreditation

Blue boxed text in each section is provided for accreditation by the MDBA. This text may refer to all or part of an attached schedule, and in these instances, that schedule or part thereof is also to be assessed by the MDBA for accreditation.

Clear boxed text for extracts

Clear boxed text provides extracts of legislation, excerpts from quoted texts or other summarised information.

Schedules:

- contain information that supports the WRP body
- parts of schedules directly referenced in blue boxed text within the WRP body are intended for accreditation.

Appendices:

- contain information that supports the WRP body
- are not intended for accreditation.

Section 1.5 provides further explanation.

1. Introduction

This section includes the following components of the Basin Plan

- 10.04 Form of water resource plan
- 10.06 Responsible persons
- 10.07, 10.26(2)(b), and 10.53 Consultation
- 10.52 Objectives and outcomes based on Indigenous values and uses
- 10.47 and 10.48 Review and amendment

1.1. Purpose

The purpose of the Lachlan Alluvium Water Resource Plan (this Plan or Lachlan Alluvium WRP) is to set out how NSW will meet its obligations under the Murray–Darling Basin Plan 2012 (Basin Plan) in the Lachlan Alluvium Water Resource Plan Area (Lachlan Alluvium WRPA or this WRPA).

This Plan addresses the requirements of Chapter 10 of the Basin Plan. A WRP must comply with Chapter 10 requirements for accreditation under Division 2 of Part 2 of the *Water Act 2007* (Cth).

1.2. Status and scope

This Plan operates in accordance with Part 2 Division 2 of the *Water Act 2007* (Cth) and the Basin Plan.

This Plan applies to all groundwater in the following groundwater Sustainable Diversion Limit resource units (SDL resource units) within the Lachlan Alluvium WRPA:

- Lower Lachlan Alluvium (GS25)
- Upper Lachlan Alluvium (GS44)
- Belubula Alluvium (GS12).

This Plan meets the NSW Government's Basin Plan water resource planning obligations shown in Table 1-1.

Table 1-1. Chapter 10 Basin Plan obligations for the Lachlan Alluvium WRPA.

Ch.10 Basin Plan Part	Matters addressed
2	Identification of the Lachlan Alluvium WRPA and other matters
3	Incorporation and application of the long-term annual diversion limits for the SDL resource units in the Lachlan Alluvium WRPA
4	Sustainable use and management of water resources of the Lachlan Alluvium WRPA within the long-term annual diversion limits
5	Management of interception activities with a significant impact on water resources of the Lachlan Alluvium WRPA
6	Planning for environmental watering
7	Water quality objectives for the Lachlan Alluvium WRPA
8	Circumstances in which tradeable water rights in the Lachlan Alluvium WRPA may be traded, and any applicable conditions

9	Broad approaches to the way risks to the water resources of the Lachlan Alluvium WRPA should be addressed
10	Measuring and monitoring of the water take and the water resources of the Lachlan Alluvium WRPA
11	Reviews of this Lachlan Alluvium WRP and amendments of this Lachlan Alluvium WRP arising from those reviews
12	Scientific information and models on which this Plan is based
13	Planning for extreme events
14	Indigenous values and uses in the Lachlan Alluvium WRPA

1.3. Objectives and guiding principles

This Plan recognises the objectives in Chapter 5 of the Basin Plan. The Basin Plan outcomes and objectives are refined for the Lachlan Alluvium WRPA through:

- the objectives in Part 2 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*
- the objectives of the Lachlan Alluvium Water Quality Management Plan, (Schedule F to this Plan).

NSW Water Sharing Plans (WSPs) are regulatory instruments under the NSW *Water Management Act 2000* (WMA 2000), and specific provisions in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* are fundamental components of this Plan. The objectives in Part 2 of the WSP are guided by the following under the WMA 2000:

- Section 3, Objects and section 5, Water Management Principles
- Part 3, Requirements of management plans
- The access licence dealing principles established in accordance with section 71Z of the WMA 2000.

Additionally, this Plan has regard to the objective identified in section 1.2 of the 2017 *Intergovernmental Agreement on Implementing Water Reform in the Murray Darling Basin* (https://federation.gov.au/about/agreements/intergovernmental-agreement-implementing-water-reform-murray-darling-basin).

The objectives and outcomes for the Basin as a whole, as specified in the Basin Plan, are shown in Box 1-1.

Overarching objectives

- to give effect to relevant international agreements through the integrated management of Basin water resources; and
- to establish a sustainable and long-term adaptive management framework for the Basin water resources, that takes into account the broader management of natural resources in the Murray-Darling Basin; and
- to optimise social, economic and environmental outcomes arising from the use of Basin water resources in the national interest; and
- to improve water security for all uses of Basin water resources.

Outcomes

- communities with sufficient and reliable water supplies that are fit for a range of intended purposes, including domestic, recreational and cultural use; and
- productive and resilient water-dependent industries, and communities with confidence in their long-term future; and
- healthy and resilient ecosystems with rivers and creeks regularly connected to their floodplains and, ultimately, the ocean.

Box 1-1. Basin Plan objectives and outcomes guiding this WRP.

1.3.1. Objectives and outcomes based on Aboriginal values and uses

The Lachlan Alluvium WRPA is located within the lands of, and significant to, the Barkandji and Maljangapa, Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations and Traditional Owners.

Chapter 10 requires that objectives and outcomes of Aboriginal people relating to the management and use of water resources in a WRPA are identified and have regard to Aboriginal peoples' values and uses of the water resources. This information is to be "determined through consultation with relevant Indigenous organisations".

The consultation process undertaken with First Nations in developing this Plan was informed by the MDBA guidelines for meeting Basin Plan (Chapter 10) requirements in relation to Aboriginal peoples' objectives and outcomes for managing water resources. The consultation process is further explained in section 1.7.1 of this WRP, in section 2.3 of Schedule C to this Plan (Consultation Report), and in each of the Nations reports in Attachments A to D of Schedule C.

Nations where consultation reports are not complete include:

- Barkandji/Maljangapa
  - NSW engaged with the Barkandji and Maljangapa Traditional Owners through the Barkandji Native Title Group Aboriginal Corporation, who advised that Barkandji and Maljangapa Traditional Owners should be consulted together.
  - Further information on the Barkandji and Maljangapa Nations consultation process to date can be found in section 2.3 of Schedule C to this Plan.
  - NSW will continue to seek further opportunities to consult with the Barkandji and Maljangapa Nations.
  - Subject to the Nations' agreement, the department will incorporate the Nations' objectives and outcomes for the management and use of water resources of the WRPA based on their values and uses into the WRP at a later date. NSW will provide a progress report on this work to the MDBA within two years of accreditation of this WRP.

Aboriginal peoples' values and uses of the water resources of the WRPA identified through this consultative process for the Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations can be seen in the following parts of the attachments to Schedule C of this Plan:

- Table 3 of Attachment A
- Tables 15 to 17 of Attachment B
- Table 5-1 of Attachment C
- Section 6.1 of Attachment D

Aboriginal peoples' objectives and outcomes for the management of the water resources of the WRPA can also be seen in these reports at the following sections in the attachments to Schedule C of this Plan:

- Table 5 of Attachment A
- Tables 19 to 23 of Attachment B
- Table 5-3 of Attachment C
- Section 8.1 and section 8.2 of Attachment D

The following are extracts from the Nation reports that summarise the deep cultural connections and values and uses that the Nations place on the water resources of the WRPA.

Nari Nari

Nari Nari people are deeply connected to their country. Not only is this considered to be important for a healthy environment, but a deep attachment to the land, water and wildlife of Nari Nari country is the bedrock of the Nari Nari Nation and caring for this is the essence of being Nari Nari. The Nari Nari word for water is "*gayini*." Gayini is central to Nari Nari life. When gayini was abundant, that meant that the Nari Nari people would thrive. Lots of gayini meant plentiful food resources and a rich and strong culture. Cultural and spiritual activities of the Nari Nari people corresponded with the seasons and water. Nari Nari land nourishes the Nari Nari people. A healthy landscape makes for healthy people, and in Nari Nari country, the health of the landscape is inextricably linked to gayini (water).

Ngiyampaa

The Ngiyampaa people have a strong historical connection to the water "*growing up on the river … it was our life.*" The Ngiyampaa people have always relied on springs, rain filled lakes, billabongs, swamps and lagoons fed by creeks for survival, and for them a healthy system brings life. The Ngiyampaa traditional owners have seen the biodiversity of their country diminish over time and are noticing less fish, yabbies, ducks and turtles. These changes are intimately connected to the declining health of the water system. "*Wildlife are suffering because they are locked out of the waterways*." "*We need our native fish to come back*." The Ngiyampaa people are also struggling to keep their culture alive in the face of environmental degradation, of their creeks and water systems and they are concerned on impacts to their children's identity. "*Teaching kids used to happen. I haven't seen it for a long time: transferring the knowledge to kids."* The Ngiyampaa people would like to see the revival of their waterways to ensure the survival of their culture. These objectives are being partly met by a project with state Environmental Water bodies at Booberoi Creek, near Murrin Bridge. The Ngiyampaa are seeing real, measurable outcomes there, as the creek comes back to life. However, environmental water is being used to supplement a real need for cultural flows. They would like a water allocation specifically for their Nation and its cultural needs. Their survival is, as it always has been, dependent on it.

Wiradjuri

From the consultation with Wiradjuri people, it is clear that above all else, water is sacred and considered a vital life source. Traditionally, Wiradjuri people would use water for cultural, spiritual, environmental, social and economic practices, many of which are still being used today and hold great value to the people, water and land. These uses and values have however, been challenged and are at risk due to modern land uses, water management and planning and government practices

Yita Yita

Water is connected to all aspects of Yita Yita people's lives, physically, culturally, and spiritually. It is the actual presence of a body of water that is crucial, as the body of water and the animal and plant life it contains connects to the land and the land connects to the animals and people it supports. Water for connectivity denotes well-being, in the physical, spiritual and cultural sense.

An example of the links between current water management initiatives and Aboriginal cultural values and uses, risks, objectives and outcomes for a spring are illustrated in Figure 1-1. '*This is a depiction of a spring water hole (Wiradjuri – giimbir). The bottom half of the design depicts the underground connection to the giimbir through the layers of rock beneath. The pattern in the sky represents the connections of waterways, both visible and unseen*.'[1]

Figure 1-1. Aboriginal peoples' values, uses, risks, objectives and outcomes as considered in groundwater resource management *(artist Nathan Peckham, 2021)*

[1] Nathan Peckham, *Artists' statement (2021)*

The objectives and outcomes as stated by the Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations are a foundational piece for further developing processes and mechanisms for considering Aboriginal peoples' objectives and outcomes for water resource management. Table 3 of Schedule C summarises the alignment of First Nations' objectives provided in Attachments to Schedule C with the objectives in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*.

Across the state, consultation has identified areas for further development in pursuit of Aboriginal objectives and outcomes in water management, including Cultural Heritage, Native Title and cultural flows. The NSW Government has taken several initiatives in this regard, with the most important of these being the development and implementation of the 2021 NSW Water Strategy[2] and the upcoming Lachlan Regional Water Strategy[3].

NSW has been working with other jurisdictions to finalise the new inland waters target under the National Agreement on 'Closing the Gap'. The objective of the target is consistent with the NSW Government 's commitment in the NSW Water Strategy to increase Aboriginal ownership of and access to water. NSW will work in partnership with Aboriginal communities to design and implement actions to meet the target.

Priority 2 of the NSW State Water Strategy is to recognise First Nations/Aboriginal People's rights and values and increase access to and ownership of water for cultural and economic purposes. The strategy goes on to identify actions to achieve this priority including:

- strengthening the role of First Nations/Aboriginal people in water planning and management
- developing a state-wide Aboriginal water strategy
- providing Aboriginal ownership of, and access to, water for cultural and economic purposes
- working with First Nations/Aboriginal people to improve shared water knowledge, and
- working with First Nations/Aboriginal People to maintain and preserve water-related cultural sites and landscapes.

There will be opportunity to further consider First Nations perspectives in groundwater management as the NSW Water Strategy moves to the implementation phase.

There are links between existing water management initiatives and the values and uses, risks, objectives and outcomes identified by Aboriginal people. For example, for springs and waterholes which may be groundwater-dependent, the:

- *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* contains an environmental objective "to protect the extent and condition of high priority groundwater-dependent ecosystems" along with strategies and performance indicators to achieve this.
- Risk Assessment for the Lachlan Alluvium Water Resource Plan Area considers risks to the environment including groundwater-dependent ecosystems and instream ecological values for connected surface water systems.
- Groundwater Monitoring, Evaluation and Reporting Plan describes monitoring of groundwater levels at approximately 250 sites in the Lachlan Alluvium Water Resource Plan area. This data informs the evaluation and reporting cycle.
- NSW Long Term Water Plans contain an ecosystem function objective for Groundwater-dependent biota that includes recharge to groundwater.

[2] https://dpie.nsw.gov.au/water/plans-and-programs/nsw-water-strategy
[3] Lachlan Regional Water Strategy - Water in New South Wales (nsw.gov.au)

For the purpose of section 10.52 of the Basin Plan:

- Aboriginal social, spiritual and cultural objectives, values, and uses were discussed during consultation with First Nations.
- Aboriginal values and uses were identified during consultation with First Nations people and are outlined in the attachments to Schedule C as follows:
    - Table 3 of Attachment A for the Nari Nari Nation,
    - Tables 15 to 17 of Attachment B for the Ngiyampaa Nation,
    - Table 5-1 of Attachment C for the Wiradjuri Nation,
    - Section 6.1 of Attachment D for the Yita Yita Nation.
- The Aboriginal values and uses in the attachments to Schedule C were developed into desired objectives and outcomes for water management, and are included in the attachments to Schedule C as follows:
    - Table 5 of Attachment A for the Nari Nari Nation,
    - Tables 19 to 23 of Attachment B for the Ngiyampaa Nation,
    - Table 5-3 of Attachment C for the Wiradjuri Nation,
    - Section 8.1 and 8.2 of Attachment D for the Yita Yita Nation.
- The consultation process undertaken to determine social, spiritual and cultural values and uses of Aboriginal people is outlined in section 2.3 of Schedule C and in sections 4 of Attachments A, B, and D for the Nari Nari, Ngiyampaa and Yita Yita Nations, and section 3 of Attachment C for the Wiradjuri Nation.
- The alignment of objectives and outcomes identified by the Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations with objectives and outcomes in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) is summarised in Table 3 of Schedule C.
- Each matter in section 10.52 of the Basin Plan was considered having regard to a range of Aboriginal organisations including the Northern Basin Aboriginal Nations (NBAN) and the Murray Lower Darling Rivers Indigenous Nations (MLDRIN). For example, NSW had regard to advice from NBAN about the engagement process with First Nations to ensure that the consultation was culturally appropriate and relevant to water resource planning.
- NSW is working to strengthen the protection of Aboriginal values and uses in accordance with the objectives and outcomes through the development and implementation of the NSW Water Strategy and the development of the associated Aboriginal Water Strategy, and through the draft Lachlan Regional Water Strategy.
- Regard to Aboriginal values and uses, including the risks to these, is demonstrated through consultation with Aboriginal people. This information is used to identify objectives and outcomes listed in each of the attachments to Schedule C. These objectives and outcomes will be considered in future updates to the provisions in Part 2 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) relevant to Aboriginal people in relation to water management in the Lachlan Alluvium WRPA.
- Protection of Indigenous values and uses has been strengthened through the consultation process and adoption of a definition and protocols for First Nations Cultural Knowledge. There is currently no specific legal protection for cultural knowledge under Australian law. Participants entered into agreements during the consultation process, allowing them to exercise control over the disclosure and use of cultural knowledge. A statement has been included in each Nation report which allows copyright in each report

to be managed, while giving Traditional Owners rights to control the use of the material within the report and establishing protocols for third party requests to use any information from the report. Further opportunities to strengthen protection of Indigenous values and uses may be identified through ongoing consultation. The effectiveness of these opportunities for Aboriginal people will be identified through future monitoring and evaluation in line with plan objectives and outcomes.

- NSW is working to strengthen the engagement and input from First Nations into water resource planning and water sharing plans.
- As groundwater water sharing plans are replaced, consultation with Aboriginal communities in the Lachlan Alluvium WRPA will provide an opportunity to improve recognition of social, spiritual and cultural values in water management.
- NSW will continue to seek further opportunities to consult with the Barkandji and Maljangapa Nation. Subject to the Nations' agreement, the department will incorporate the Nations' objectives and outcomes for the management and use of water resources of the WRPA based on their values and uses into this WRP at a later date. NSW will provide a progress report on this to the MDBA within two years of accreditation of this WRP.

1.4. Relationship between this Plan and other instruments

NSW will meet its water resource plan obligations under Chapter 10 of the Basin Plan largely through its existing water management framework. The Chapter 10 requirements, outlined in section 1.2, deal with water sharing and water quality management. Water sharing in this context is viewed broadly, and includes:

- sharing between the environment, other instream uses or values and
- extractive water use
- managing access to groundwater resources to achieve the agreed objectives.

Water resource management in NSW is complex. The primary legislation regulating water management in NSW is the *Water Management Act 2000* (WMA 2000). A conceptual view of the relationship between the existing water management framework in NSW, this Plan and the Commonwealth water management framework is shown in Figure 1-2.

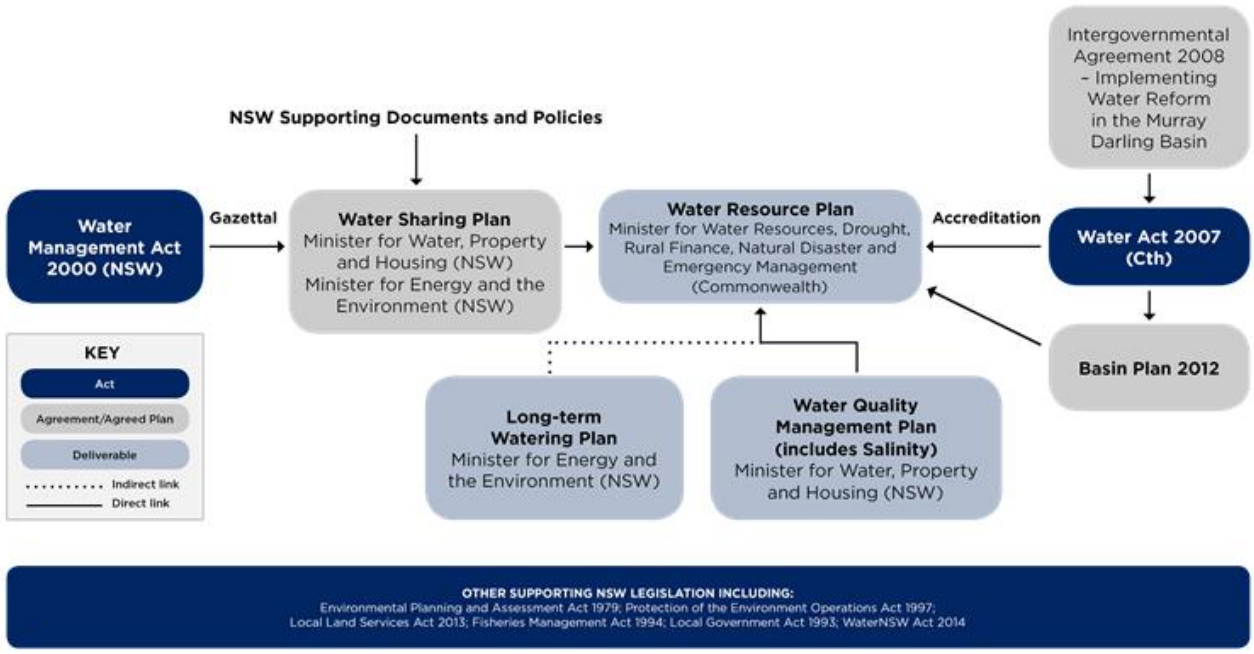


Figure 1-2. Relationship between the Basin Plan, WRP and other instruments.

NSW has amended WSPs where necessary to meet the relevant Basin Plan requirements. For the Lachlan Alluvium WRPA, the relevant WSP that operates under the provisions of the WMA 2000 as a 'stand-alone' statutory plan, as well as contributing to the Lachlan Alluvium WRP, is the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* at Schedule A. This WSP has replaced the provisions in the *Water Sharing Plan for the Lower Lachlan Groundwater Source 2003*, and the provisions in the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012* as it related to the Belubula and Upper Lachlan alluvial groundwater sources.

Where this Lachlan Alluvium WRP specifies a provision of a statutory WSP, that provision is 'incorporated' into this Plan, and operates to make that provision of the NSW statutory WSP a part of the Lachlan Alluvium WRP. Section 48 of the WMA 2000 requires the Minister for Water, when exercising functions under the WMA 2000, to take all reasonable steps to give effect to the provisions of a WSP and, in particular, to ensure that any environmental water rules established by the WSP are observed.

This WRP references provisions in the WMA 2000 that enable implementation of the specific WSP provisions. Examples include the water access licensing and enforcement provisions of the WMA 2000, and orders made under section 324 of the Act.

Many stakeholders have a broad range of water quantity and quality obligations and provide a range of products and services relevant to the development and implementation of this Plan. Table 1-2 shows the key stakeholders, their links to water resource management processes, and the primary instruments governing their responsibility. In addition, NSW has adopted key national guidelines including, of relevance for this Plan, the Australian Drinking Water Guidelines and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC Guidelines).

Table 1-2. Key water resource management stakeholders and responsibilities within NSW.

Stakeholder	Links to water resource management/WRP	Primary instruments[4]
Minister responsible for Water Water Group of Department of Planning and Environment	Responsible for the development, amendment and implementation of water sharing plans. Responsible for water allocation and access. Responsible for development and implementation of WRPs. Advice on key operational aspects of drinking water supply and review/approval of section 60 (*Local Government Act 1993*) applications including ability of a process train to treat water from a particular raw water source.	*Water Management Act 2000* See also Figure 1-2. *Local Government Act 1993*
Murray–Darling Basin Authority	Basin Plan implementation. Responsible for assessing whether WRPs are consistent with the Basin Plan and advising the Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management if they should be accredited. Supporting Basin Plan compliance and enforcement.	*Water Act 2007 (Cth)* *Basin Plan 2012 (Cth)*
Minister responsible for the Environment Environment and Heritage Group of Department of Planning and Environment	Responsible for protecting NSW's environment and heritage, which includes the natural environment, Aboriginal country, culture and heritage, and built heritage. Concurrence role for making or amending water sharing plans. Holder and manager of environmental water licence. Responsible for convening and managing local environmental water advisory groups in relevant valleys. Responsible for developing and administering the long-term water plans under the Basin Plan.	*Protection of the Environment Operations Act 1997* *National Parks and Wildlife Act 1974*
WaterNSW	State-owned corporation, bulk water supplier, river operator and responsible for service provision to the Water Group of the Department of Planning and Environment including hydrometric and in-stream water quality monitoring. Licensing of water take under access licences. Measurement of water take under access licences. Responsible for catchment management in declared catchments.	*Water NSW Act 2014* Operating agreement between Department of Planning and Environment and WaterNSW (13 September 2016)
Natural Resource Access Regulator (NRAR)	Responsible for compliance with and enforcement of the regulatory framework for water in NSW including water management rules, and licence and approval conditions.	*Water Management Act 2000* *Natural Resources Access Regulator Act 2017*

[4] All Acts are Acts of NSW unless otherwise stated. A reference to an Act implies a reference to its accompanying regulation/s. This table is intended to be illustrative for the purposes of the WRP, not comprehensive.

Stakeholder	Links to water resource management/WRP	Primary instruments[4]
Environment Protection Authority	The primary environmental regulator for NSW. Responsibilities for responding to pollution incidents and emergencies and enforcing environmental regulation (both of which may impact on WRP objectives).	*Protection of the Environment Operations Act 1997* *Protection of the Environment Administration Act 1991*
Fire and Rescue NSW and other emergency services including Rural Fire Service, SES and NSW Police	Response to emergencies, control of incidents and emergencies (those happening near a water source have the potential to impact the resource and therefore, objectives of the WRP). Contribution to development and deployment of EMPLAN (relevant to management of extreme events which may impact on the WRP).	*Protection of the Environment Operations Act 1997* Acts relevant to the operation of those emergency services such as the *State Emergency and Rescue Management Act 1989*
Independent Pricing and Regulatory Tribunal (IPART)	Oversight of private and major water utilities in NSW including WaterNSW. Responsibility for annual operating licence audits, noting that licence requirements include various responsibilities relating to catchment and water resource management. Setting of rural and urban water prices.	*Independent Pricing and Regulatory Tribunal Act 1992* *Water Industry Competition Act 2006*
Local government authorities	Local governments implement planning requirements which may impact on land management, which in turn may impact on water quality and quantity and WRP objectives. Carrathool Shire Council, Central Darling Shire Council, Lachlan Shire Council, Hay Shire Council, Cabonne Shire Council, Cowra Shire Council, and Parkes Shire Council are within the Lachlan Alluvium WRPA. May be responsible for development and implementation of Integrated Water Cycle Management Strategy (IWCMS).	*Local Government Act 1993* *Environmental Planning and Assessment Act 1979*

Stakeholder	Links to water resource management/WRP	Primary instruments[4]
Local water utilities (LWUs)	Must hold a WMA 2000 water access licence. Must develop and maintain a DWMS, which involves understanding the water from source to tap (linkage to WRP objectives in terms of critical human water needs and objectives for raw water for drinking purposes). May be a holder of an Environmental Protection Licence. May be responsible for management of dam infrastructure. May be responsible for development and implementation of Integrated Water Cycle Management Strategy (IWCMS). For the Lachlan Alluvium WRPA, the following LWUs hold groundwater licences: Carrathool Shire Council Central Darling Shire Council Lachlan Shire Council Hay Shire Council Cabonne Council Cowra Shire Council Parkes Shire Council Hilltops Council Central Tablelands Water	*Dams Safety Act 2015* *Local Government Act 1993* *Public Health Act 2010* *Water Management Act 2000*
Local Land Services (LLS)	Work with land managers and the community to improve primary production within healthy landscapes, including better management of water, land, soil, vegetation, biodiversity and cultural heritage. Deliver actions through LLS strategic plans and other plans such as for Natural Resource Management. Role in natural disaster planning and management. The Lachlan Alluvium WRPA is in the Central West and Western LLS regions.	*Local Land Services Act 2013*
National Parks and Wildlife Service	NSW National Parks, a part of the Department of Planning and Environment, manages protected areas in NSW including historic sites, places of Aboriginal cultural significance and habitats that protect wildlife. NPWS declares sites of special cultural significance to the Aboriginal people as Aboriginal Places under the *National Parks and Wildlife Act 1974*. NPWS also partners with Aboriginal and broader communities to promote and support the continuation of the Aboriginal peoples' connections and access to their traditional lands and engage in the management of cultural landscapes known as Country.	*National Parks and Wildlife Act 1974*
NSW Health—Water Unit / Local Health Department	Regulator with responsibility for implementation / oversight of the Drinking Water Management System (DWMS). Raw water objectives and fitness for treatment are considered within the DWMS.	*Public Health Act 2010*

1.5. Form of water resource plan and responsible persons

For the purpose of section 10.04 of the Basin Plan:

- This WRP consists of material in a number of documents.
- All text that is boxed and highlighted blue in this document, and any instruments or provisions, text or tables to which such text refers form part of this Plan for accreditation purposes.
- It is not the intent of this WRP to incorporate whole instruments for accreditation purposes. Where whole instruments are cited in blue boxed text without accompanying reference to specific parts or provisions of the instrument, the reference is for information purposes only.
- Where blue boxed text references a section of the WRP, only the blue boxed text in that referenced section is provided for accreditation purposes.
- All text that is not contained in, or referenced by, the blue boxed sections of this document is for explanatory purposes only and does not form part of this Plan for accreditation purposes.
- Where blue boxed text references the LTWP, or a schedule that contains details from the LTWP, this is for explanatory purposes only and the LTWP does not form part of this Plan for accreditation purposes.
- Any reference to the *Access Licence Dealing Principles Order 2004* or section 71Z of the WMA 2000 in this WRP or schedules does not form part of this Plan for accreditation purposes.
- The text for accreditation, and any instruments or provisions, text or tables to which such text refers indicates if it applies only to some of the SDL resource units of the WRPA, and those SDL resource units are shown on the indicative map at Figure 2-1.
- Schedule B (the WRP Index) identifies the parts of this Plan addressing each requirement in Chapter 10 of the Basin Plan.
- With the exception of Schedule C, which is incorporated in its entirety, other Schedules to this Lachlan Alluvium WRP form part of this Plan, but only to the extent that provisions are directly referenced in the blue boxed sections of this document.
- Appendices to this Lachlan Alluvium WRP contain supporting information and additional documentation, and do not form part of this Plan for accreditation.
- The provisions in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that are directly referenced in the WRP and are in force at the time of accreditation, and for 10 years from its date of commencement, must be reviewed prior to the end of the WSP's 10 year term to inform any subsequent replacement plan. For clarity, only those WSP provisions that are directly referenced in this WRP are part of the accredited WRP.
- Subject to the above, any reference to the WMA 2000 or any other statutory instrument is a reference to the version of the instrument in force at the time of formal submission of this WRP for assessment and accreditation under section 63 of the *Water Act 2007 (Commonwealth).*
- No other instruments or texts for accreditation in this WRP are subject to cessation or review.

For the purpose of section 10.06 of the Basin Plan, the WRP Index at Schedule B identifies the person responsible for the matters, including implementation measures associated with each requirement in Chapter 10 of the Basin Plan. Unless otherwise identified in this WRP, this person is also responsible for undertaking a measure or action under the instrument or text identified.

To be clear, the Schedules to this Lachlan Alluvium WRP form part of this Plan, but only those provisions in the Schedules that are directly referenced in the blue boxed sections of this document.

1.6. Enforcement

To the extent that this Plan is implemented under the WMA 2000, the implementation and enforcement provisions of the WMA 2000 will apply. WMA 2000 provisions relating to management plans (Chapter 2, Part 3), basic landholder rights and access licences (Chapter 3, Parts 1 and 2), and enforcement (Chapter 7) will apply.

MDBA enforcement powers are contained in Part 8 of the *Water Act 2007* (Cth), while the obligation to comply with the requirements of an accredited WRP is contained in sections 58 and 59 of that Act.

This means that where an obligation is expressed in this Plan relating to the specific Commonwealth enforcement powers, the person on whom the obligation is imposed may be subject to enforcement under the *Water Act 2007* (Cth) for non-compliance with that obligation. These obligations operate separately from any similar obligations under the WMA 2000.

Specific enforceable WRP provisions of the Basin Plan:

- Require a holder of a water access right to comply with the conditions of that right (s.10.08(2))
- Ensure that there is no net reduction in the protection of planned environmental water from the protection provided for under NSW law immediately before the commencement of the Basin Plan, (s.10.28)
- Require that if a review of the plan (or part of the plan) is undertaken, the report of the review must be given to the MDBA within 30 days after the report is completed, (s.10.47) require that any proposed amendment to the plan arising from a review gives the reasons for the amendment to the Authority (s.10.48).

Box 1-2. WRP provisions enforceable under the Basin Plan.

1.7. Consultation undertaken

For the purpose of sections 10.07 and 10.26(2)(b) of the Basin Plan:

- A Consultation Report is attached at Schedule C of the WRP. The WRP is not being presented for the purpose of an amendment accreditation under section 65 of the *Water Act 2007*.

For the purpose of section 10.53 of the Basin Plan:

- NSW consulted with relevant Aboriginal organisations about the process for engaging with First Nations to prepare the WRP.
- The WRP was prepared having regard to the views of First Nations with respect to the requirements under section 10.52 and the specific matters in subsections (1)(a) to (1)(f).
- NSW is committed to furthering the discussion to meet the requirements of Part 14 of Chapter 10 of the Basin Plan through engaging with Aboriginal people, including Traditional Owners and Aboriginal organisations, over the coming 12 months.
- Schedule C of the WRP demonstrates how the consultation process was undertaken.
- Section 4 of each of Attachments A, B and D to C and Section 3 of Attachment C to Schedule C demonstrates how the consultation process is viewed as informed participation.

For section 10.53(1)(a) of the Basin Plan:

- Native Title Services Corporation was contacted as part of WRP consultation activities.
- Native Title determinations relevant to the Lachlan Alluvium WRP area are specified in Part 5 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*

(Schedule A). A Native Title determination has been made for the Barkandji Traditional Owners #8.

- Native Title claims have been registered by the Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan People over areas that are relevant to the *Water Sharing Plan for the Lachlan Alluvial Rock Groundwater Sources 2020*. Subject to determination of these claims, the WSP will be amended accordingly.
- A full list of all the current registered native title claimant applications in NSW is available from the National Native Title Tribunal register of claims, along with the list of current Indigenous Land Use Agreements linked to Native Title determinations.
- Table 2 of Schedule C sets out the details of the consultation outcomes regarding Native Title.

For section 10.53(1)(b) of the Basin Plan:

- Registered Aboriginal heritage recorded in the Aboriginal Heritage Information Management System must be considered as part of application processes for water management works and use approvals.
- Registered Aboriginal heritage, as held by NSW Department of Planning and Environment - Environment and Heritage Group, has also been considered as part of the development of Long-Term Water Plans for water resource plan areas. Aboriginal heritage considerations under Commonwealth law are triggered as part of NSW land use planning.
- The department acknowledges that 'Aboriginal cultural heritage' has generally focused on physical artifacts. For First Nations their cultural heritage encompasses much more, including intangible values. Some First Nations may also have their own registers, lists or databases that capture cultural heritage. Where this information is shared and incorporated into the water planning process, it forms part of considerations for water management decisions. Information about cultural heritage shared during the First Nations consultation is summarised in Table 1-3.

For section 10.53(1)(c) of the Basin Plan:

- A range of Aboriginal organisations were involved in the consultation. NBAN and MLDRIN were consulted about the appropriate Traditional Owners to engage in First Nation consultation in the WRP area.

For section 10.53(1)(d) of the Basin Plan:

- Aboriginal objectives and outcomes for water management were discussed during consultation.
- Aboriginal objectives and outcomes for water management are included in section 1.3.1 of this WRP. Where strategies for achieving desired objectives were expressed during the First Nations' consultation process, these views are included in each of the respective Nation reports.
- At a NSW level, a review was undertaken to identify similarities and gaps between the social, cultural, spiritual and customary objectives identified through the First Nation engagement and existing objectives in water sharing plans. A summary of instruments that address risks and impacts identified during consultation with First Nations is provided in Table 3-3. Insofar as those instruments are relevant to First Nation objectives, strategies to address these will be included as considerations in the work to establish a monitoring, evaluation and reporting framework for water sharing plans.
- Water sharing plans can be replaced at the end of their ten-year term. As part of future plan replacements, consultation will build on learnings and relationships developed with First Nations to ensure that social, cultural, spiritual and

customary objectives and strategies are considered. All inland groundwater sharing plans are due to expire in 2030.

- The processes for developing water strategies at state (Priority 2 of the State Water Strategy and the development of a proposed state-wide Aboriginal Water Strategy) and regional levels (Regional Water Strategies) continues to include specific engagement with Aboriginal communities about social, cultural, spiritual and customary objectives. It is a priority to recognise cultural values in water management, as well as Aboriginal rights and values and increase access to and ownership of water for cultural and economic purposes.

For section 10.53(1)(e) of the Basin Plan:

- Based on guidance from NBAN and MLDRIN, the department engaged with First Nations in a way that encouraged active and informed participation, for example the use of Data Use Agreements to ensure that information is managed and used in accordance with First Nations rights to cultural information that they share.
- Further, the department is strengthening First Nations' participation in water planning and management, for example through implementation of Priority 2 of the State Water Strategy and a proposed state-wide Aboriginal Water Strategy based on a co-design approach that includes capacity building and sharing of water planning and management knowledge with communities.
- The department is also progressing work to support Aboriginal water literacy and engagement in regulatory water planning.

For section 10.53 (1)(f) of the Basin Plan:

- Risks and impacts, values and uses were discussed during consultation.
- The risks and impacts raised by the Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations during consultation are summarised in Table 3-3 of this WRP.
- The risks to Aboriginal values and uses for the Lachlan Alluvium WRP area are also included in the Attachments to Schedule C for each Nation as follows:
  - Table 4 of Attachment A for the Nari Nari Nation,
  - Section 6.2 of Attachment B for the Ngiyampaa Nation,
  - Table 5-2 of Attachment C for the Wiradjuri Nation,
  - Section 7.1 of Attachment D for the Yita Yita Nation.

NSW will continue to strengthen the engagement with First Nations regarding risks and impacts to cultural values and uses through the water planning process.

For "registered Aboriginal Heritage" (Basin Plan section 10.53(1)(b)), Aboriginal people of the Lachlan Alluvium WRPA describe their heritage in their own terms. Information shared about cultural heritage is included in the Lachlan Alluvium First Nation consultation reports by references to "cultural sites", "sacred sites" or "significant sites", and is summarised in Table 1-3 below.

Table 1-3. Information about cultural heritage as shared by First Nations of the Lachlan Alluvium WRP area

First Nation	Information shared about cultural heritage
Nari Nari	• Cultural sites are heavily water dependent. • Recent archaeological findings have dated burial sites on country at close to 50,000 years.
Ngiyampaa	• People have significantly less access to their Country, cultural sites and water bodies.
Wiradjuri	• The “Wiradjuri wars” were in response to loss of significant sites following invasion by new settlers. • There is evidence of cultural sites all along the rivers and creeks such as burial grounds, scar trees and camp sites.
Yita Yita	• In relation to access to sacred sites and recognition/access to birthing trees, burial sites, scar trees, artefacts, massacre sites.

An overview of this WRP development process is at Figure 1-3, which shows the interaction of the consultation process with other aspects of WRP development.

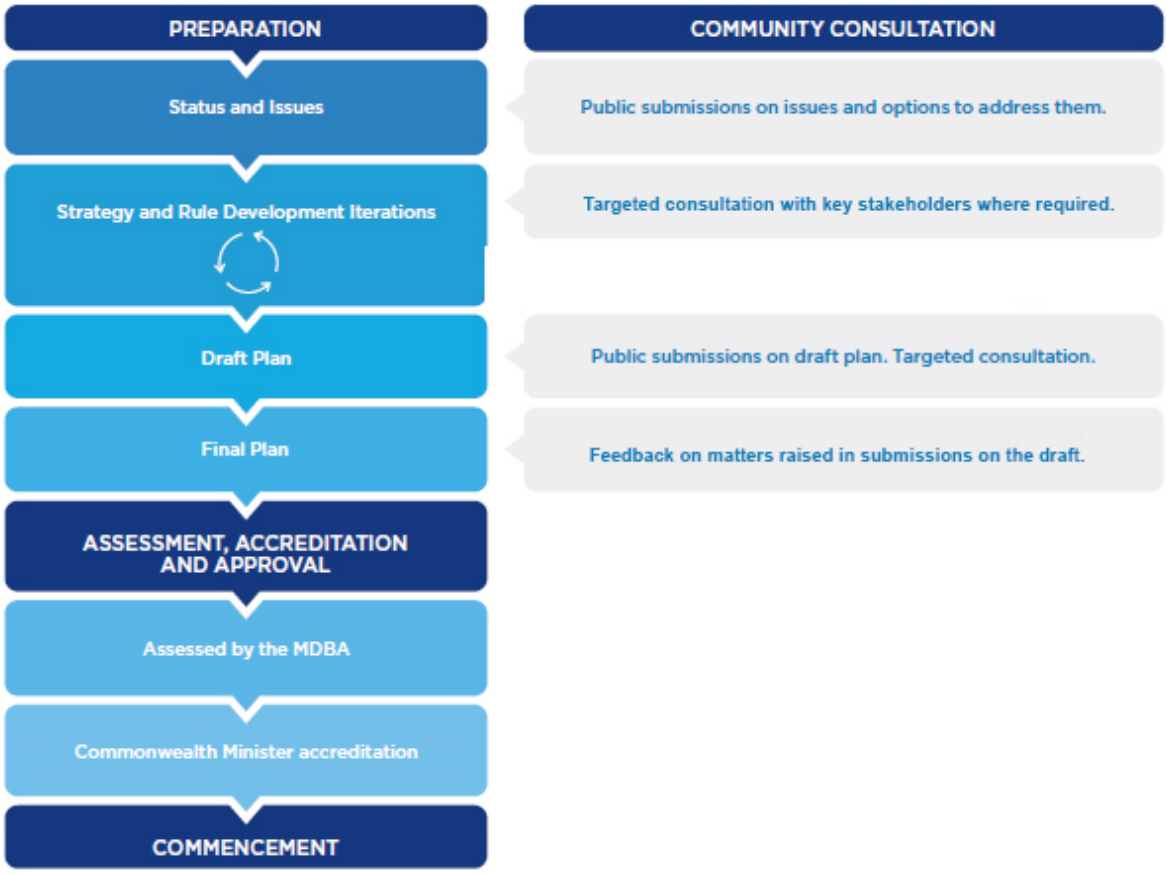


Figure 1-3. Consultation processes in WRP development.

During the water resource planning process, the department consulted with stakeholders to obtain their input on issues, and suggestions for improved water resource management. This consultation took three forms:

i. Broad public consultation via submissions processes - on the Status and Issues paper early in the process, and on the Draft WRP.

ii. Targeted consultation - with key stakeholders, primarily through the State Groundwater Stakeholder Advisory Panel (SAP) throughout the process and also with Lower Lachlan stakeholders

iii. Consultation with Aboriginal people.

A state-wide Groundwater Stakeholder Advisory Panel (SAP) was established to provide early input on groundwater issues and management options. Information was provided to SAP members throughout the planning process to help them participate in the development of the groundwater WRPs. Members included local licence holder representatives drawn from groundwater irrigator groups, environmental representatives, the mining industry, Aboriginal representatives, as well as local Government and State government agency representatives.

For more information about consultation during the development of this Pan, please see Schedule C to this Plan.

1.7.1. Aboriginal consultation

To improve Indigenous outcomes associated with water there is a need for genuine and ongoing consultation with traditional owners and people and Aboriginal organisations across NSW. The NSW Government is committed to engaging genuinely with Aboriginal people with culturally appropriate timeframes and processes. NSW is committed to furthering the discussion to meet the requirements of Part 14 of Chapter 10 of the Basin Plan through engaging with Aboriginal people, including Traditional Owners and Aboriginal organisations, over the coming 12 months.

While some of the examples provided in the First Nation reports relate to surface water, Aboriginal people see all water as one and the cultural connection Aboriginal people have to water is not limited by where the water sits in the landscape. These examples have therefore been included in this groundwater WRP.

Workshops were held in different townships across towns around the Nations at different times and the Traditional Owners all raised similar issues that reflect the key issues highlighted in Attachments A – D of Schedule C to this Plan.

The consultation undertaken as part of the development of the WRPs is the first step in an ongoing process that will work with traditional owners and Aboriginal people and organisations to achieve the following outcomes around Indigenous water objectives:

- enhance cultural flows, economic opportunities and access to water entitlements
- seek shared benefits by using water allocated for environmental and consumptive purposes to deliver cultural benefits where synergies exist
- acknowledge water is critical to the health and wellbeing of communities
- enable access to Country
- embed Aboriginal participation, partnerships and communication into water management and government decision making.

The process undertaken for Aboriginal consultation followed the MDBA Guidelines for meeting Basin Plan (Chapter 10) requirements in relation to Aboriginal peoples' objectives and outcomes for water. Those guidelines suggest appropriate consultation processes to ensure that the concerns of Traditional Owners are taken into account and draw on the *Akwé: Kon Guidelines in a water resource planning context*. Consultation with First Nations must be meaningful and fulfil the requirements of the Basin Plan.

A Nation based consultation method ensures Aboriginal people continue in their traditional roles of custodians and that each individual Nation can contribute to the WRPs. It allows First Nations people

to work with government to make better decisions in water planning within the context of their cultural boundaries.

Where appropriate, consultation with other Aboriginal organisations (land councils and native title claimant groups etc.) was undertaken as part of, or separate to, the Nation-based consultation.

A range of Aboriginal organisations have been engaged or referenced in the water resource planning process. This includes Native Title Services Corporation in relation to native title matters, the NSW Aboriginal Land Council (NSWALC), NBAN and MLDRIN in relation to engagement in water resource planning, and the NSW Department of Planning and Environment – Environment and Heritage Group in relation to registered Aboriginal heritage. The NSWALC, NBAN and MLDRIN have been involved at a number of levels of engagement, from board meetings and gatherings to individual First Nation consultation events, where appropriate.

The Barkandji Native Title determination extends from the South Australian border to Tilpa in the east, Wentworth in the south and to Wanaaring in the north. It is the largest Native Title determination in NSW, covering 128,000 square kilometres. The Native Title claim was lodged in 1997 and determined in 2015. This determination covers a number of water resource plan areas, including the Lachlan Alluvium. The department has commenced consultation with the Native Title holders in relation to an Indigenous Land Use Agreement. Consultation will also be undertaken as part of water resource planning for other relevant plans in the determination area.

Native Title claims have been registered by the Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan People over areas that are relevant to the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*.

An overview of the Nation-by-Nation engagement process is shown in Figure 1-4.

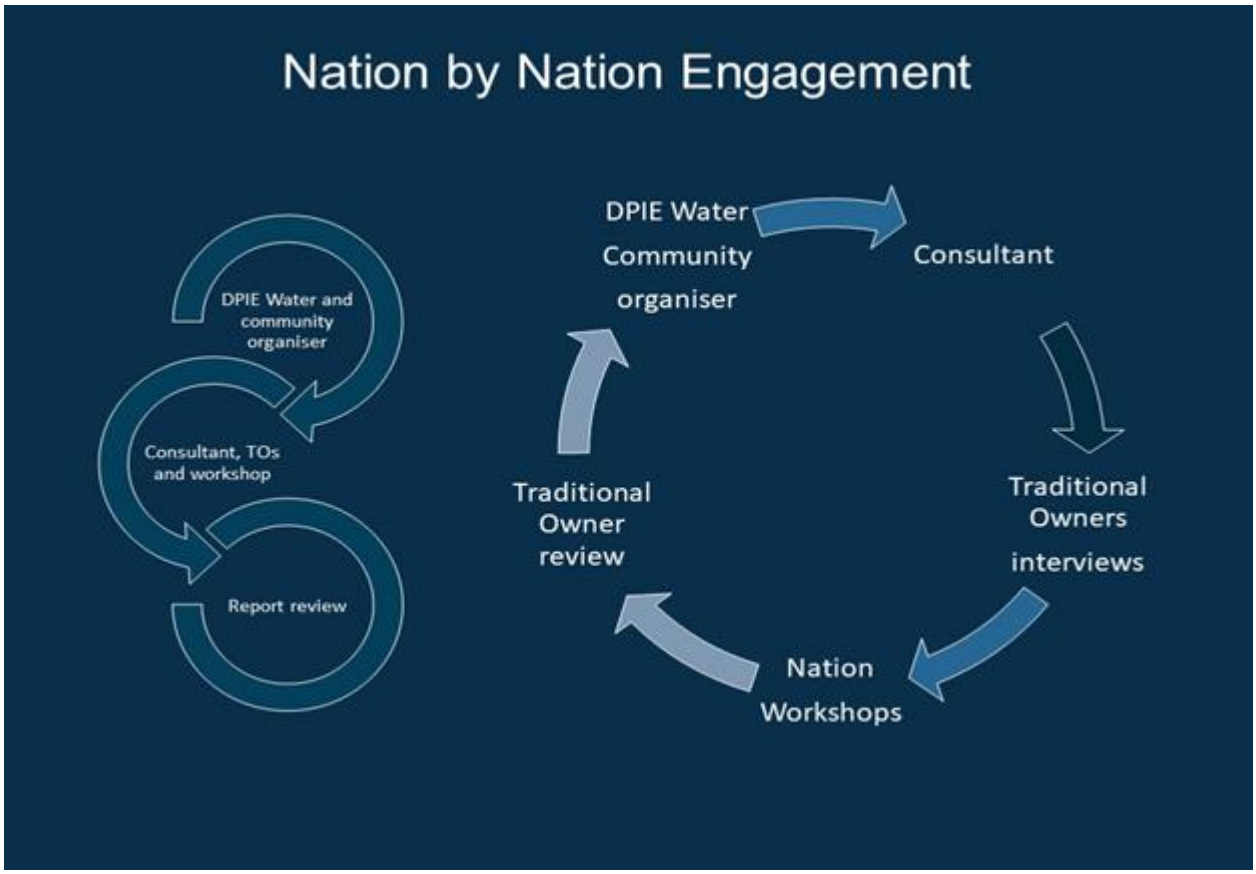


Figure 1-4. Nation's engagement plan overview.

A consultation program was undertaken for each of the Barkandji/Maljangapa, Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita Nations. Figure 1-5 shows the location of each Nation.

Consultation workshops were organised as detailed in Table 1-4 and venues were chosen according to the instruction of the Nation organiser following culturally appropriate knowledge and protocols. The consultation consisted of targeted workshops on Country with invited Traditional Owners Table 1-4 also provides a description of the location of each nation and other details of consultation.

For more details on the consultation undertaken:

- Section 2.3 of Schedule C
- The Nari Nari Nation Consultation Report is available at Attachment A to Schedule C,
- The Ngiyampaa Nation Consultation Report is available at Attachment B to Schedule C,
- The Wiradjuri Nation Consultation Report is available at Attachment C to Schedule C,
- The Yita Yita Nation Consultation Report is available at Attachment D to Schedule C.

Table 1-4. Aboriginal consultation undertaken in respect of the Lachlan Alluvium

Nation	Relevant WRPAs	Date of workshops	Location of workshops	Family groups represented during consultation
Barkandji and Maljangapa Nations	Darling Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Great Artesian Basin Shallow, NSW Murray-Darling Basin Porous Rock, Lachlan Alluvium, Lachlan, NSW Murray and Lower Darling, Barwon-Darling Watercourse, Intersecting Streams	June and October 2019	Bourke, Wilcannia, Broken Hill, Menindee, Wentworth	Not supplied
Ngiyampaa Nation	Lachlan Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Murray-Darling Basin Porous Rock, Macquarie–Castlereagh, Lachlan, Namoi, Barwon-Darling Watercourse and NSW Murray and Lower Darling	July 2018	Lake Cargelligo, Ivanhoe and Cobar.	Not supplied
Wiradjuri Nation	Lachlan Alluvium, Macquarie Alluvium, Murray Alluvium, Murrumbidgee Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Murray-Darling Basin Porous Rock, NSW Great Artesian Basin Shallow, Macquarie–Castlereagh, Lachlan, Murrumbidgee and NSW Murray and Lower Darling	2018	Euabalong, Condobolin, Forbes and Cowra	Not supplied
Yita Yita Nation	Lachlan Alluvium, NSW Murray-Darling Basin Fractured Rock, Lachlan	April 2019	Balranald	Not supplied

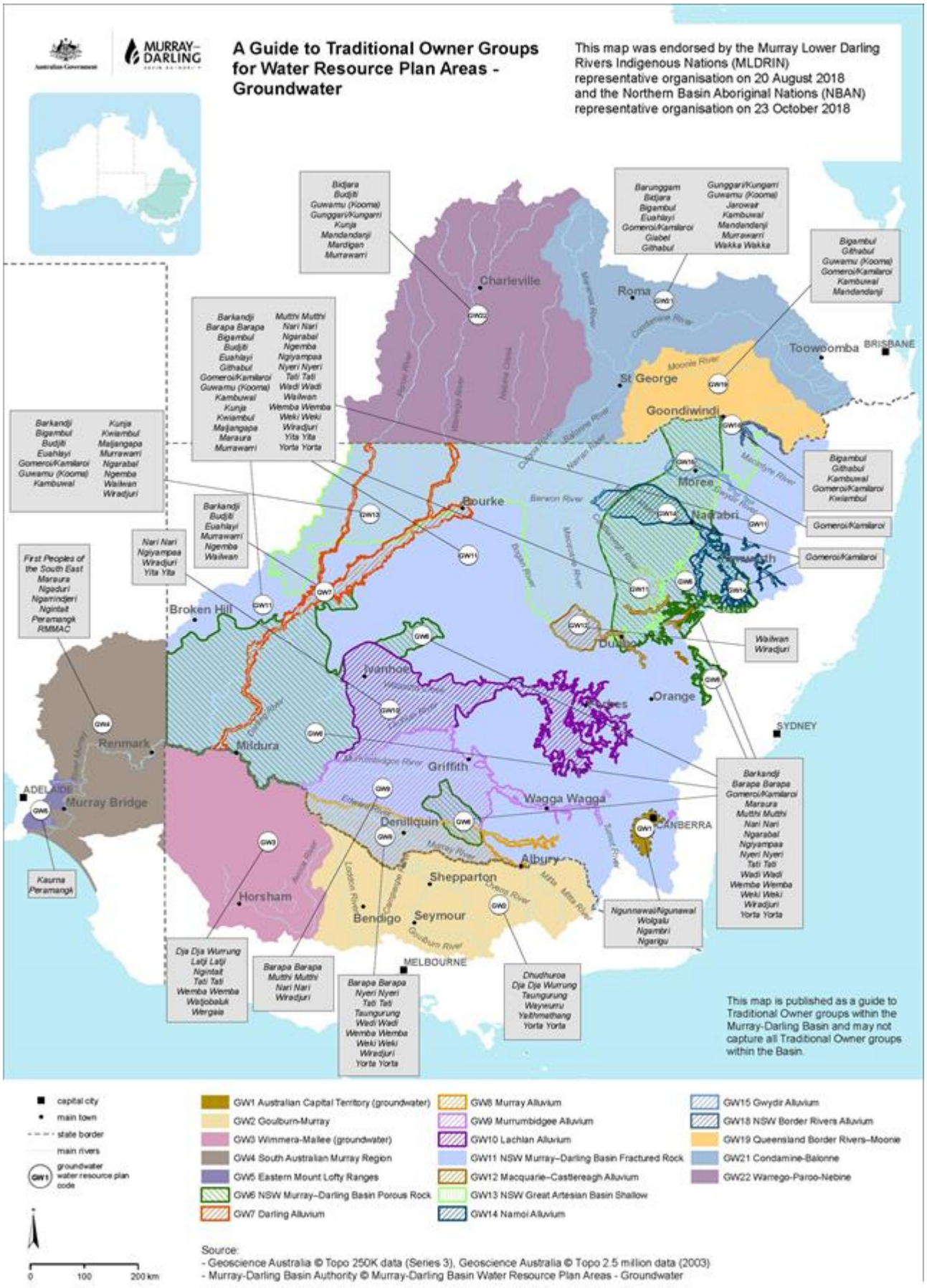


Figure 1-5. Traditional owner groups of the groundwater WRPAs.

1.8. Review and amendment

For the purpose of section 10.47 of the Basin Plan, if a review of this Plan is undertaken, the report of that review will be given to the Murray–Darling Basin Authority within 30 days after the report is completed.

For the purpose of section 10.48 of the Basin Plan, if a review of this Plan results in a proposed amendment to any accredited provision, the reasons for the amendment will be provided to the Murray–Darling Basin Authority. Reasons for the amendment may include those set out in Box 1-3.

- Within three years of an amendment to the Basin Plan that requires changes to WRP accreditation requirements.
- Under section 23B of the *Water Act 2007 (Cth),* following approval of proposals for adjustment under Chapter 7 of the Murray-Darling Basin Plan.
- If any amendment to State water resource management arrangements, including an amended or replaced WSP, materially affects this Lachlan Alluvium WRP.

Box 1-3. Circumstances under which this plan may be amended.

2. Identification of water resource plan area and other matters

This section includes the following components of the Basin Plan:

- 10.02 Identification of WRP area and water resources
- 10.03 Identification of SDL resource units and water resources
- 10.04 Form of water resource plan
- 10.05 Regard to other water resources
- 10.14 Effects, and potential effects on water resources of the water resource plan area.
- 10.19 Groundwater and surface water connections

2.1. Identification of WRP area, SDL resource unit and water resources

For the purpose of section 10.02 of the Basin Plan:

- This Plan applies to the WRPA and the water resources specified in section 3.06(h) of the Basin Plan as the Lachlan Alluvium Water Resource Plan area. No variation to boundaries under section 3.04 of the Basin Plan applies to this WRPA.
- The official map and spatial data of the Lachlan Alluvium WRPA and SDL resource units are available from https://data.gov.au/dataset/groundwater-sdl-resource-units consistent with sections 3.03 and 6.03 of the Basin Plan.

For the purpose of section 10.03 of the Basin Plan, the following are identified:

- The SDL resource units in the Lachlan Alluvium WRPA as described in section 6.03 and Schedule 4 to the Basin Plan within the Lachlan Alluvium WRPA
- The water resources within these SDL resource units as described in section 6.03 and Schedule 4 to the Basin Plan within the Lachlan Alluvium WRPA.

For the purpose of section 10.04(3) of the Basin Plan Figure 2-1 is an indicative map of the water resources to which this plan applies.

A full description of the Lachlan Alluvium WRPA is provided at Appendix A, and Figure 2-1 is an indicative map of the area. The SDL resource units are the:

- Belubula Alluvium (GS12), which corresponds to the Belubula Valley Alluvial Groundwater Source in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*. This unit is made up of Cenozoic (Pleistocene) valley fill alluvial sediments. It extends from approximately 12 km upstream to 10 km downstream of Canowindra and is up to 2 km wide. The alluvial sediments of the Belubula Alluvium become thicker to the west until they merge with the Upper Lachlan Alluvium at the water source boundary. The Belubula Alluvium is comprised of clay, silt, sand and gravel generally less than 40 m thick.
- Upper Lachlan Alluvium (GS44), which corresponds to the Upper Lachlan Alluvial Groundwater Source in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*. This unit is made up of Cenozoic valley fill alluvial sediments. It extends

from approximately 13 km to the northeast of Young through to Lake Cargelligo. The Upper Lachlan Alluvium was deposited in deep paleo-valleys that follow the track of the Lachlan River and its main tributaries reaching a maximum width of approximately 60 km.

- Lower Lachlan Alluvium (GS25), which corresponds to the Lower Lachlan Groundwater Source in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*. This unit is made up of the Cenozoic alluvial sediments extending from Lake Cargelligo to approximately 25 km west of Ivanhoe and Oxley. These sediments form an extensive alluvial fan deposited by the Lachlan River and its tributaries, comprised of clay, silt, sand and gravel.

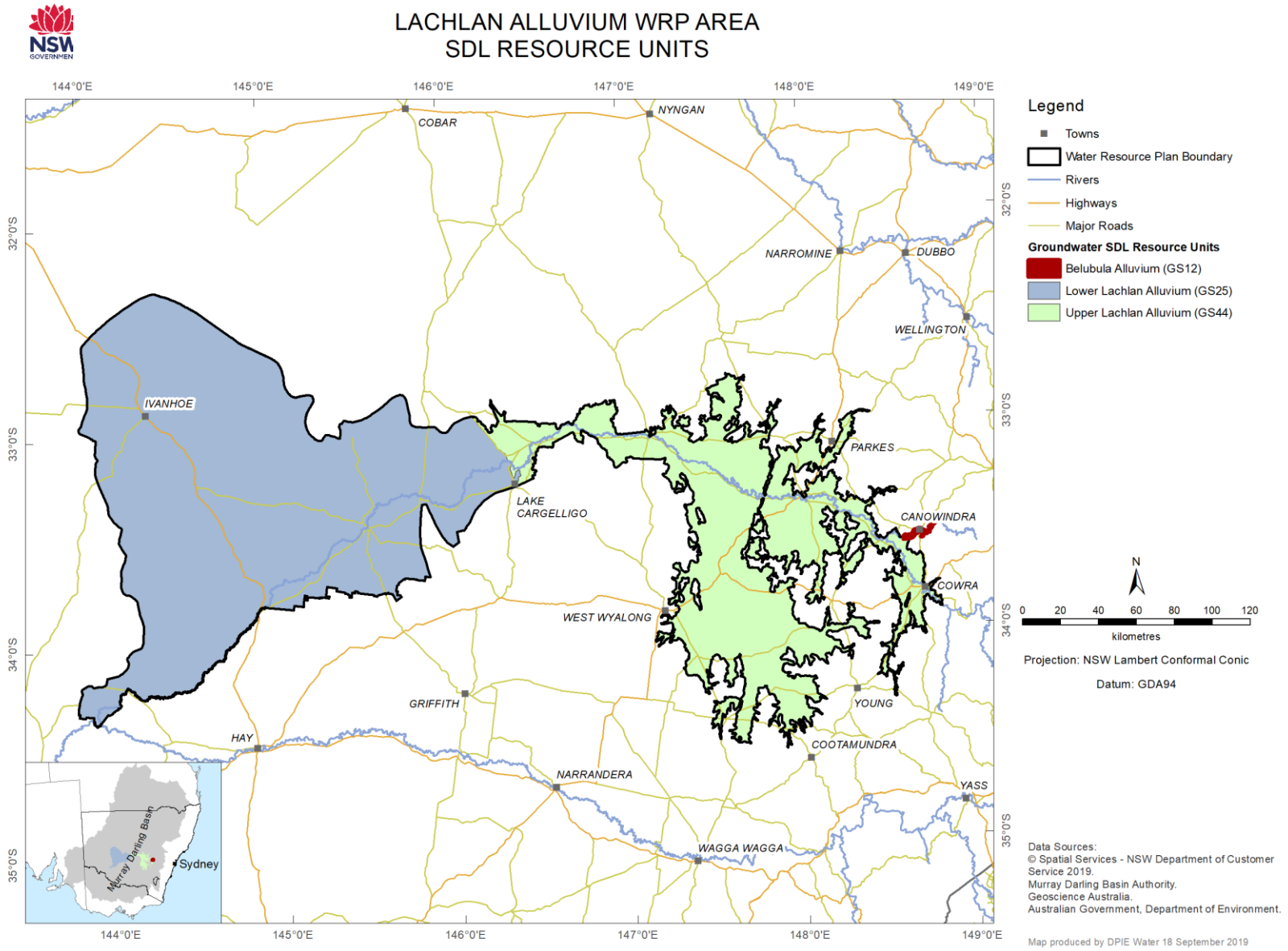


Figure 2-1. Map of Lachlan Alluvium WRPA.

2.2. Regard to other water resources

For the purpose of section 10.05 of the Basin Plan:

- The Lachlan Alluvium WRP has been prepared having regard to the management and use of connected water resources as described in section 3.3 of the Lachlan Alluvium Risk Assessment (GW10 WRPA).
- Division 1 Part 6 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) sets the long-term average sustainable diversion limits (SDLs) for the Lachlan Alluvium SDL resource units and manages extraction within these over the long term having regard to connected surface water and groundwater resources.
- Clause 34 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) has regard to significant hydrologic connection between the Belubula Alluvium SDL resource unit and the water resources of the Lachlan surface water resource plan area SW10.
- Clause 41 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) has regard to significant hydrologic connection between the groundwater of the Lachlan Alluvium SDL resource units, the surface water resources of the Lachlan catchment, and other surface water priority environmental assets and priority ecosystem functions that may also be groundwater-dependent.

For the purpose of section 10.14 of the Basin Plan, there is no connectivity to a non-Basin water resource and no take from non-Basin water resources that affect, or potentially affect, the SDL resource units of the Lachlan Alluvium WRPA.

The three SDL Resource Units of the Lachlan Alluvium WRPA have varying degrees of connectivity to their associated surface water systems. The long-term average annual extraction limits (LTAAELs, which equate to the Basin Plan SDLs) have been established in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* for these SDL Resource Units having regard to acceptable impacts on the connected surface water resources, recognising that groundwater extraction can, over time, potentially impact the surface water/groundwater flux. Available water determinations (AWDs) are used to control growth in extractions above the LTAAEL in each SDL resource unit.

The Belubula Alluvium SDL Resource Unit is considered highly connected to the regulated Belubula River. Data from monitoring shows the groundwater responds quickly to changes in the river levels and demonstrates the connectivity between the surface and groundwater resources within the Belubula Alluvium. This high level of hydraulic connection is recognised and managed in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* by:

- establishing the LTAAEL (and SDL) for this groundwater source at 2012 (Basin Plan) use levels, recognising that in highly connected systems increasing extraction will further decrease base flows in surface water systems. This is consistent with NSW Government policy principles[5]
- linking annual available water determinations (AWDs) for high-security aquifer access licences in the Belubula Alluvium to AWDs for high-security surface water access licences in the regulated river.

In the Upper Lachlan Alluvium, the Lachlan River varies between losing and gaining conditions along its length depending on geology, topography, local conditions and prevailing long-term climatic conditions. Although the Lachlan River is considered to be hydraulically connected with the Upper Lachlan Alluvium, due to the depth and width of the alluvium, groundwater pumping impacts

[5] DPI Water, 2015, *Macro water sharing plans – the approach for groundwater. A report to assist community consultation*, first published June 2011, updated November 2015

at the river are subdued and/or delayed. This lag time of groundwater pumping impacts is acknowledged in setting the extraction limit of the groundwater source; however, it is managed independently from the river. The LTAAEL (and SDL) for this groundwater source is set at 2012 (Basin Plan) use levels, recognising that increasing extraction will further decrease base flows in surface water systems over time, and ensuring that this does not occur.

The greater depth to the regional water table in the Lower Lachlan Alluvium results in the Lachlan River and its tributaries being largely hydraulically disconnected from the groundwater for much of their reaches. That is, whilst the Lachlan River may lose water into the underlying alluvium, the rate of loss is not influenced by groundwater pumping.

Distance criteria for water supply work approvals and trade assessment criteria are also used to manage the location at which additional water is extracted in order to minimise any localised impacts on surface water sources and high priority groundwater dependent ecosystems that may also be surface water priority environmental assets and priority ecosystem functions.

3. Risks to water resources

This section includes the following components of the Basin Plan:

- 10.41 Risk identification and assessment methodology
- 10.42 Description of risks
- 10.43 Strategies for addressing risks

An assessment of the current and future risks to the condition, and continued availability, of the water resources of the Lachlan Alluvium WRPA has been undertaken, and strategies have been identified to address medium and high risks. The assessment has been undertaken in accordance with the requirements outlined in Chapter 10 of the Basin Plan, having regard to the risk-management strategies listed in Chapter 4 of the Basin Plan. Specific risks to the condition and availability of Basin water resources considered include:

(a) Insufficient water availability for the environment

(b) Water being of a quality unsuitable for use

(c) poor health of water-dependent ecosystems.

The full Lachlan Alluvium Risk Assessment (GW10 WRPA) (the Risk Assessment) is provided at Schedule D.

For the purpose of sections 10.41(1), 10.41(2) and 10.41(3) of the Basin Plan, the provisions for accreditation in Table 3-3 and section 3 of this WRP and section 7 of the Risk Assessment (Schedule D) demonstrate that this plan has been prepared having regard to current and future risks to the condition and continued availability of the water resources of the WRPA.

For the purpose of section 10.41(3)(b) of the Basin Plan no guidelines have been published by the Authority in relation to risk identification and risk assessment under s. 4.02 of the Basin Plan.

3.1. Risk assessment method and uncertainty

For the purpose of section 10.41(7) of the Basin Plan:

- Table B-1 in Appendix B of the Risk Assessment (Schedule D) provides a summary of data used to identify and assess the current and future risks to the condition and continued availability of the water resources in the Lachlan Alluvium WRPA.
- Sections 2.2, 2.3, 4.1, 5.1, 6.1 and 7 of the Risk Assessment (Schedule D) describe the methods used to identify current and future risks to the condition and continued availability of the water resources of the water resource plan area.
- The following sections of the Risk Assessment (Schedule D) detail the methods used to assess current and future risks to the condition and continued availability of the water resources of the water resource plan area, and the uncertainties in the level of risk:

Risks to consumptive users

- Sections 4.2 – 4.2.1 dealing with the consequence and sections 4.3 – 4.3.1 and 4.3.2 dealing with the likelihood of risk to structural integrity of the groundwater systems (R1)
- Sections 4.2 – 4.2.1 dealing with the consequence and sections 4.4 – 4.4.1 and 4.4.2 dealing with the likelihood of risk of groundwater extraction inducing connection with poor quality groundwater (R2)
- Sections 4.2 – 4.2.1 dealing with the consequence and sections 4.5 – 4.5.1 and 4.5.2 dealing with the likelihood of risk of local drawdown in bores reducing groundwater access by consumptive users (R3)
- Sections 4.6 – 4.6.1 and 4.6.3 dealing with the consequence and likelihood of risk of sediment compaction impacting surface water users (QL1)
- Sections 4.7 – 4.7.1 and 4.7.3 dealing with the consequence and likelihood of risk of groundwater extraction impacting water users in adjacent groundwater systems (QL2)
- Sections 4.8 and 4.8.2 – 4.8.3 dealing with the consequence and 4.8.1 and 4.8.3 dealing with the likelihood of risk of poor water quality to water users (QL3)

Risks to Aquifer Access Licence holders

- Sections 5.2– 5.2.1 dealing with the consequence and sections 5.3 – 5.3.1 and 5.3.2 dealing with the likelihood of risk of climate change reducing recharge and groundwater availability (R4)
- Sections 5.2 – 5.2.1 dealing with the consequence and sections 5.4 – 5.4.1 and 5.4.2 dealing with risk of growth in Basic Landholder Rights reducing groundwater availability (R5)
- Sections 5.2 – 5.2.1 dealing with the consequence and sections 5.5 – 5.5.1 and 5.5.2 dealing with the likelihood of risk of growth in Local Water Utilities reducing groundwater availability (R6)
- Sections 5.2 – 5.2.1 dealing with the consequence and sections 5.6 – 5.6.1 and 5.6.2 dealing with the likelihood of risk of increases in irrigation efficiency and improved water delivery reducing recharge (R7)
- Sections 5.2 – 5.2.1 dealing with the consequence and sections 5.7 – 5.7.1 and 5.7.2 dealing with the likelihood of risk of plantation forestry intercepting recharge (R8)
- Sections 5.2 – 5.2.1 dealing with the consequences and sections 5.8 – 5.8.1 and 5.8.3 dealing with the consequence and likelihood of risk of growth in mining reducing groundwater availability (QL4)

Risks to water available for the environment

- Sections 6.2 – 6.2.2 dealing with the consequence and sections 6.3 – 6.3.2 dealing with the likelihood of risk of groundwater use causing local drawdown (R9, R10)
- Sections 6.2 – 6.2.2 dealing with the consequence and sections 6.4 – 6.4.2 dealing with risk of growth in plantation forestry intercepting recharge (R11, R12)
- Sections 6.2 – 6.2.2 dealing with the consequence and sections 6.5 – 6.5.2 dealing with risk of climate change reducing recharge and groundwater availability (R13, R14)
- Sections 6.2 – 6.2.2 dealing with the consequence and sections 6.6 – 6.6.1 and 6.6.3 dealing with the consequence and likelihood of risk of poor water quality to the environment (QL5)
- Sections 6.2 – 6.2.2 dealing with the consequence and sections 6.7 – 6.7.1 and 6.7.3 dealing with the consequence and likelihood of risk of growth in BLR and LWU to the environment (QL6)
- Sections 6.2 – 6.2.2 dealing with the consequence and sections 6.8 – 6.8.1 and 6.8.3 dealing with the consequence and likelihood of risk of growth in mining reducing groundwater availability (QL7)

Sections 2.4, 4.2.1, 4.3.2, 4.4.2, 4.5.2, 4.6.1, 4.7.1, 4.8.3, 5.2.1, 5.3.2, 5.4.2, 5.5.2, 5.6.2, 5.7.2, 5.8.1, 6.2.1, 6.2.2, 6.3.2, 6.3.2, 6.4.2, 6.5.2, 6.6.1, 6.7.1, and 6.8.1 of the Risk Assessment (Schedule D) outline the limitations and uncertainties associated with the levels of risk identified and assessed.

No quantitative sensitivity analysis was undertaken regarding the uncertainties in the level of risk attributed to each risk. As such, the requirement at s 10.41(8) of the Basin Plan is not applicable to this WRP.

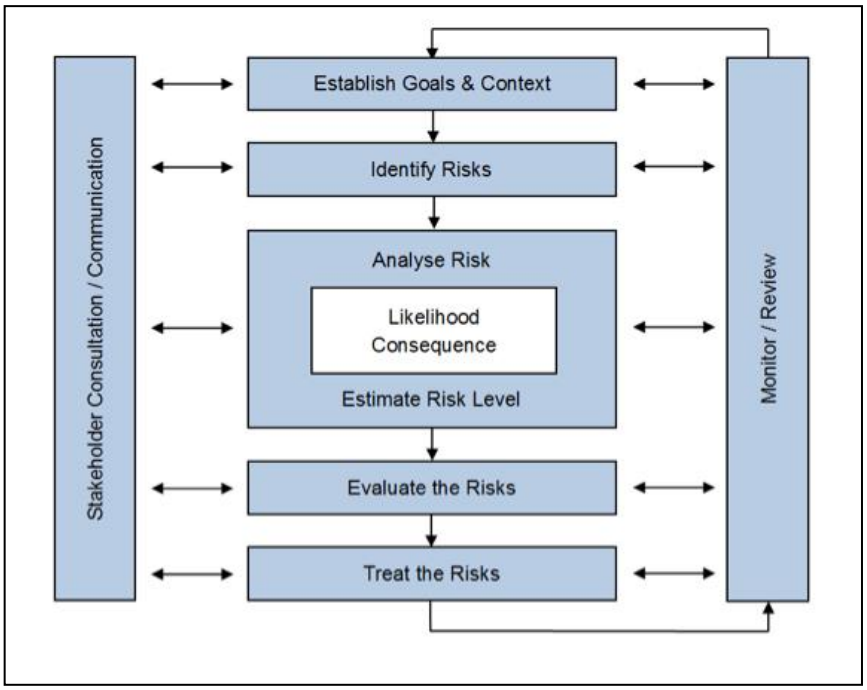
The risk-assessment approach taken for each NSW WRP follows the process illustrated in Box 3-1. This process is consistent with the National Water Initiative Policy Guidelines for Water Planning and Management and NSW's Basin Plan obligations. The risk assessment framework adopts a cause/threat/impact pathway model that describes the pathway for impacts to a receptor. Adopting this approach provides a systematic way to identify the full range of factors that may lead to an impact, while also being consistent with the internationally recognised risk standard that considers both likelihood and consequence.

Causes have the potential to induce a threat to various extents, depending upon the characteristics of the water resource. Receptors are considered in an intergenerational context, that is, current and future uses and users, as required under subsection 10.41(1) of the Basin Plan.

The risk level of an impact is a function of the likelihood of a cause and threat occurring, and the consequence of the impact on the receptor. For this risk assessment, the following definitions have been adopted:

- Likelihood—the probability that a cause will result in a threat. It is not an indication of the size of the threat, but rather conveys the probability that the threat will be significant.
- Consequence—the loss of value for an impacted receptor.

Risk levels are calculated using the standard risk assessment matrix used under the NSW water sharing plan macro-planning approach, specific matrices for each risk are provided within the specific sections of the Risk Assessment.



Source: AS/NZS ISO 31000:2009 (Standards Australia 2009)

Box 3-1. The NSW Plan risk assessment framework.

3.2. Description of risks

For the purpose of sections 10.41(4), 10.41(5), 10.41(6) and 10.42 of the Basin Plan:

- Table 3-1 details the risk assessment outcomes for the Lachlan Alluvium WRPA
- Figures 4-1 to 4-8, 5-1 to 5-7, 6-1 and 6-7 to 6-12 of the Risk Assessment (Schedule D) detail factors that contribute to the medium or high risks.

Table 3-1. Risk assessment outcomes in the Lachlan Alluvium WRPA.

Risk		SDL resource unit	Risk outcome[1]
Risks to consumptive users			
R1	Risk to structural integrity of the groundwater systems	Lower Lachlan Alluvium	Medium
		Upper Lachlan Alluvium	Medium
		Belubula Alluvium	Low
R2	Risk of groundwater extraction inducing connection with poor quality groundwater	Lower Lachlan Alluvium	High
		Upper Lachlan Alluvium	High
		Belubula Alluvium	Low
R3	Risk of localised drawdown in bores reducing groundwater access by consumptive users	Lower Lachlan Alluvium	High
		Upper Lachlan Alluvium	High
		Belubula Alluvium	Low
QL1	Risk of sediment compaction impacting surface water users	Lachlan SS16	Low - QAL
		Lower Darling SS18	Low - QAL

QL2	Risk of groundwater extraction impacting water users in adjacent groundwater systems	Kanmantoo Fold Belt MDB (GS19)	Nil – QAL
		Lachlan Fold Belt (GS20)	Nil – QAL
		Lower Murrumbidgee Shallow Alluvium (GS28a)	Nil – QAL
		Lower Murrumbidgee Deep Alluvium (GS28b)	Nil – QAL
		Orange Basalt (GS39)	Nil – QAL
		Western Porous Rock (GS50)	Nil – QAL
		Young Granite (GS51)	Nil – QAL
QL3	Risk of poor water quality to water users	Lower Lachlan Alluvium	Low - QAL
		Upper Lachlan Alluvium	Low - QAL
		Belubula Alluvium	Low - QAL
Risks to Aquifer Access Licence holders			
R4	Risk of climate change reducing recharge and groundwater availability	Lower Lachlan Alluvium	Low
		Upper Lachlan Alluvium	Medium
		Belubula Alluvium	High
R5	Risk of growth in Basic Landholder Rights reducing groundwater availability	Lower Lachlan Alluvium	Medium
		Upper Lachlan Alluvium	High
		Belubula Alluvium	High
R6	Risk of growth in Local Water Utilities reducing groundwater availability	Lower Lachlan Alluvium	Medium
		Upper Lachlan Alluvium	Medium
		Belubula Alluvium	Medium
R7	Risk of increases in irrigation efficiency and improved water delivery reducing recharge	Lower Lachlan Alluvium	Low
		Upper Lachlan Alluvium	Medium
		Belubula Alluvium	High
R8	Risk of plantation forestry intercepting recharge	Lower Lachlan Alluvium	Nil
		Upper Lachlan Alluvium	Nil
		Belubula Alluvium	Nil
QL4	Risk of growth in mining reducing groundwater availability	Lower Lachlan Alluvium	Low
		Upper Lachlan Alluvium	Low
		Belubula Alluvium	Low
Risks to water available for the environment			
R9 R10	Risk of groundwater extraction causing local drawdown	Lower Lachlan Alluvium	GDEs – High
			IEVs - Nil
		Upper Lachlan Management Zone 1	GDEs – High

			IEVs – High
		Upper Lachlan Management Zone 2	GDEs – High
			IEVs - Medium
		Upper Lachlan Management Zone 3	GDEs – High
			IEVs - Medium
		Upper Lachlan Management Zone 4	GDEs – Medium
			IEVs - High
		Upper Lachlan Management Zone 5	GDEs – High
			IEVs - High
		Upper Lachlan Management Zone 6	GDEs – Medium
			IEVs - High
		Upper Lachlan Management Zone 7	GDEs – High
			IEVs - High
		Upper Lachlan Management Zone 8	GDEs – Medium
			IEVs - High
		Belubula Alluvium	GDEs – Low
			IEVs - Low
R11 R12	Risk of growth in plantation forestry intercepting recharge	Lower Lachlan Alluvium	GDEs - Nil IEVs - Nil
		Upper Lachlan Management Zone 1	GDEs - Nil IEVs - Nil
		Upper Lachlan Management Zone 2	GDEs – Nil IEVs - Nil
		Upper Lachlan Management Zone 3	GDEs – Nil IEVs - Nil
		Upper Lachlan Management Zone 4	GDEs – Nil IEVs - Nil
		Upper Lachlan Management Zone 5	GDEs – Nil IEVs - Nil
		Upper Lachlan Management Zone 6	GDEs – Nil IEVs - Nil
		Upper Lachlan Management Zone 7	GDEs – Nil IEVs - Nil
		Upper Lachlan Management Zone 8	GDEs – Nil IEVs - Nil
		Belubula Alluvium	GDEs - Nil

			IEVs - Nil
R13 R14	Risk of climate change reducing recharge and groundwater availability	Lower Lachlan Alluvium	GDEs – Low IEVs – Nil
		Upper Lachlan Management Zone 1	GDEs – Low IEVs – Low
		Upper Lachlan Management Zone 2	GDEs – Low IEVs - Low
		Upper Lachlan Management Zone 3	GDEs – Low IEVs - Low
		Upper Lachlan Management Zone 4	GDEs – Low IEVs - Low
		Upper Lachlan Management Zone 5	GDEs – Low IEVs - Low
		Upper Lachlan Management Zone 6	GDEs – Low IEVs - Low
		Upper Lachlan Management Zone 7	GDEs – Low IEVs - Low
		Upper Lachlan Management Zone 8	GDEs – Low IEVs - Low
		Belubula Alluvium	GDEs – Medium IEVs – Medium
QL5	Risk of poor water quality to the environment (Land and waste management practices)	Lower Lachlan Alluvium	GDEs – Low - QAL IEVs – Nil - QAL
		Upper Lachlan Alluvium	GDEs – Low - QAL IEVs – Low - QAL
		Belubula Alluvium	GDEs – Low - QAL IEVs - Low – QAL
	Land management induced water quality (salinity) deterioration	Lower Lachlan Alluvium	GDEs – Nil – QAL IEVs – Nil – QAL
		Upper Lachlan Alluvium	GDEs – Nil – QAL IEVs – Nil – QAL
		Belubula Alluvium	GDEs – Nil – QAL IEVs - Nil – QAL
	Pumping induced water quality (salinity) deterioration	Lower Lachlan Alluvium	GDEs – Low - QAL IEVs – Nil - QAL
		Upper Lachlan Alluvium	GDEs – Low - QAL

			IEVs – Low - QAL
		Belubula Alluvium	GDEs – Low - QAL
			IEVs - Low – QAL
QL6	Risk of growth in Basic Landholder Rights and Local Water Utilities to the environment (GDEs and instream ecological values)	Lower Lachlan Alluvium	Nil – QAL
		Upper Lachlan Alluvium	Nil – QAL
		Belubula Alluvium	Nil – QAL
QL7	Risk of growth in mining reducing groundwater availability	Lower Lachlan Alluvium	GDEs – Low
			IEVs – Low
		Upper Lachlan Alluvium	GDEs – Low
			IEVs – Low
		Belubula Alluvium	GDEs – Low
			IEVs – Low

3.3. Strategies for addressing risks

For the purpose of section 10.43 of the Basin Plan:

- Columns 1 and 5 of Table 8-7, and Table 8-8 of the Risk Assessment (Schedule D) detail the strategies to manage the current and future risks to the condition and continued availability of the groundwater resources of the Lachlan Alluvium.
- Column 6 of Table 8-7 of the Risk Assessment (Schedule D) identifies for each strategy the related requirements of other parts of Chapter 10 of the Basin Plan and the strategies listed in section 4.03(3) of the Basin Plan. 4.03(3)(d) has not been addressed in this WRP or the Risk Assessment as it only relates to surface water.
- Tables 8-3 and 8-1 of the Risk Assessment (Schedule D) explain why a risk is tolerable, or cannot be addressed by the water resource plan in a manner commensurate with the level of risk.
- For the purposes of 10.43(3) (b) of the Basin Plan no guidelines have been published by the Authority in relation to risk strategies under Section 4.04 of the Basin Plan.

Section 8 of the Risk Assessment provides detail of the strategies to manage risks to the condition and continued availability of the water resources of the Lachlan Alluvium WRPA. A summary of management strategies and the risks they address is provided below in Table 3-2.

For medium and high risks that cannot be addressed, Tables 8-3 and 8-1, and Figure 8-1 of the Risk Assessment set out the approach to reviewing existing strategies and rationales for why a level of risk is tolerable, or why a risk cannot be addressed in a manner commensurate with the level of risk as required by the Basin Plan.

Table 3-2. Strategies to address high and medium risks in the Lachlan Alluvium WRPA

Strategy	Relevant risks	Mechanisms/Instruments
Limit total water extraction (basic rights and groundwater take) within each groundwater source/SDL resource unit to: • Long-term sustainable diversion limits • Long-term average annual extraction limits (LTAAELs)	R1, R2, R3, R4, R5, R6, R7, R9, R10, R13, R14 QL1, QL2, QL3, QL4, QL5, QL6, QL7	Part 6 - *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020:* • limits to the availability of water
Within each groundwater source/SDL resource unit, reserve all water above the LTAAEL/SDL for the environment	R1, R2, R3, R4, R5, R6, R7, R9, R10, R13, R14, QL1, QL2, QL3, QL4, QL5, QL6, QL7	Parts 4 and 6 - *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020:* • planned environmental water provisions • limits to the availability of water
Manage the location of groundwater works and extraction at a local scale within each groundwater source/SDL resource unit to prevent or manage localised drawdown related impacts	R1, R2, R3, R5, R6, R9, R10, R13, R14, QL1, QL2, QL3, QL4, QL5, QL6, QL7	Parts 9, 10 & 11 - *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020:* • Rules for water supply work approvals • Access licence dealing rules (trade restrictions) • Conditions on access licences and water supply work approvals S.324 *Water Management Act 2000* (temporary water restrictions) Ss.100, 100A and 102 *Water Management Act 2000* (discretionary conditions on works) Determination of a dealing application made under Division 4 of Part 2 of the *Water Management Act 2000* Access Licence Dealing Principles Order 2004 (trade assessment principles) S.331 *Water Management Act 2000* (directions to holders of basic landholder rights)

3.4. Risks and impacts to water resources as identified by First Nations

> 'First Nations Peoples have rights and a moral obligation to care for water under their law and customs. These obligations connect across communities and language groups, extending to downstream communities, throughout catchments and over connected aquifer and groundwater systems'.[6]

This section refers to risks and their impacts based on consultation across the state and does not include specific risks identified by the Barkandji and Maljangapa Nations.

Figure 3-1is an artist's impression of how First Nations Peoples effectively have become separated from many locations of cultural significance along rivers. An image of a river is relevant in this groundwater WRP as both Aboriginal and western science recognise the fundamental connectivity between groundwater and surface water and the importance of groundwater in the landscape.

'The design depicts an aerial view of a river, flanked by farmland. The intent if this piece to convey how the introduction of farming practices and the land's mistreatment has destroyed many of our cultural practices and connections to the waterways that our people depended on for thousands of years.

It also speaks to the disruption farming has caused to the habits and life cycles of the wildlife which once depended on the waterways also.

The image also tells the story of the shrinking of our waterways from what were once mighty rivers and lakes, now reduced to dry riverbeds and claypans in some places and mere creeks and ponds in others.

It is hoped that people will understand that it has been our responsibility to care for these lands and waterways for generations, and to see them in their current state causes our collective spirits to feel a great sense of shame and sorrow, for we have failed our ancestors.'[7]

[6] MLDRIN, NBAN & NAILSMA 2017, *Dhungala Baaka: Rethinking the Future of Water Management in Australia (Project Summary Report),* National Cultural Flow Research Project Report

[7] Nathan Peckham, *Artists' statement (2021)*

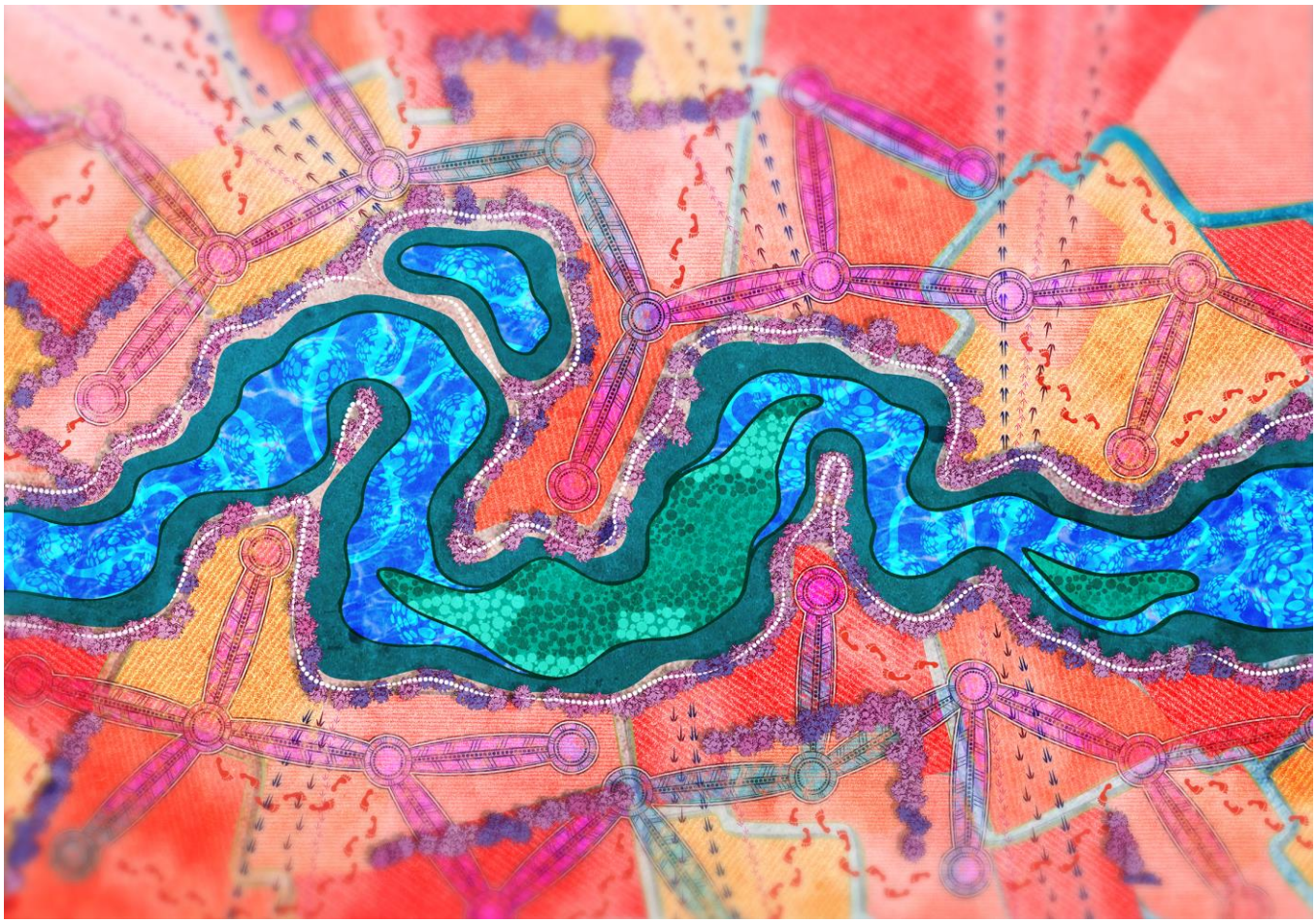


Figure 3-1. *Ghi-dhuray* – Connection to the River *(Wiradjuri – having river, artist Nathan Peckham 2021)*

Work undertaken with First Nations of the Lachlan Alluvium WRP area has established that there is "direct, causal relationships between the availability of water and Aboriginal socio-cultural life". Water is considered to be crucially important to the current and future social, environmental, spiritual, economic and cultural wellbeing of Aboriginal people. However, regarding water management Aboriginal people feel as though their voices are not heard.

Each Nation in the Lachlan Alluvium WRP area is concerned that culture and cultural practices that have been around for many years are being damaged due to poor water management decisions. They shared concern that cultural sites and traditional cultural practices such as women's birthing places, men and women's business sites, rock formations and burial sites are being tarnished due to lack of water and in some cases public use such as tourism. They recognise that the education of others about the importance of cultural sites could assist in the long-term protection and maintenance of sites but have strong fears that doing so could also result in deliberate destruction and damage to sites, as they have witnessed a lack of respect and care from some people once they know there is a significance to a particular site. "Water is Life", and poor water management effects all elements of Aboriginal practices such as bush tucker, healing practices, emotional wellbeing and identity, as well as important knowledge that needs to be passed down to the next generations and generations to come.

An inclusive approach was used to identify groundwater risks, which recognises the connected nature of surface water and groundwater systems. Accordingly, risks identified by First Nations that relate to flows in rivers and creeks in addition to specific risks to groundwater are included in this groundwater WRP.

"*It's healthy. You know, health for the people. It brings life. … Without water, we'd be done. It's our lifeblood*". From Ngiyampaa Nation consultation

"*The water is a pinnacle part of our culture and plays a critical role in our cultural activities*". From Wiradjuri Nation consultation

The risks identified by the First Nations across NSW to date are summarised in Table 3-3, and grouped by the type of impact:

- barriers to accessing water and areas with cultural significance
- loss of cultural links due to declining ecological health, and
- barriers to participating in policy making, planning and management processes.

The second column in Table 3-3 outlines the water management instruments that could be used to address the risks. Not all risks can be addressed through water management instruments.

The third column identifies other resource, economic and social planning instruments that could be used to mitigate the risk.

Often these risks related to historic and systemic issues, such as the dispossession and discrimination that First Nations have continued to experience since colonialisation.

A reference in Table 3-3 to the NSW Water Strategy includes a reference to the strategy itself, released in 2021 (https://dpie.nsw.gov.au/water/plans-and-programs/nsw-water-strategy/the-strategy) in which strategic priority 2 is to *Recognise First Nations/Aboriginal People's rights and values and increase access to and ownership of water for cultural and economic purposes*. It also includes a reference to the strategy's commitment to implement five strategic actions, being to:

- Strengthen the role of First Nations/Aboriginal People in water planning and management
- Develop a state-wide Aboriginal water strategy
- Provide Aboriginal ownership of and access to water for cultural and economic purposes
- Work with First Nations/Aboriginal People to improve shared water knowledge
- Work with First Nations/Aboriginal People to maintain and preserve water-related cultural sites and landscapes.

Table 3-3. Risks identified by First Nations and management instruments that can be used mitigate risks

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
Barriers to access		
Significant cultural sites and locations for conducting rituals have been damaged or destroyed and are not receiving adequate water flow.	WSP: Cultural water entitlements, distance rules for new bores from groundwater-dependent cultural sites LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	Land use planning Crown lands management Conservation/heritage management (public and private land) NSW Water Strategy Regional Water Strategy
TSRs, locked gates, restricted access and fencing off areas adjacent to rivers, streams billabongs and rock holes result in an inability to walk country and visit sites for cultural, spiritual and social activities.	No specific instrument	Land use planning Crown lands management Conservation/heritage management (public and private land) NSW Water Strategy Regional Water Strategy
Cultural flow water rights are essentially non-existent. Cultural flows are not given, or when they are, there is not enough water for cultural purposes. First Nations people would prefer a simpler and/or cheaper way to access cultural water; the licence process is prohibitive and unclear.	WSP: Cultural water entitlements	NSW Water Strategy Regional Water Strategy
First Nations peoples' connection to country continues to be affected by the impacts of colonisation, dispossession, relocations, and lack of jurisdiction. First Nations people feel they are disconnected from their role as caretakers of the land and have the knowledge to maintain healthy, viable waterways into the future. State water managers need to understand the whole system is interconnected, not separate.	No specific instrument	Land use planning Crown lands management Conservation/heritage management (public and private land) NSW Water Strategy Regional Water Strategy
The application of Native Title does not apply to water in the waterways; contrary to the cultural understanding of how people, place and water are connected.	WSP: Native title (basic landholder right)	Native Title system
First Nations people feel water sharing is inequitable and the system prioritises irrigators and miners. Water is over-allocated and over-extracted from systems that are too fragile for irrigation. First Nations people also believe that there is not enough transparency around water allocations.	WRP: Sustainable diversion limits WSP: extraction limits, available water determinations WSP: Cultural water entitlements	National Water Initiative Murray-Darling Basin Plan NSW Water Strategy Regional Water Strategy Water register and other transparency initiatives
Cultural links to ecological values		

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
Industrial and agricultural land uses (farming, cattle, mining) at a large scale have altered the landscape and led to erosion, reduced soil moisture, siltation of the river, barren land, poor riparian zones and river system impacts.	No specific instrument	Economic development Land use planning Crown lands management Conservation/heritage management (public and private land) Natural resource access regulation NSW Water Strategy Regional Water Strategy
Invasive plants, animals and fish (carp and redfin perch) are threatening and out competing native species and causing damage to the land and rivers including deoxygenating water and bad water quality (willows and carp) and riverbank erosion (hard-hoofed animals and carp).	WSP: Cultural water entitlements, management of environmental water (held and planned) LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	Conservation/heritage management (public and private land) Fisheries management NSW Water Strategy Regional Water Strategy
Native animals, birds, fish and aquatic life are in decline or gone completely. There is less diversity of species, not enough suitable habitat and breeding sites for waterbirds have been lost. There is not enough water flow to support wildlife and fish populations and animals frequently come into towns looking for water.	WSP: Cultural water entitlements, distance rules for new bores from rivers, management of environmental water (held and planned) LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	Conservation/heritage management (public and private land) Fisheries management NSW Water Strategy Regional Water Strategy
Decline of native plants and water plants, changes to fruiting times, loss of native bush medicine plants (old man weed), reeds for cultural practices and loss of overall vegetation diversity. Bush medicine plants available are poor quality due to poisons, there has been a reduction of in water habitat for river life (from large dead trees). The changing landscape has also led to overgrowth of certain trees like river red gum.	WSP: Cultural water entitlements, distance rules for new bores from groundwater-dependent cultural sites or ecosystems, management of environmental water (held and planned LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	Land use planning Crown lands management Conservation/heritage management (public and private land) NSW Water Strategy Regional Water Strategy

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
There is less opportunity to collect bush tucker - to fish, spear, dive or hunt to collect food and food collected is not good quality. First Nations people feel this is due to the disturbance of natural flow regimes and restricted water flow, water pollution and limited access.	WSP: Cultural water entitlements, distance rules for new bores from rivers, management of environmental water (held and planned LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	Land use planning Crown lands management Conservation/heritage management (public and private land) Fisheries management Environmental protection (EPA) NSW Water Strategy Regional Water Strategy
The timing and volume of flows (including irrigation and environmental flows) is not adequate and is having a major impact on the environment, particularly floodplains, billabongs, waterholes and anabranches and doesn't support the requirements of native plants and animals. The pace of delivering water for irrigators has reduced some sections of river to narrow canals, while others run dry.	WSP: Cultural water entitlements, groundwater available water determinations (AWDs) linked to surface water AWDs in groundwater systems that are highly connected to regulated rivers Surface water WSPs, management of held environmental water and river operations LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	NSW Water Strategy Regional Water Strategy
Water quality is often poor. It is affected by pollution, chemical runoff, mining, blue-green algae, salinity, siltation, turbidity and a lack of flow. First Nations people are unable to drink it and the poor quality affects cultural activities including gathering, swimming, and fishing.	WSP: Cultural water entitlements, distance rules for new bores from contamination sources and on-site sewage disposal systems, groundwater rules to minimise saline groundwater intrusion LTWP: Considerations for First Nations' cultural values WQMP: Water quality targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	Land use planning Crown lands management Conservation/heritage management (public and private land) Fisheries management Environmental protection (EPA)
Drought, floods, and climate change are affecting waterways, damaging Country, animals and plants.	WRP: Sustainable diversion limits WSPs: Extraction limits IRG: Drought management	NSW Water Strategy Regional Water Strategy

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
First Nations storylines, culture and connection to Country are threatened by bad water management practices. This has left the rivers degraded and sick. First Nations people are unable to pass on cultural knowledge and responsibility or educate the young people. There has been a loss of social connection and spiritual identity as rites of passage and ceremonies can't be performed.	WRP and WSP	NSW Water Strategy Regional Water Strategy
Unhealthy waterways have an impact on physical and mental health and overall wellbeing. First Nations people feel disconnection and cultural loss from poor waterways management. First Nations people see water as part of themselves, and when waterways are damaged and stressed, so too are the people. Cultural uses of water and waterways are restricted, and custodianship of Country can't be conducted.	WRP and WSP	Land use planning Crown lands management Conservation/heritage management (public and private land)
First Nations economies are affected by poor water management practices. Cultural tourism and employment opportunities are limited when waterways are in bad condition. First Nations groups are not able to use water licences for their economic benefit like other stakeholders.	WRP and WSP	Economic development Land use planning Crown lands management Conservation/heritage management (public and private land) Natural resource access regulation Commonwealth funding program
There are grave concerns about the lack of compliance and accountability in the system. First Nations people believe water users are illegally pumping water and using illegal infrastructure. They also believe that some rules in water sharing plans are too lenient and that there is inadequate monitoring of the system.	WRP and WSP	Metering Natural resource access regulation
Cease to pump rules are too lenient. Floodplain harvesting structures and floodplain infrastructure redirect overland flow away from wetlands. Floodplain development does not seem to protect critical cultural and environmental assets and floodplain mapping does not account for connectivity adequately. More stringent rules and compliance would make the river healthier.	WRP: Connectivity between water sources WSP: Rules for water take linked groundwater – surface rules for take in highly connected systems FPH: Regulation of floodplain harvesting	Land use planning Floodplain management Natural resource access regulation
First Nations water management is impacted by inappropriate and poor-quality infrastructure (dams, weirs, bores) on waterways. Block banks and canals divert water away from natural flow paths and fragment the environment. First Nations people believe weirs benefit irrigators at the cost of native flora and fauna.	WSP: distance rules for new bores from groundwater-dependent cultural sites and rivers	Water delivery and operational management
Groundwater quality and quantity is essential to healthy ecosystems. The quality of the water from bores is increasingly saline and the amount available is also decreasing.	WSP: distance rules for new bores from contamination sources and on-site sewage disposal systems, groundwater rules to	NSW Water Strategy Regional Water Strategy

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
	minimise saline groundwater intrusion WRP and WQMP	
Water does not cross the border between NSW and QLD. The water management systems in each state don't complement one another.	WRP	Murray-Darling Basin Plan New South Wales – Queensland Border Rivers Intergovernmental Agreement 2008
Participation in water management, planning and policy		
Cultural burning is restricted or not allowed and native vegetation regeneration projects or Indigenous ranger programs that could maximise opportunities for river restoration and management are not being fully utilised.	No specific instrument	Conservation/heritage management (public and private land) Bushfire management
First Nations people feel that they are not involved enough in developing water sharing plans and water resource plans and their knowledge is not properly included in water policy. As a result, rules don't reflect cultural interests and the lack of cultural input into water management has left Nations feeling disempowered and believing the government does not care about cultural concerns.	WRP and WSP engagement process	NSW Water Strategy Regional Water Strategy
First Nations people struggle with 'water literacy' - policy and engagement language is complicated and hard to understand, rules change frequently. Decision-making processes are not transparent, bureaucrats block outcomes, Traditional Owners are not in charge of, and are often overlooked in decision making processes.	WRP and WSP engagement process	NSW Water Strategy Regional Water Strategy Water literacy program
There is a need for better scientifically based mapping for environmental needs and environmental flows. Lack of research puts rivers at risk from poor decision making.	WRP: Risk assessment, groundwater-dependent ecosystem and HEVAE mapping, monitoring	NSW Water Strategy Regional Water Strategy
First Nations people feel that the policy framework for water management is not culturally inclusive, and that their cultural authority and governance over water and Country is not recognised. First Nations people believe that cultural flows are often managed too similarly to environmental flows. First Nations people believe that a lack of cultural awareness results in worse consultation outcomes.	WRP and WSP	NSW Water Strategy Regional Water Strategy
First Nations people feel ignored. Consultation practices are too infrequent or of insufficient quality, First Nations people feel that consultation with them is an afterthought and was rushed. Best practice engagement principles are not adhered to and can show a lack of cultural understanding.	WRP and WSP engagement process	NSW Water Strategy Regional Water Strategy
Insufficient/inadequate structures and support in place to enable collaboration and information sharing between nations.	No specific instrument	Murray-Darling Basin Plan

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
Commonwealth Environmental Water Office's approach to cultural flows and engagement on cultural interests is not satisfactory.	No specific instrument	Basin wide environmental watering strategy

4. Environmental water, cultural groundwater and sustainable management

This section addresses the following components of the Basin Plan:

- 10.09 Identification of Planned Environmental Water (PEW) and Register of Held Environmental Water (HEW)
- 10.17 Priority environmental assets and priority ecosystem functions
- 10.18 Priority environmental assets dependent on groundwater
- 10.19 Groundwater and surface water connections
- 10.20 Productive base of groundwater
- 10.22 Description of how requirements have been met
- 10.28 Ensure no net reduction in the protection of PEW
- 10.54 Cultural 'flows', and
- 10.55 Retention of current protection for indigenous values and uses

4.1. Identification of environmental water

The WMA 2000 defines environmental water and requires a water sharing plan (WSP) to commit water as planned environmental water. In addition, water access licences can be purchased/acquired and held for an environmental purpose.

Section 8 of the WMA 2000 defines environmental water as comprising:

- water that is committed by management plans for fundamental ecosystem health or other specified environmental purposes, either generally or at specified times or in specified circumstances, and that cannot to the extent committed be taken or used for any other purpose (**planned environmental water**)
- water **(licensed environmental water)** that is:
    - committed by an adaptive environmental water condition
    - taken or permitted to be taken under a licence of an environmental subcategory
    - taken or permitted to be taken under a licence of a class prescribed by the regulations for the purposes of section 8.

The WMA 2000 also requires a WSP to:

- commit water as **planned environmental water** in at least two of the following ways (whether by 2 separate ways or a combination of 2 ways):
    - by reference to the commitment of the physical presence of water in the water source
    - by reference to the long-term average annual commitment of water as planned environmental water
    - by reference to the water that is not committed after the commitments to basic landholder rights and for sharing and extraction under any other rights have been met
- contain provisions for the identification, establishment and maintenance of planned environmental water (environmental water rules). The environmental water rules relating to a water source do not need to specify that a minimum quantity of water is required to be present in the water source at all times.

In addition to environmental water defined under section 8 of the WMA 2000, the NSW Department of Planning and Environment recognises that water access licences may be purchased and/or held for an environmental purpose.

Planned environmental water (PEW) for the purposes of s10.09 of the Basin Plan is defined in s6 of the *Water Act 2007* (Cth). 'This definition applies irrespective of any language used or not used by a state in this regard', (MDBA Position Statement 3A – Determining PEW). PEW is **water** which meets the following criteria:

1. it is **committed** by a plan made under a State water management law or any other instrument made under a law of a State, or is **preserved** by a law of a state or an instrument made under a law of a State; and
2. it is committed or preserved for the **purposes of achieving environmental outcomes** or, in the case of committed water, other environmental purposes specified in the plan or instrument; and
3. **the water cannot**, to the extent to which it is committed or preserved for such purposes, **be taken, or used for any other purpose**.

4.1.1. Identification of Planned Environmental Water (PEW) for the Lachlan Alluvium Water Resource Plan Area

Section 10.09 of the Basin Plan requires that this WRP identifies PEW, as defined in the *Water Act 2007* (Cth), and the associated rules and arrangements relating to this water. Water sharing rules that establish PEW and specify how it is managed or protected have been included.

Rules relating only to the management of consumptive water (as defined from time to time) have not been identified as rules and arrangements relating to PEW, as they manage access to water available for extraction. Rules that may provide an environmental benefit, improve water management or manage risk are also not identified for s 10.09 if they do not directly relate to PEW

The *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (the WSP) reserves for the environment all water in remaining excess of the Long Term Average Annual Extraction Limit (LTAAEL) for each groundwater source on a long-term average annual basis. The relationship between the LTAAELs for the Lachlan Alluvial groundwater sources and the Basin Plan SDLs for the WRPA are described in Table 5-2. To ensure this PEW is protected, the WSPs contain rules which provide for a reduction in water credited to or debited from aquifer access licence accounts via AWDs or the maximum water account debit when an assessment indicates extraction has exceeded an LTAAEL or an SDL.

The WSP also commits as PEW the water remaining after water has been taken under basic landholder rights, access licences and any other rights under the WMA 2000, and that cannot be carried over from one water year to the next in water allocation account. As such, water that 'spills' from accounts at the end of a water year becomes PEW.

A full list of PEW and the associated rules and arrangements relating to PEW are set out in the blue box below to meet requirements under s 10.09.

For the purpose of section 10.09(1) of the Basin Plan the following provisions of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* apply:

- Clauses 16 and 17
- Division 1 of Part 6
- Part 8

4.1.2. No net reduction in the protection of PEW

Changes made to state water management arrangements relating to PEW since the commencement of the Basin Plan

The *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*[8] (the 2012 WSP) and the Water Sharing Plan for the Lower Lachlan Groundwater Source 2003[9] (Lower Lachlan 2003 WSP) included provisions committing, identifying and maintaining PEW in the Lachlan Alluvial Groundwater Sources immediately before the commencement of the Basin Plan.

The 2012 WSP also included provisions for unregulated water sources not relevant to the Lachlan Alluvium WRP.

When developing the WRP, NSW reviewed the water sharing rules for the Lachlan Alluvial Groundwater Sources and included all Lachlan alluvial groundwater sources in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (2020 WSP). Proposals to change PEW rules were developed in close consultation with the NSW Department of Planning and Environment – Environment and Heritage Group consistent with the WSP objectives.

This resulted in the following changes to provisions for the Lachlan Alluvial Groundwater Sources:

- Provisions removed from;
  - Part 4 - Subclause under Clause 18 (Lower Lachlan 2003 WSP) and Clause 16 (2012 WSP) that stated that water is committed and identified as planned environmental water by reference to the commitment of the physical presence of water in these water sources.
    - Part 4 - Subclauses under Clause 17 (2012 WSP) that estimated the planned environmental water as a proportion of the long-term average annual recharge and the storage for each groundwater source.
  - Part 4 – Subclauses under Clause 18 (Lower Lachlan 2003 WSP) that
    - Reduced PEW by the allocation to supplementary water access licences provide for reviews and changes to the portion of recharge committed as planned environmental water in the Lower Lachlan Groundwater Source following studies of groundwater-dependent ecosystems.
- Provisions changed:
  - Part 6 (2020 WSP) - Reference to supplementary water access in the Lower Lachlan Groundwater Source LTAAEL has been removed as supplementary water access licences are now cancelled.
  - Part 6 (2020 WSP) - Rather than expressing the LTAAEL in the Lower Lachlan Groundwater Source as a volume per year plus BLR, the BLR estimates in Part 5 Division 2 (2020 WSP) has been added to the LTAAEL.
  - Part 6 (2020 WSP) - When assessing compliance with the LTAAEL, the 2020 WSP (Clause 27) assess average annual extraction over 5 years instead of 3 years in the Lower Lachlan Groundwater Source (Lower Lachlan 2003 WSP)
- Provisions added to the 2020 WSP:
  - Part 6 (2020 WSP) - Clause 29 allowing the Minister to make further available water determinations in a water year if the Minister had previously reduced available water determinations if assessment demonstrated non-compliance with limits.
  - Part 6 (2020 WSP) - Division 1 of Part 6 requiring NSW to assess compliance with the Basin Plan SDLs and identifying actions if there is non-compliance with SDLs.
  - Part 6 (2020 WSP) - Division 1 of Part 6 to allow the maximum water account debit to be reduced if there is non-compliance with the limits.

[8] https://legislation.nsw.gov.au/view/html/2012-09-14/sl-2012-0458 – version 14 September 2012 to 3 January 2013
[9] https://legislation.nsw.gov.au/view/html/2011-08-12/sl-2003-0187 - version 12 August 2011 to 31 December 2013

The effect of all other provisions identifying, establishing, and maintaining PEW remained unchanged between the Lower Lachlan 2003 WSP, the 2012 WSP and the 2020 WSP. This includes provisions under Part 8 of the 2020 WSP that sets the maximum carry over permitted from one water-year to the next and the water allocation debiting rules. While the way these rules are expressed has changed to improve clarity, the effect of those rules has not changed given:

- The 2020 WSP sets the 'maximum water account debit' which equals the maximum volume of water 'taken' + allocations sold as:
  - maximum allocation + carryover permitted + allocations bought + allocations recredited under s76 WMA 2000
- The Lower Lachlan 2003 WSP and the 2012 WSP set the maximum volume of water that can be 'taken' as:
  - maximum allocation + carryover permitted + allocations bought – allocations sold + allocations recredited under s76. (This is equivalent to take + allocations sold = maximum allocation + carryover permitted + allocations bought + allocations recredited under s76.
- Maximum available determinations and carryover limits have not change between plans.

Application of the Lower Lachlan 2003 WSP and the 2012 WSP

The application of the Lower Lachlan 2003 WSP and the 2012 WSP means that the PEW:

- included:
  - the long-term average annual commitment of water resulting from compliance with limits and
  - water remaining after water has been taken under basic landholder rights, access licences and any other rights under the WMA 2000, and the water that cannot be carried over from one water year to the next
- and was maintained by the application of the
  - LTAAEL and the compliance rules and
  - account rules.

While clauses in the 2012 WSP include AWD provisions as maintaining PEW, the mechanisms that allows AWDs to be reduced following an assessment of non-compliance with the LTAAEL is applied by Division 1 of Part 6 of this WSP and not Division 2 of Part 6.

No reduction in the volume, effectiveness or legal protection of PEW

The 2020 WSP provides for:

- equivalent volume, effectiveness and legal protection of PEW to the 2012 WSP.
- equivalent effectiveness and legal protection of PEW as the Lower Lachlan 2003 WSP
- increased volume of PEW compared to the Lower Lachlan 2003 WSP.

The changes in Part 4 have no material effect on the legal protection, the volume or the effectiveness of planned environmental water as:

- PEW remains committed and protected in two ways as required by the WMA 2000.
- The extraction limits and compliance with the limit's clauses and account management rules remain in the 2020 WSP (Part 6 Division 1 and Part 8).
- Subclauses in Clause 17 in the 2012 WSP did not protect a percentage of rainfall recharge as PEW. Rather it provided an estimate of recharge established as PEW arising from applying the LTAAELs. Removing these recharge estimates, which may change over time, and provisions allowing a portion of recharge to be included following studies in the Lower Lachlan Alluvial Groundwater Sources in the Lower Lachlan 2003 WSP, does not reduce the protection of PEW.

- While Subclause 18(1) in the Lower Lachlan 2003 WSP and Clause 17(1)(a)(iii) in the 2012 WSP committed the groundwater storage over the long term as PEW, the water committed in these clauses is still maintained by the application of Division 1 Part 6 and Part 8 of the 2020 WSP.

There is no reduction in the effectiveness, volume or legal protection of PEW arising from changes to Part 6 given:

- The volume in excess of the LTAAEL remains protected as PEW and cannot be used for any other purposes.
- The LTAAELs were not designed to manage groundwater levels or groundwater extraction on a short term or asset scale. Extending the period for assessing average annual extraction from 3 years to 5 years in the Lower Lachlan Alluvial Groundwater Sources doesn't allow additional extraction on the long-term therefore the effectiveness, volume and legal protection of PEW has remained unchanged. The plan maintains rules to take action if assessment shows non-compliance with the limits. This longer period for assessment supports socio-economic objectives by allowing groundwater extraction to vary within the period of the WSP in response to seasonal variations in climate while ensuring extraction does not exceed the LTAAELs over the long term.
- The ability to reduce the maximum water account debit (in addition to, or instead of reducing the AWDs if there is non-compliance with the limits) provides another mechanism to ensure extraction remains within limits and PEW is maintained.

There is an increase in the volume of PEW in the Lower Lachlan Alluvial Groundwater Sources as:

- Before 23 November 2012, there were supplementary water access licences in the Lower Lachlan 2003 WSP. Under the Lower Lachlan 2003 WSP, the LTAAEL in this groundwater source was reduced by the volume of water allocated to supplementary water access licences each year. Available water determinations to supplementary water access licences were reduced until allocations were zero on 1 July 2017. With these licences now cancelled, LTAAELs are reduced in these groundwater sources, and the volume of PEW increased.

There is a minor increase in legal protection of PEW by adding provisions that require compliance with the Basin Plan SDLs in Part 6:

- While the SDL and the LTAAEL are the same, an additional method of assessing compliance with the limits will increase the likelihood of identifying growth in take beyond the limits, strengthening the compliance with limits provisions.

Changes in Part 6 to allow further AWDs or the maximum water account debit to increase after 1 July does not change the effectiveness, volume or legal protection of PEW. The Lower Lachlan 2003 WSP and the 2012 WSP were silent on this matter. This change improves transparency on how NSW assesses and manage compliance to limits, reflecting the operational practice of the department. A reduced AWD or maximum water account debit may need to be made at the start of a water year if metering data available at the time indicates there is likely to be non-compliance with limits. However, all data is not received until October each year. If new data, received after making announcements on 1 July, indicates compliance with the limits, AWDs or the maximum account debit may be increased up to limits specified in Part 6. This supports the socio-economic objectives of the WSP while maintaining PEW.

Part 8 of the 2020 WSP maintains the protection of PEW provided by the Lower Lachlan 2003 WSP and the 2012 WSP given there is no change in the maximum volume of water that can be carried over from one water year to the next or the maximum volume that can be debited from an account. Any unused water allocation that cannot be 'carried over' into the subsequent water years becomes planned environmental water.

In total, these rules ensure there is no 'net' reduction in the protection of PEW from the protection provided for under NSW water management arrangements before the commencement of the Basin Plan on 23 November 2012.

For the purpose of section 10.28 of the Basin Plan, the rules in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* relating to the protection of PEW identified in section 4.1.1 which have been amended since the commencement of the Basin Plan are:

- Clauses 16 and 17, no longer commit water as PEW by reference to the 'physical presence of water'. Instead, the WSP maintains the physical presence of water by provisions in Division 1 Part 6 and Part 8.
- Clause 17 no longer commits or compares the PEW to the estimated percentage of recharge and storage in the groundwater sources.
- The LTAAEL in clause 25 for the Lower Lachlan Groundwater Source no longer includes allocations to supplementary water access licences.
- The assessment of compliance with LTAAEL in Division 1 of Part 6 in the Lower Lachlan Groundwater Source compares the LTAAEL with average annual extraction over 5 years instead of 3 years.
- A provision was added to Division 1 of part 6 to allow the maximum water account debit to be reduced if there in non-compliance with the limits.

These changes to the rules relating to the protection of PEW do not result in a net reduction in the protection of planned environmental water compared to the protection provided under state water management law on 23 November 2012.

4.1.3. Register of held environmental water (HEW)

Held environmental water (HEW) represents a group of licences that are committed to the environment at any one time. This group of licences reserves water from the consumptive pool, in addition to PEW, specifically for environmental water purposes. HEW, as a water access entitlement, may be available to trade (where permitted) on the temporary market. HEW is commonly held by entities such as the CEWH and Environment and Heritage Group of the NSW Department of Planning and Environment.

For the purpose of 10.09(2) and 10.09(3) of the Basin Plan, the Department of Planning and Environment is responsible for the establishment and maintenance of a published register of held environmental water in the Lachlan Alluvium WRPA that records:

- the characteristics of held environmental water in the WRP area (for example, quantity, licence category, licence type)
- who holds that water.

This register is available online (https://www.industry.nsw.gov.au/water/environmental-water-hub/public-register/environmental/licences).

At the commencement of this Plan, a zero share HEW Water Access Licence exists within the Lachlan Alluvium WRPA.

4.2. Priority environmental assets dependent on groundwater, including surface water connectivity

The Lachlan Alluvium WRP has had regard to the protection of watering requirements for environmental assets dependent on groundwater (GDEs). GDE mapping has been undertaken to support WRP risk assessments and Long-Term Water Plans (LTWPs) and to inform the development of WRPs and WSP updates. This mapping work includes GDEs based on vegetation types with a high probability of groundwater dependency. It has also been assumed that any river that has a base flow component of its flow regime has some groundwater dependency (unless the underlying groundwater source is disconnected). These base flow assets have also been identified in the LTWP.

An ecological value has been assigned to the identified GDEs based on the High Ecological Value Aquatic Ecosystems (HEVAE) framework. The GDE HEVAE methods have direct alignment with Schedules 8 and 9 of the Basin Plan.

A map of the high priority GDEs considered as key environmental assets form part of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* and is reproduced below in Figure 4-1. These assets are areas of very high and high ecological value vegetation and Ramsar/DIWA wetlands, with a high probability of groundwater dependence, and are summarised in Table 4-1.

Specific environmental watering requirements (EWRs) for groundwater priority environmental assets and ecosystem functions, such as the extent and thresholds for groundwater dependence, have not been identified in the Basin Plan or this WRP. Instead, the WRP and Risk Assessment consider the risk to meeting EWRs by assessing the risk of insufficient water available for the environment using the threat of groundwater extraction or interception activities lowering groundwater levels.

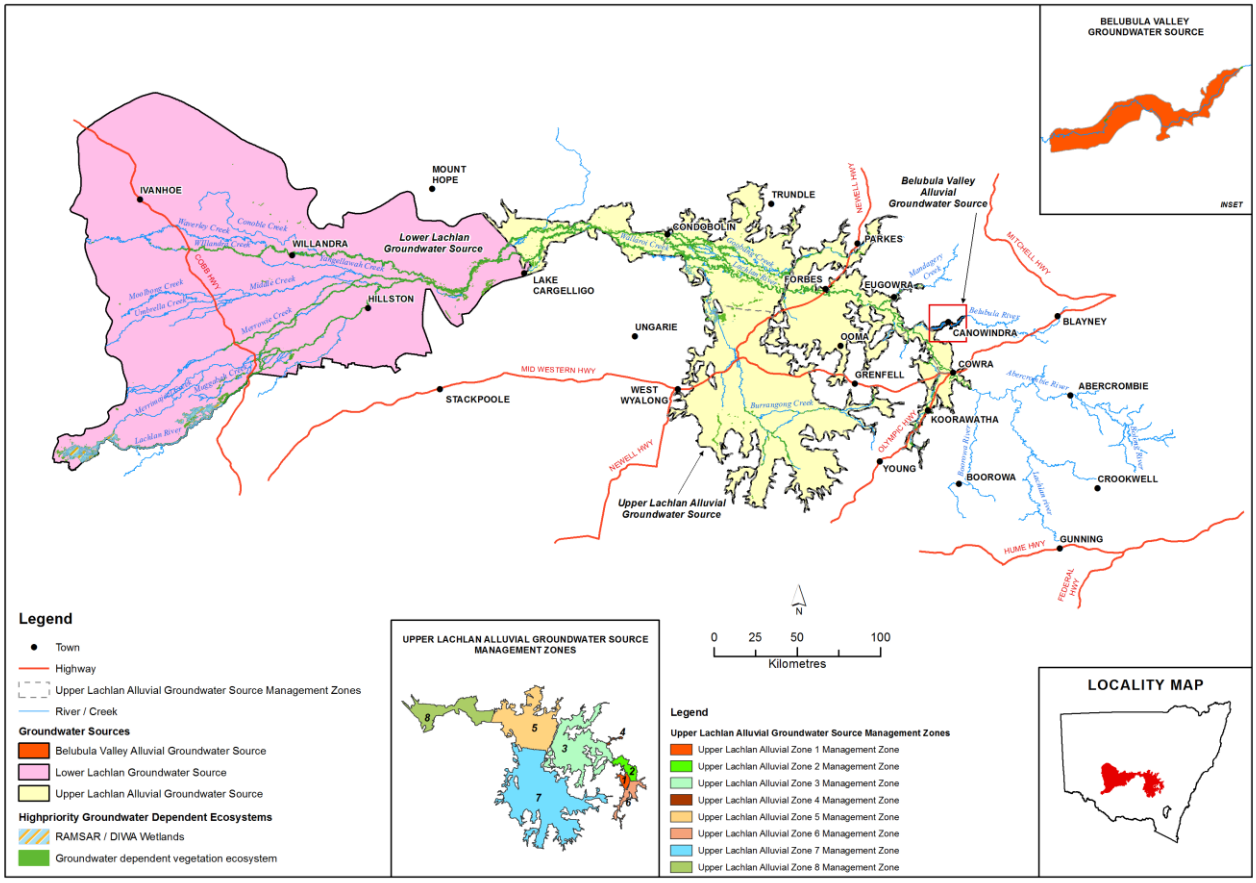


Figure 4-1. High priority groundwater dependent ecosystems in the Lachlan Alluvium WRPA.

Table 4-1. Key environmental assets within the Lachlan Alluvium WRPA

Lower Lachlan Alluvium				
Key Ecological Assets				
• Lachlan Swamp	• Great Cumbung Swamp	• Lake Brewster	• Booligal wetlands	• Patches of very high and high ecological value
Key Ecological Values				
Six groundwater dependent woodland forests and wetlands including black box, lignum, river red gum. Three non woody wetlands including Cumbungi rush land wetlands				
Upper Lachlan Alluvium				
Key Ecological Assets				
• Merrowie Creek wetlands	• Blakelys red gum-yellow box EEC	• Lake Cowal wetlands	• Patches of very high and high ecological value	
Key Ecological Values				
Eleven Groundwater dependent woodland forests and wetlands including block box, lignum, river red gum, yellow box. Three freshwater wetlands including cane grass swamps and cumbungi rush land wetlands.				

The WSP sets restrictions on the granting or amending of water supply works within specified distances of high priority GDEs to ensure that the operation of the WSP does not compromise the meeting of environmental water requirements.

Standardised distances based on expert advice were applied across all groundwater SDL resource units in NSW in 2020. This resulted in the setback distance for BLR works from the Bogolong Springs and Old Man Springs reducing from 200m to 100m.

Applying the standard distance of 100m for works used solely for BLR purposes:

- better recognises that the risk of take (estimated as less than 3ML/year per bore) by these works to EWRS is significantly lower than works used for other purposes and
- reflects that under the WMA 2000, the sharing of water from a water source must protect the water source and its dependent ecosystems first, then BLR before protecting any other right.

The process outlined in Figure I-4 and Table I-3 of Schedule I identifies the triggers and actions for determining groundwater access restrictions if authorised take causes or is likely to cause unacceptable impacts on high priority GDEs.

Risks arising from dense distribution of BLR works can be managed by section 100(1)(b)(ii), 97(2), 107 (5), 324(1) and 324 (2) of the WMA2000 that provides for the Minister to:

- impose conditions on approvals to protect the environment
- only grant or amend a water supply work approval if satisfied that adequate arrangements are in place to ensure that no more than minimal harm will be done to any water source, or its dependent ecosystems as a consequence of the construction or use of the proposed or amended water management work
- prohibit or restrict take within a specified area and for a specified period to maintain or protect water levels in an aquifer; maintain pressure or ensure pressure recovery in the aquifer; or to protect groundwater-dependent ecosystems

Distance rules for water supply works (nominated by an access licence or used solely for BLR purposes) from the edge of an escarpment were removed in 2020 as there are no escarpments identified in the Lachlan area.

The restrictions on the granting or amending of water supply works within specified distances of high priority GDEs do not apply to GDEs shown on the High Priority Groundwater Dependent Ecosystem Map in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* unless the NSW Department of Planning and Environment has confirmed a high probability of groundwater dependence for the relevant ecosystem. The department is developing a process to confirm the probability of groundwater-dependence for high priority GDEs that will be in place by the end of 2022.

The WMA 2000 also provides for the Minister for Water to take action to limit or prohibit extraction from specific works (bores) or works in a specified area to protect GDEs and instream values.

Management of extraction within the LTAAELs and SDLs also contributes to managing risks to GDEs. These limits generally are determined with reference to data on historic records of use, groundwater levels, rainfall and gain and loss of connectivity to streams. Groundwater availability is maintained in the long term for GDEs and instream ecological values in a general sense, and for ongoing extraction for economic and social purposes. Note that while PEW rules related to LTAAEL and SDL compliance may help manage risks to GDEs, the restrictions on the granting or amending water supply works within specified distances of high priority GDEs do not protect PEW and are not rules or arrangements relating to PEW.

Risk assessments have been undertaken to consider the risks of insufficient water being available for the environment including GDEs and instream ecological values. The risk assessment outcomes for potential risks to GDEs associated with groundwater extraction causing drawdown were medium and high in the Lachlan Alluvium WRPA.

The strategies to address these risk outcomes are shown in Table 8-7 of the Risk Assessment (Schedule D). These strategies are largely rules in the WSP designed to protect GDEs and instream ecological values and maintain groundwater and surface water connectivity. These rules include distance rules to minimise the impact of the location of new bores, account rules for managing access licences, and rules limiting the availability of water to ensure compliance with LTAAELs and SDLs as outlined above.

For the purpose of section 10.17 no rules are specified in this Plan to provide for the management of solely surface water-dependent priority environmental assets and priority ecosystem functions.

For the purpose of section 10.18, 10.19 and 10.22 of the Basin Plan:

- The High-Priority Groundwater Dependent Ecosystems referred to in clause 4(4) of the WSP (Schedule A) specifies the priority environmental assets that depend on groundwater in the WRPA (GDEs).
- Surface water systems with significant hydrologic connection to the groundwater resources in the WRPA are identified in section 2.2 of this WRP.
- Table 3-1of this Plan and Section 6 of the Risk Assessment (Schedule D) shows regard has been had to the necessity for rules to manage the risks to meeting environmental watering requirements of GDEs and instream ecological values in the WRPA.
- The following rules ensure that the operation of the Plan does not compromise the meeting of environmental watering requirements of GDEs, instream ecological values, and other surface water priority environmental assets and priority ecosystem functions that may also be dependent on groundwater in the WRPA.
    - Division 1 of Part 6 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that limits the long-term average annual rates of extraction.
    - Clause 34 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that links available water determinations for aquifer (high security) access licences to available water determinations made for regulated river (high security) access licences in the Belubula Regulated River Water Source.
    - Clause 41 and subclauses 43(1)(b), 43(1)(c), 43(1)(d), 43(2) and 43(3) of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that restrict the location of new or amended works to minimise impacts on GDEs and instream ecological values. The department is developing a process to confirm the probability of groundwater-dependence for high priority GDEs that will be in place by the end of 2022.
    - Clause 36 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that defines the maximum water account debit.
    - The process outlined in Figure I-4 and Table I-3 of Schedule I for determining the circumstances in which limits on the rate of extraction of groundwater from works would be applied to prevent unacceptable impacts on groundwater-dependent ecosystems and instream ecological values at the local scale
    - Section 100(1)(b)(ii) of the WMA 2000 that provides for the Minister to impose conditions relating to the protection of the environment.
    - Section 97(2) and Section 107(5) of the WMA 2000 that provides that the Minister for Water may only grant or amend a water supply work approval if satisfied that adequate arrangements are in place to ensure that no more than minimal harm will be done to any water source, or its dependent ecosystems, as a consequence of the construction or use of the proposed or amended water management work
    - Section 324 (1) and (2) of the WMA 2000 that authorises the Minister to direct that, within a specified area and for a specified period, the taking of water from

that aquifer, or from any other aquifer that is above, below or adjacent to that aquifer, is prohibited, or is subject to specified restrictions, as the case requires to maintain or protect water levels in an aquifer, maintain pressure, or to ensure pressure recovery, in an aquifer, or to protect groundwater-dependent ecosystems.

For the purpose of section 10.26(1) and 10.26(2) of the Basin Plan, sections 6.1.1, 6.2.1, 6.2.2 and Table 6-2 in the Risk Assessment (Schedule D) demonstrate that the Lachlan Long-Term Water Plan, given effect by the Lachlan surface water WRP, provides for the surface water requirements of groundwater-dependent assets and functions, and that regard was had to the most recent version of that plan.

4.3. Productive base of groundwater

The sustainable management of groundwater in these SDL resource units ensures the ongoing viability of the groundwater sources. The *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* establishes LTAAELs for the groundwater sources and manages extraction within these. LTAAELs, and provisions for management of extraction within these, have been developed to ensure the long-term availability of water for productive use generally, and to protect high priority uses such as for critical human water needs. They also have regard to acceptable impacts on the connected surface water and groundwater resources. The management of extraction to these limits and the rules provided in the blue box for accreditation against section 10.20 of the Basin Plan will ensure these hydraulic relationships are maintained within acceptable limits.

In addition, section 324(2) of the WMA 2000 authorises the Minister for Water to direct that, within a specified area and for a specified period, the taking of water from these aquifers, or from any other aquifer that is above, below or adjacent to these aquifers, is prohibited, or is subject to specified restrictions, as the case requires to:

- maintain or protect water levels in an aquifer, or
- maintain, protect or improve water quality in an aquifer, or
- prevent land subsidence or compaction in an aquifer, or
- protect groundwater-dependent ecosystems, and
- maintain pressure, or to ensure pressure recovery, in an aquifer.

For the purpose of section 10.20 and 10.22 of the Basin Plan:

- There are no non-renewable groundwater resources in the Lachlan Alluvium WRPA
- Table 3-1 of this Plan identifies the level of risk of structural damage to an aquifer in the WRPA.
- Sections 4.3 – 4.3.1 and 4.3.2 of the Risk Assessment (Schedule D) shows regard has been had to the necessity for rules to manage the risk to the structural integrity of the aquifers in the WRPA.
- Sections 3.3.1 – 3.3.2, 4.4 – 4.4.1 and 4.4.2, 4.6 – 4.6.1 and 4.7 – 4.7.1 of the Risk Assessment (Schedule D) shows regard has been had to the necessity for rules to manage the risk to hydraulic relationship between groundwater and surface water systems, between groundwater systems, and within groundwater systems.
- Tables 8-3 and 8-1 of the Risk Assessment (Schedule D) explain why a risk is tolerable or cannot be addressed by the water resource plan in a manner commensurate with the level of risk.
- The following rules ensure that the operation of the plan does not compromise overall structural integrity of the aquifers and overall hydraulic relationship in the WRPA:
    - Division 1 of Part 6 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that limits the long-term average annual rates of extraction.
    - Clause 39 and 41(1)(a) of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that restrict the location of new or amended works to manage interference between works and near the high bank of a river.
    - Clause 36 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that defines the maximum annual water account debit.
    - Clause 34 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* that links available water determinations for aquifer (high security) access licences to available water determinations made for regulated river (high security) access licences in the Belubula Regulated River Water Source.
    - Clause 58(1) of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* provides mandatory conditions for the construction of water supply works in the WRP area. These mandatory conditions may mitigate risks to hydraulic relationships and properties in the immediate vicinity of the work.
    - The process outlined in Figure I-4 and Table I-3 of Schedule I for determining the circumstances in which limits on the rate of extraction of groundwater from works would be applied to prevent unacceptable impacts on water levels or pressures at the local scale.
    - Section 97(2) and Section 107(5) of the WMA 2000 that provides that the Minister for Water may only grant or amend a water supply work approval if satisfied that adequate arrangements are in place to ensure that no more than minimal harm will be done to any water source, or its dependent ecosystems, as a consequence of the construction or use of the proposed or amended water management work.
    - Section 100(1)(b)(ii) of the WMA 2000 which provides for the Minister to impose conditions on water supply work approvals relating to the protection of the environment.
    - Section 324 (1) and (2) of the WMA 2000 that authorises the Minister to restrict or prohibit water take.

4.4. Cultural connections to groundwater and retention of the current level of protection for Aboriginal values and uses

4.4.1. Cultural water and flows

Aboriginal values and uses of groundwater provide a cultural connection to land and First Nation people are acknowledged as the first managers and carers of this natural resource.

Aboriginal values and uses are outlined in section 1.3.1 of this Plan.

Water is crucially important to the current and future social, environmental, spiritual, economic and cultural wellbeing of Aboriginal people. However, Aboriginal people feel as though their voices are not heard in water management and cultural flows and outcomes are not considered in policy and implementation.

The 2007 Echuca Declaration defines cultural flows as "water entitlements that are legally and beneficially owned by the Indigenous Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, environmental, social and economic conditions of those Indigenous Nations. This is our inherent right." The NSW Government will apply the guides developed under the National Cultural Flows Research Project when working with First Nations people on cultural flows.

Where appropriate, NSW Department of Planning and Environment will work with Traditional Owners and Aboriginal people and organisations and adopt the processes developed in the *A Pathway to Cultural Flows in Australia*[10] and *Cultural Flows—A guide for First Nations*[11].

For the purpose of section 10.54 of the Basin Plan:

- This Plan has regard to the views of Aboriginal people with respect to cultural flows (cultural connections to groundwater) by including Attachments A and D of Schedule C.
- The development of the State Water Strategy has identified the need for additional work to achieve cultural water flows and water management aspirations. Several key pieces of work provide the foundation for the way forward, including First Nations-led work developed under the National Cultural Flows Research Project. The Government will continue to work with First Nations and Aboriginal people and organisations, and apply the processes developed in the Pathway to Cultural Flows in Australia, Cultural Flows—A guide for First Nations and Cultural Flows—A guide for Water Managers.

4.4.2. Legal protection of Aboriginal heritage

A range of rules currently operate to protect Aboriginal cultural heritage at both State and Commonwealth levels. In NSW, the main legislation under which protected areas are created and managed is the *National Parks and Wildlife Act 1974 (NSW)*. The *Heritage Act 1997 (NSW)* provides for a State Heritage Register where items of significance can be listed. Heritage Orders to control potential developments that may harm the heritage value of items are issued under this Act.

There are also protections for Aboriginal heritage under a range other legislation, policies and strategies. Table 4-2 lists key legislation in NSW that is relevant to Aboriginal cultural heritage. Figure 4-2 is an example of how key legislation can operate to protect Aboriginal cultural heritage values. It is acknowledged that this legislation does not have water related requirements.

[10] Murray Lower Darling Rivers Indigenous Nations (MLDRIN), Northern Basin Aboriginal Nations (NBAN) & North Australian Indigenous Land and Sea Management Alliance (NAILSMA), 2018
[11] Murray Lower Darling Rivers Indigenous Nations (MLDRIN), Northern Basin Aboriginal Nations (NBAN) & North Australian Indigenous Land and Sea Management Alliance (NAILSMA), 2017

As part of a long-standing reform initiative, Heritage NSW under the NSW Department of Premier and Cabinet, will manage Aboriginal cultural heritage regulation. NSW is undertaking consultation with peak Aboriginal bodies on Aboriginal cultural heritage legislation to ensure self-determination and custodianship is at the centre of any legislation that deals with Aboriginal cultural heritage.

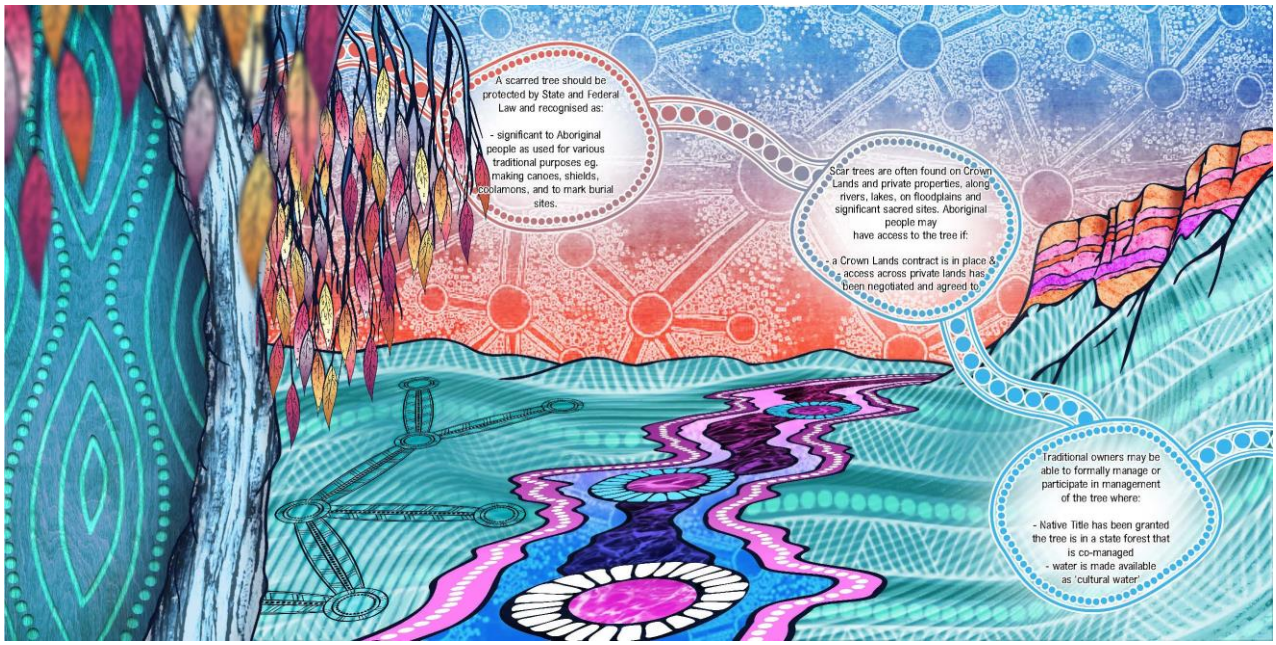


Figure 4-2. Cultural heritage protection of a scarred tree *(artist Nathan Peckham, 2021)*

Table 4-2. Key legislation in NSW that protects water related Aboriginal heritage.

NSW Legislation	Relevance to Aboriginal cultural heritage protection
Water Management Act 2000, and Water Sharing Plans	Aboriginal representation on water management committees; Aboriginal cultural access and community development licences as part of Water Sharing Plans. Water sharing plans provide for recognition of Native Title determinations and have provision for water entitlements for Aboriginal cultural purposes as part of basic landholder rights. Groundwater water sharing plans include distance rules that restrict the location of new or amended works near groundwater-dependent culturally significant areas. Applications for water management work approvals are advertised.
National Parks and Wildlife Act 1974	Provides for the protection of Aboriginal objects and declared Aboriginal Places in NSW; and to foster appreciation, understanding and enjoyment of Aboriginal cultural heritage. Provides protection by establishing offences for 'harm' (damage, destroy, deface or move). Requires that information on Aboriginal cultural heritage be maintained in the Aboriginal Heritage Information Management System (AHIMS). Allows for the reservation of Aboriginal Areas and for the co-management of some national parks through Boards of Management.
Environmental Planning and Assessment Act 1979	Provides planning controls and requirements for environmental assessment. Oversees land-use planning for local areas. Compulsory clause in standard Local Environmental Plan template specifically for conservation of locally significant Aboriginal heritage.

NSW Legislation	Relevance to Aboriginal cultural heritage protection
Crown Lands Act 1989	Sets out processes and principles for using and managing Crown land. The Act enables covenants to be placed over Crown land to protect environmental and cultural and heritage values before the land is sold or transferred.
Aboriginal Land Rights Act 1983	Establishes a system of Local Aboriginal Land Councils (LALC) across NSW. LALCs and NSWALC can also acquire and deal in land and negotiate agreements for access to private land for cultural resource use. LALCs have a role in the protection and promotion of awareness of Aboriginal culture and heritage.
Native Title Act (NSW) 1994	Enables full ownership of land via native title as well as provision for making agreements via Indigenous Land Use Agreements (ILUA).
Forestry Act 1916	Allows for the co-management of State Forests. Boards of Management have been established and resourced for three State Forests. Under this Act, Aboriginal people can gain access to state forests for obtaining forest products and materials.
Fisheries Management Act 1994, and the *Marine Parks Act 1997*	The Fisheries Management Act issues permits for taking fish for cultural community events. The Marine Parks Act permits Aboriginal cultural resource use in certain areas/zones of marine parks in particular circumstances.
Rural Fires Act 1997	When hazard reduction and wildfire control is carried out, Aboriginal heritage is taken into account via AHIMS (Aboriginal Heritage Information System) searches and consideration of relevant management plans.
Game and Feral Animals Control Act 2002	Certain Aboriginal people are exempt from licence requirements for hunting feral animals.
Land Acquisition (Just Terms Compensation) Act 1991	An authority of the State of NSW may acquire land in exceptional circumstances.
Threatened Species Conservation Act 1995	Requires that Aboriginal people's interests be considered in threatened species recovery plans.

4.4.3. Protecting Aboriginal values and uses

Various state instruments and policies apply to the protection of cultural connections to groundwater. Provisions for groundwater for cultural purposes are implemented through water sharing plans in NSW. Table 4-3 summarises the key provisions in the protection and development of Aboriginal peoples' groundwater values and uses in the WRPA.

Table 4-3. Existing protection of Aboriginal people's values and uses for water under NSW legislation/regulations.

Relevant NSW Legislation/Regulation	Where Implemented	Changes as a result of WRP
s.3 (c) (iv) of WMA 2000	Specified in Part 2 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* Acknowledgement of and identification of Aboriginal cultural objectives, strategies and performance indicators.	Improved
s.5 (2) (e) of WMA 2000	Specified in Part 2 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* Part 9 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* also applies rules for managing water supply works near groundwater dependent culturally significant areas.	Improved
S.5 (3) and 9 (1) of WMA 2000	Clause 29 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* – Basic Landholder Rights (Native Title) access not reduced if plan limits are breached.	Retained from pre-WRP arrangements
Schedule 4(16) of WMA 2000	Land vested in a Aboriginal Land Council declared as exempt from the payment of rates and fees	Retained from pre WRP arrangements
s.55 of the WMA 2000	Native Title basic landholder rights established under s.55 of the WMA 2000 provides for any water access as determined in the area under *Native Title Act 1993* (Cth) Part 5 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	Retained from pre WRP arrangements
61(1)(a) of the WMA 2000	An application may be made for specific purpose access licences (subcategory "Aboriginal cultural"), for Aboriginal cultural purposes Part 7 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	Retained from pre WRP arrangements
s.8(1) of the *Access Licence Dealing Principles Order 2004*	Dealings (trade) should not affect geographical and other features of Indigenous significance.	Retained from pre WRP arrangements
The NSW *Water Management (General) Regulation 2018, Schedule 3*	The *NSW Water Management (General) Regulation 2018* (Schedule 3) establishes (of relevance to this Plan) Aboriginal commercial, Aboriginal cultural, and Aboriginal community development subcategories of access licences. This Regulation replaces the *Water Management (General) Regulation 2011.*	Retained from pre WRP arrangements

NSW *Water Management (General) Regulation 2018*, cl.26.	The *NSW Water Management (General) Regulation 2018* cl.26 provides that applications for most water management works approvals must be advertised. This Regulation replaces the *Water Management (General) Regulation 2011.*	Retained from pre WRP arrangements
Formal data use agreements with First Nations	The agreements clearly describe the limited purposes that the information collected during the consultation can be used for. Third parties are directed to the relevant First Nations to seek permission to use information for any other purpose.	Improved

Subclause 35(2) in Part 7 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* provides for the granting of an aquifer (Aboriginal cultural) access licences if the share component is no greater than 10 ML/year. This reflects rules in the water sharing plans that operated as interim or transitional water resource plans prior to this WRP commencing. While the *Water Sharing Plan for the Lower Lachlan Groundwater Sources 2003* did not specifically limit licences to no more than 10 ML per year, the plan limited the shares to the minimum required to meet that purpose and circumstance. Policy decisions made since 2003 applies volumetric limits of 10 ML per year per application with no limit on the total number of aquifer (Aboriginal cultural) access licences.

For the purpose of section 10.55 of the Basin Plan:

- This Plan provides for a level of protection of Aboriginal values and Aboriginal uses in the Lachlan Alluvium WRPA that is, at a minimum, equal to that which existed under NSW water management arrangements prior to this Plan, as shown in Table 4-3.
- A transitional WRP operated for the Lower Lachlan Alluvium (*Water Sharing Plan for the Lower Lachlan* Groundwater *Source 2003)*. An interim WRP operated for the water resources in the Lachlan Alluvium (*Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*). This plan retains or improves the protection of Indigenous values and uses as identified in Table 4-3.

5. Take for consumptive use

This section includes the following components of the Basin Plan:

- 10.08 Water access rights must be identified
- 10.10 Annual determination of water permitted to be taken
- 10.11 Rules for take including water allocation rules
- 10.12 Matters relating to accounting for water
- 10.15 Actual take
- 10.23 Types of interception activities
- 10.24 Monitoring impact of interception activities
- 10.25 Actions to be taken regarding interception activities
- 10.36 Tradability of access rights
- 10.37 Trade within a groundwater SDL resource unit
- 10.38 Trade between groundwater SDL resource units
- 10.39 Trade between groundwater and surface water
- 10.51 Measures in response to extreme events.

Figure 5-1 shows the NSW approach to determining the amount of water available to be taken in the Lachlan Alluvium WRPA, and how that take will be managed within the SDLs set by the Basin Plan. The elements of this approach are discussed in this section, with reference to the Chapter 10 Basin Plan requirements.

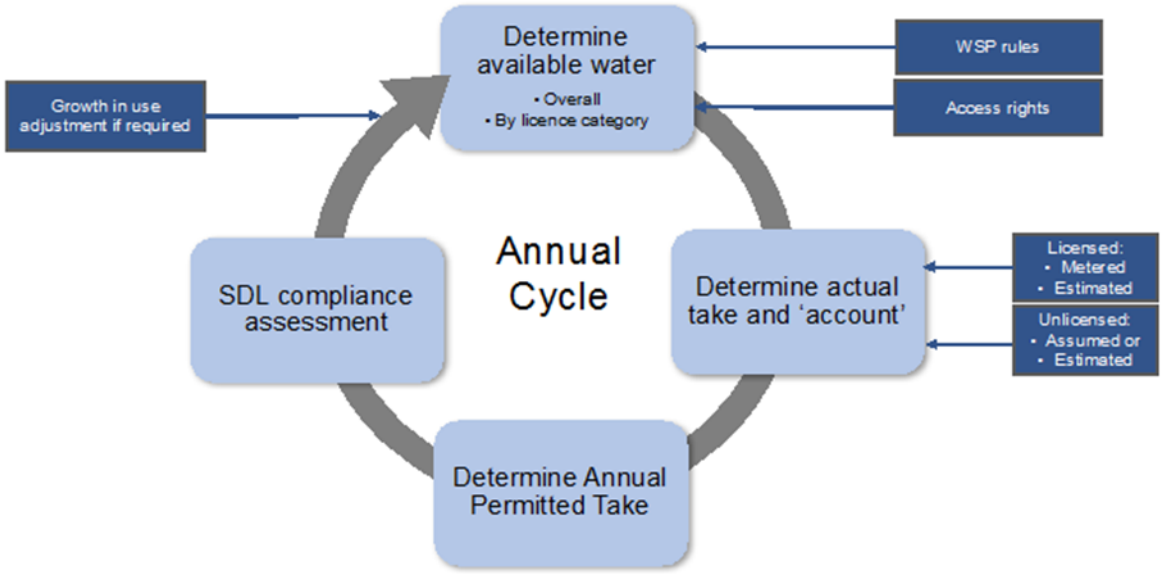


Figure 5-1. NSW approach to determining water available for 'take' and compliance with SDLs in groundwater WRPAs.

5.1. Water access rights

5.1.1. Identifying water access rights

Water access rights in the Lachlan Alluvium WRPA are enabled under the WMA 2000, and include access licences (known as 'take from groundwater' under the Basin Plan) and basic landholder rights (known as 'take under basic rights' under the Basin Plan).

Take from groundwater is associated with access licences issued in the Lachlan Alluvium WRPA. Entitlements are specified on the access licences, either as a volume in megalitres per year (ML/yr) for specific purpose access licences such as local water utility access licences and domestic and stock access licences, or as 'unit shares' in the resource made available for all other categories of access licence.

Take under basic rights as defined under the Basin Plan 2012 in the Lachlan Alluvium WRPA is a right conferred under Part 1 of Chapter 3 of the WMA 2000 to take water for domestic use and stock watering, or in the exercise of native title rights, without the need for an access licence. The extraction permitted under this form of take is that required to satisfy the right. Volumes (in ML/yr) attributed to take under basic rights in this Chapter are estimates only.

Section 5(3) of the WMA 2000 gives priority of access for basic landholder rights over all categories of access licences. Section 58(1)(a) of the WMA 2000 gives priority to local water utility access licences and domestic and stock access licences over all other categories of access licences

Take from groundwater may change if, for example:

- a local water utility access licence volume is increased or decreased as provided for in the WMA 2000
- access licences are cancelled as provided for in the WMA 2000
- access licences are granted as provided for in the WMA 2000
- a 'dealing' under the WMA 2000 changes the relative volumes or shares of access licences.

Take under basic landholder rights may change if, for example:

- there is subdivision of land overlying an aquifer, in the case of domestic and stock basic rights
- Native Title rights are determined under the *Native Title Act 1993* (Cth), in the case of Native Title basic landholder rights.

Note that any 'interception' of groundwater (excluding interception from commercial plantations) requires an access licence and is therefore managed as take from groundwater.

5.1.2. Complying with the conditions of water access rights

The WMA 2000 (s.17, s.66 and s.67) enables NSW water sharing plans to include provisions that impose conditions on access licences and water supply work approvals. These conditions specify the particular circumstances under which water access rights may be used.

The *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020 sets* out the conditions to be imposed on all access licences in the Lachlan Alluvium WRPA.

Section 66 (1AA) and Part 5 of Chapter 3 of the WMA 2000 also provide for conditions to be imposed on access licences and approvals by regulation. Part 10 of the *Water Management (General) Regulation 2018* imposes conditions relating to metering equipment and logbooks.

Under s.60A and s.91B of the WMA 2000, it is an offence to operate in breach of a condition imposed by a water sharing plan. Significant penalties can apply to such offences.

For the purpose of section 10.08(1) of the Basin Plan

- Table 5-1 identifies all forms of take and classes of water access rights, and their characteristics, in the Lachlan Alluvium WRPA at the commencement of this Plan, and no additional forms of take apply to the SDL resource units.
- It is not appropriate to identify the number of water access rights in the Lachlan Alluvium WRPA as the numbers may change as a result of consolidation, subdivision or cancellation of water access rights provided for under NSW legislation.

For the purpose of section 10.08(2) and 10.08(1)(c) of the Basin Plan

- Table 5-1 identifies the conditions that apply to access licences and water supply work approvals in the Lachlan Alluvium WRPA.

Table 5-1. Identification of water access rights in the Lower Lachlan Alluvium, Upper Lachlan Alluvium and Belubula Alluvium SDL resource units.

Basin Plan requirement s10.08(1)(a),(b)		Basin Plan requirement s10.08(1)(c)	
Form of Take	Class of Water Access Right	Total amount issued or estimated to each class	Conditions on the exercise of the Water Access Right
Take from groundwater	Local Water Utility Access Licence	As specified in clause 22 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	As specified under Part 11 of the *Water Sharing Plan for Lachlan Alluvial Groundwater Sources 2020.* As imposed by the WMA 2000 (ss.63, 66, 66A, 67, 95(1A), 100, 100A, 101A and 102) or regulation as provided for in Part 5 of Chapter 3 of the WMA 2000. As per ss.60A – D and 60F, and 91A, 91B, 91H – 91K and 91M of the WMA 2000. Subject to any further restrictions as imposed by ss.324 (all) and 336B (domestic and stock) of the WMA 2000.
	Aquifer Access Licence	As specified in clause 23 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	
	Aquifer (High Security) Access Licence	As specified in clause 24 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	
	Domestic and Stock Access Licence	As specified in clause 21 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	
Take under basic rights	Basic Landholder Rights—Domestic and Stock	As specified in clause 19 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	Limited statutory right under s.52 of the WMA 2000. Subject to any further restrictions as imposed by ss.324, 331 or 336B of the WMA 2000
	Basic Landholder Rights—Native Title	As specified in clause 20 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	Statutory right under s.55 of the WMA 2000
Take from groundwater and take under basic rights	State water access rights – WMA 2000, s.392 (4)(a) & (c)	Not specified volumetrically	No licence required as it establishes a right to take water from a water source for firefighting purposes and for stock watering purposes. The conditions and characteristics associated with these rights are those referred to by the specified WMA 2000 clauses. No estimate available and not considered consumptive take so not included in methods to address Basin Plan ss 10.10, 10.11 and 10.15

5.2. Long-term average sustainable diversion limits (SDLs)

5.2.1. SDL relationships

In the Lachlan Alluvium WRPA, the 'SDL resource units' specified under the Basin Plan equate to the 'Groundwater Sources' specified in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.*

The SDL for each SDL resource unit is specified in Schedule 4 to the Basin Plan. For the Lachlan Alluvium SDL resource units, the SDLs are equivalent to the long-term average annual extraction limits (LTAAELs) for the Groundwater Sources specified in clause 25 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*.

Table 5-2 shows these fundamental relationships between key elements of Basin Plan and the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* and the initial SDLs for each SDL resource unit.

Table 5-2. Relationship between the Basin Plan and Water Sharing Plan.

Specified in Schedule 4 of the Basin Plan		**Specified in Part 6 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020***	
SDL Resource Unit	**SDL**	**Groundwater Source**	**LTAAEL**
Lower Lachlan Alluvium (GS25)	117 GL/yr	Lower Lachlan	117,000 ML/yr
Upper Lachlan Alluvium (GS44)	94.2 GL/yr	Upper Lachlan Alluvial	94,168 ML/yr
Belubula Alluvium (GS12)	2.88 GL/yr	Belubula Valley Alluvial	2,883 ML/yr

5.2.2. SDL adjustments

Sections 7.25 and 7.26 of the Basin Plan provide for adjustment to an SDL as a result of improvements in information relating to the groundwater resources of the SDL resource unit.

5.3. Annual actual take (AAT)

5.3.1. General overview

The AAT for each SDL resource unit is the sum of the quantity of water that is taken for consumptive use in a water year in that SDL resource unit.

AAT can be considered as the total volume of groundwater extracted annually and is used for the purpose of assessing compliance with the SDL over time.

5.3.2. Determining actual take

In the Lachlan Alluvium WRPA, the volume of take from groundwater in any water year under local water utility access licences, aquifer access licences, domestic and stock access licences, and aquifer (high security) access licences is measured, as outlined in section 1.1 of Schedule I.

Take under basic rights pursuant to Basic Landholder Rights—Domestic and Stock in each SDL resource unit in the Lachlan Alluvium WRPA is estimated as being the total amount of water specified in clause 19 of the WSP. An area-based method was used to specify these volumes. The details of this method are specified in section 1.2 of Schedule I.

Water may also be taken from the WRPA in the exercise of native title rights in accordance with the *Native Title Act 1993* (Cth). Further details are provided in section 1.3 of Schedule I.

A summary of methods used to determine AAT for each type of take in each SDL resource unit is shown in Table 5-3.

Table 5-3. Forms of take from groundwater in the Lachlan Alluvium WRPA.

SDL resource unit	Form of take	Class of Water Access Right	Take determination method
Lower Lachlan Alluvium	Take from groundwater	Local Water Utility, Domestic and Stock Access Licences Aquifer Access Licences, Aquifer Access (high security) Licences	Measured in accordance with policy and practices outlined in section 1.1 of Schedule I
	Take under basic rights	Basic Landholder Right—Domestic and Stock	Estimated in accordance with method outlined in section 1.2 of Schedule I as volume specified in clause 19 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*
		Basic Landholder Right—Native Title	Estimated in accordance with process outlined in section 1.3 of Schedule I. At the commencement of this Plan, the native title determination for the Barkandji Traditional Owners #8 (Parts A and B, National Native Title Tribunal references NCD2015/001 and NCD2017/001) applies
Upper Lachlan Alluvium	Take from groundwater	Local Water Utility, Domestic and Stock Access Licences Aquifer Access Licences, Aquifer Access (high security) Licences	Measured in accordance with policy and practices outlined in section 1.1 of Schedule I
	Take under basic rights	Basic Landholder Right—Domestic and Stock	Estimated in accordance with method outlined in section 1.2 of Schedule I as volume specified in clause 19 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*

		Basic Landholder Right—Native Title	Estimated in accordance with process outlined in section 1.3 of Schedule I.
Belubula Alluvium	Take from groundwater	Local Water Utility, Domestic and Stock Access Licences Aquifer Access Licences, Aquifer Access (high security) Licences	Measured in accordance with policy and practices outlined in section 1.1 of Schedule I
	Take under basic rights	Basic Landholder Right—Domestic and Stock	Estimated in accordance with method outlined in section 1.2 of Schedule I as volume specified in clause 19 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*
		Basic Landholder Right—Native Title	Estimated in accordance with process outlined in section 1.3 of Schedule I.

For the purpose of section 10.15(1), 10.15 (2) and 10.15(3) of the Basin Plan:

- Annual actual take will be determined at the end of each water accounting period in accordance with Table 5-3 and as detailed in section 1 of Schedule I.
- Where the method for the determination of annual actual take is estimated, it is consistent with the method in this WRP for the determination of annual permitted take under s10.10(1) of the Basin Plan.
- The components of each form of take listed in Table 5-3 will be added together to determine the volume that is reported as annual actual take for each form of take.

At the commencement of this Plan there were no water entitlements associated with an access licence used for environmental purposes (held environmental water) in these groundwater sources.

For the purposes of section 10.15(4) and 10.12(3), 10.12(1)(d), 10.12(1)(h) and 10.10(3) of the Basin Plan:

- If any current or future held or acquired environmental water in an SDL resource unit of this WRPA is disposed of and then used for consumptive use, that use will be determined in accordance with the take method specified in Table 5-3 and section 1 of Schedule I for the take type and class of water access right and included in the AAT.
- Water sourced from the Great Artesian Basin cannot be released into and taken from these SDL resource units, and as a consequence the method does not need to consider releases into and take from the GAB.

5.4. Annual permitted take (APT)

5.4.1. Difference between APT and Available Water Determinations (AWDs)

The Basin Plan defines the APT as the sum of the maximum quantity of water that could be taken in each SDL resource unit in a water year. It is determined retrospectively at the end of a water year.

APT can be seen as an annual expression of an SDL as it forms the benchmark against which AAT will be compared for the purpose of *assessing compliance with the SDLs* over time.

APT differs from available water determinations (AWDs) made under section 59 of the WMA 2000, which are applied at the commencement of a water year in each groundwater source. AWDs are

one mechanism by which take can be managed or adjusted to comply with the SDLs and LTAAELs.

5.4.2. APT methods

The Basin Plan requires NSW to establish a suitable method for determining the APT.

NSW proposes to use two different methods (simple and variable) in the Lachlan WRPA, with their application dependent on the form of take and/or current levels of take from the SDL resource unit, as outlined in Table 5-4.

Table 5-4. APT methods and their application.

Annual Permitted Take will be determined at the end of the water accounting period			
Type	**Take**	**Method**	**Where Applied**
Simple	Take under basic rights	APT equals the volume for the relevant SDL resource unit specified in Clause 19 and 20 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	Lower Lachlan Alluvium Upper Lachlan Alluvium Belubula Alluvium
	Take from groundwater	APT equals the volume for the relevant SDL resource unit specified in clause 25 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* minus the volumes for the relevant SDL resource unit specified in Clause 19 and 20 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*	Upper Lachlan Alluvium Belubula Alluvium
Variable	Take from groundwater	APT equals the volume for the Lower Lachlan SDL resource unit specified in clause 25 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* minus the volumes for the Lower Lachlan SDL resource unit specified in Clause 19 and 20 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020,* and then varied based on the annual rainfall at Hillston Table 5-5.	Lower Lachlan Alluvium

The simple method is used to determine APT for take under basic rights in the Lower Lachlan Alluvium, Upper Lachlan Alluvium and Belubula Alluvium SDL resource units and take from groundwater in the Upper Lachlan Alluvium and Belubula Alluvium SDL resource units. This method defines the APT as the proportion of SDL component attributable to each form of take as shown in Table 5-3.

The variable method for determining APT for take from groundwater in the Lower Lachlan Alluvium SDL resource unit is based on eight potential APT volumes that vary around a volume of 108 GL/yr. This represents that proportion of the SDL attributable to take from groundwater, as shown in Table 5-2Of the eight potential APT volumes, the one that will apply in any one water year will depend on the rainfall recorded at Hillston in that water year, as shown in Table 5-5.

Table 5-5. Maximum permitted take from groundwater from the Lower Lachlan Alluvium SDL resource unit.

Rainfall at Hillston (July to June)	APT for take from groundwater
Greater than 502 mm	86.4 GL/yr
Greater than 466 mm and less than or equal to 502 mm	91.8 GL/yr
Greater than 430 mm and less than or equal to 466 mm	97.2 GL/yr
Greater than 394 mm and less than or equal to 430 mm	102.6 GL/yr
Greater than 323 mm and less than or equal to 394 mm	108.0 GL/yr
Greater than 251 mm and less than or equal to 323 mm	113.4 GL/yr
Greater than 215 mm and less than or equal to 251 mm	124.2 GL/yr
Less than or equal to 215 mm	129.6 GL/yr

APT volumes greater than 108 GL correspond to periods when the annual rainfall is less than 90% of the average rainfall at Hillston and therefore usage is likely to be increased as conditions are dry. APT volumes less than 108 GL correspond to periods when the annual rainfall at Hillston is greater than 110% of the average rainfall and usage is likely to be less as conditions are wetter.

For the purpose of section 10.10 of the Basin Plan:

- Table 5-4 and Table 5-5 set out the method for determining the annual permitted take for each SDL resource unit in the Lachlan Alluvium WRPA, and for each form of take. The method is consistent with the other provisions in this WRP.
- The maximum quantity of water that this Plan permits to be taken for take under basic rights during a water accounting period is the annual permitted take.
- The annual permitted take is calculated after the end of the relevant water accounting period (i.e. water year).
- Subject to the operation of Parts 6 and 8 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*, the maximum quantity of water that this Plan permits to be taken from groundwater during a water accounting period for each SDL resource unit in the Lachlan Alluvium WRPA is the annual permitted take.
- A simple annual permitted take method applies to take from groundwater in the Upper Lachlan Alluvium and Belubula Alluvium SDL resource units, and to take under basic rights for all SDL resource units in the Lachlan Alluvium WRPA and to forms of take where there is a relatively low level of actual take compared to the SDL, and as such the annual permitted take method:

    - will result in meeting the SDL if applied over a repeat of the historical climate conditions, and
    - has had an appropriate level of regard to the availability of water resources
- A variable annual permitted take method apples to take from groundwater in the Lower Lachlan Alluvium SDL resource unit. By applying the variable method for APT:
    - the appropriate level of regard to the water resources available during any water year is applied, and
    - the SDL will be met if applied over a repeat of the historical climate, as demonstrated in section 2.2 of Schedule I.
- Section 2.1 of Schedule I describes how the matters in subsection 10.12(1) of the Basin Plan have been accounted for in determining the APT methods.
- NSW does not intend for the APT methods to account for any other matters.
- At the time of making this WRP, the SDLs for the Lachlan Alluvium SDL resource units are not affected by any adjustment under s.23B of the *Water Act 2007* (Cth), and as such amendments under s.23B are not relevant for section 10.10(4) of the Basin Plan. The WRP will be amended to reflect the outcome of any adjustment under s.23B in the future.

5.5. SDL Compliance

5.5.1. SDL compliance method

Division 3 of Chapter 6 of the Basin Plan establishes the method for determining compliance with the SDL within each SDL resource unit.

At the completion of a water year, the AAT and the APT will be determined, as outlined in sections 5.3 and 5.4 of this Plan, and these values will be recorded in a 'register of take'. Under the Basin Plan, there is non-compliance with an SDL for a groundwater SDL resource unit in a water accounting period ending on or before 30 June 2028 if:

- From 1 July 2019 to 30 June 2028, the sum of the annual actual take (AAT) from the water accounting periods since 1 July 2019 exceeds the sum of the annual permitted take (APT) from the water accounting periods since 1 July 2019 plus 20% of the SDL for that SDL resource unit, and NSW does not have a 'reasonable excuse' for the excess.

- After 30 June 2028, the AAT averaged over the proceeding 10-year period is greater than the APT averaged over the same time period, and NSW does not have a 'reasonable excuse' for the excess.

Grounds for a reasonable excuse are set out in the Basin Plan and cover where the excess debit results from the operation of this Plan or other circumstances beyond NSW's control.

SDL compliance will be assessed in accordance Chapter 6, Part 4 of the Basin Plan and the MDBA *Sustainable Diversion Limit Reporting and Compliance Framework.* Where a finding of 'non-compliant' or 'compliant with a reasonable excuse' is made, the *Water Act 2007* (Cth) would require NSW to 'make good' by advising actions it proposes take to rectify the situation and ensure future SDL compliance. Make good actions could range from improving methods for determining permitted take to triggering a 'growth in use response' under the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* to comply with the SDLs.

5.5.2. Ensuring SDL compliance

The primary tools for ensuring SDL compliance are set out in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*. This WSP provides for:

- the calculation of current levels of annual extraction (AAT) from each SDL resource unit
- the assessment of extractions against SDLs, consistent with the Basin Plan requirements discussed above
- measures to ensure compliance with the SDL over the medium term, consistent with the Basin Plan requirements discussed above

For the purpose of section 10.11 of the Basin Plan:

- Division 1 of Part 6 and clauses 33, 34 and 36 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* specify the limits to take of groundwater from the Lachlan Alluvium SDL resource units and provisions to ensure compliance with these limits. These ensure that, as far practicable, the quantity of water actually taken from each SDL resource unit for consumptive use in a water accounting period beginning on or after 1 July 2019 does not (after making any adjustments for the disposal or acquisition of held environmental water) exceed the unit's annual permitted take for the period.
- Where a trade or dealing of a held environmental licence results in water being returned to the consumptive pool, it will be accounted for as take from groundwater and included in any assessment of extraction against extractions limits in accordance with Division 1 of Parts 6 and clause 33 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*.

5.6. Interception activities

In the groundwater context, the Basin Plan identifies mining activities, including coal seam gas mining, and commercial plantations as types of interception activities that may have the potential to significantly impact on the groundwater resources of a water resource plan area.

In NSW, the impacts of mining and coal seam gas activities are assessed under the *Environmental Planning and Assessment Act 1979.* If approved, these developments are conditioned to mitigate impacts on water and related resources. As part of the development approval process, proponents must assess not only their process requirements for water take, but also the impact the activity may have on the quantity of water in all water sources. This includes impacts on immediate or adjacent groundwater sources both directly and indirectly via interception of recharge and/or inducing groundwater flows. Access licences under the WMA 2000 must be obtained for any impacts on the quantity of water in immediate or nearby water sources. In most of the Basin, including the Lachlan Alluvium WRPA where no additional licences can be granted, these must be obtained via the market. As such, these activities are no different to any other type of groundwater take and are considered outside of the 'interception' construct of the Basin Plan.

An assessment of the risk of a growth in mining intercepting recharge and impacting groundwater resources and dependent ecosystems has been undertaken and is addressed in sections 5.8 and 6.8 of the Risk Assessment (Schedule D). The results in the overall risk of growth in mining and coal seam gas activities impacting aquifer users, GDEs and groundwater-dependent instream ecological values is low based on regions identified in the Bioregional Assessments Program. These assessments target regions with significant coal deposits and focus on those regions that are subject to significant existing or anticipated mining activity and on those areas identified by

governments through the National Partnership Agreement on Coal Seam Gas and Large Coal Mining Development.

An assessment of the risk of growth in plantation forestry intercepting recharge and impacting on groundwater resources and dependent ecosystems has been undertaken and is addressed in Section 5.7 and 6.4 of the Risk Assessment (Schedule D). Combining the likelihood and consequence ratings, the results in the overall risk of growth in plantation forestry impacting aquifer users, GDEs and groundwater-dependent instream ecological values is nil, as there is no predicted increase in plantation area.

For the purpose of section 10.23, 10.24 and 10.25 of the Basin Plan:

- As specified in sections 5.7, 5.8, 6.4 and 6.8 of the Risk Assessment (Schedule D), no types of interception activity were found to have the potential to have a significant impact on water resources in the Lachlan Alluvium WRPA such that they would need to be listed in accordance with section 10.23(2) of the Basin Plan.
- The risks of impacts caused by mining activities are managed by requiring all such activities to hold licences for all take that may otherwise constitute 'interception' for the purpose of the Basin Plan.

Given the above, sections 10.24 and 10.25 therefore are not applicable to this Plan.

5.7. Trade of water access rights

5.7.1. General overview

In the context of the WMA 2000, 'trade' refers to several transactions known as 'dealings' that result in a change to one of the fundamental components of an access licence. The type of dealing that an access licence holder may use to affect a trade depends on what they are trying to achieve, their existing situation with respect to access licences and approvals and administrative considerations. Table 5-6summarises the dealings available under different section of the WMA 2000. Note that basic rights cannot be traded, and as such the dealings provisions do not apply to this form of access rights.

Table 5-6. Dealings under the WMA 2000.

Section WMA 2000	Transaction Description
71M	Transfer holder of an access licence
71N	Transfer holder of an access licence for a set term only
71Q	Assignment of a share component of an access licence from one access licence to another
71R	Change of water source of an access licence
71S	Change of an extraction component of an access licence, including change of its location in terms of management zone
71T	Assignment of water allocation from one access licence water allocation account to another
71U	Interstate transfer of a share component of an access licence
71V	Interstate transfer of water allocation in a water allocation account
71W	Change of work nominated by an access licence

This Water Resource Plan is subject to the water trading rules in Chapter 12 of the Basin Plan. The Basin Plan has requirements that apply to all trades (dealings). There are also specific rules regarding groundwater trade that only apply when the trade results in a change of location that leads to either a change of water source or a change of management zone. As a result, these rules are only concerned with four dealings: under 71R of the WMA 2000 (change of water source); 71S of the WMA 2000 (change of management zone); 71U of the WMA 2000 (interstate permanent trade); and 71V of the WMA 2000 (interstate temporary trade).

5.7.2. Trade within the Lachlan Alluvium WRPA

Trade between a surface water and groundwater sources are prohibited in the Lachlan Alluvium WRPA.

Trade between groundwater SDL resource units in the Lachlan Alluvium WRPA are prohibited.

Trades between two locations as defined under the Basin Plan are prohibited in the Lachlan Alluvium WRPA.

For NSW groundwater water resource plans, trade that does not result in a change of water source or a change in management zone (where management zones exist) is not a ‘change of location' for the purposes of the Basin Plan.

No conversion factors are applied to dealings in these water sources and the volume traded is maintained. For example, if 100 unit shares is assigned from one water access licence at location A to a different water access licence at location B, the water access licence at location B will be credited with 100 unit shares.

For the purpose of sections 10.36 of the Basin Plan, water access rights and the circumstance of their tradability is determined through the WMA 2000 (s.71O – s.71W) and rules within Part 10 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*. Note that any reference to the *Access Licence Dealing Principles Order 2004* in Schedule A or any part of this WRP does not result in the Order being incorporated for accreditation.Basic rights, as identified in Table 5-1 cannot be traded, and as such the dealings provisions do not apply to this form of access right.

For the purpose of sections 10.37 of the Basin Plan, trade in groundwater access rights between two locations within a Lachlan Alluvial SDL resource unit is not permitted.

For the purpose of section 10.38 of the Basin Plan, trade between two groundwater SDL resource units within the Lachlan Alluvium WRPA and other SDL resource units is not permitted.

For the purpose of section 10.39 of the Basin Plan, trade between any Lachlan Alluvium SDL resource unit and a surface water SDL resource unit is not permitted

For all other matters relating to trade within the Lachlan Alluvium Water Resource Plan area, this WRP is subject to the rules of trade in Chapter 12 of the Basin Plan.

5.8. Measures in response to extreme events

The Lachlan Alluvium Incident Response Guide (IRG) at Schedule E outlines how the groundwater resources in the Lachlan Alluvium WRPA will be managed during an extreme groundwater quantity or quality event in this WRPA. It is consistent with the WMA 2000 relating to managing access to water during severe water shortage or if water quality poses a threat to water uses.

An extreme event in relation to groundwater quantity is defined as an extended period during which replenishment of an SDL resource unit (groundwater source) by all sources (flood flows, rainfall,

river, and through flow) has been below average, and this is putting at risk the ability to access groundwater of sufficient quantity and/or quality for its intended purposes.

An extreme event in relation to groundwater quality is defined generally as a water quality event of an intensity, magnitude and duration that is sufficient to render water acutely toxic or unusable for established local uses and values. In practice this could include diffuse or point-source contamination of groundwater, or salination of groundwater as a result of extraction. This may occur if significant extraction of fresh water is occurring near an area of poor quality (saline) groundwater, and this poor quality water is being drawn into the fresh water.

The IRG:

- Identifies the critical water requirements within the WRPA
- Establishes processes for progressively introducing more stringent measures to support the highest-priority needs as circumstances and the risk relating to accessing suitable groundwater becomes more critical
- Details a toolkit of measures for implementation during extreme events, both quality and quantity, based on the criticality of the event.

For the purposes of section 10.51 of the Basin Plan:

- Appendix A of Schedule E, *Lachlan Alluvium Incident Response Guide,* establishes the applicability of the IRG to the Lachlan Alluvium WRP area.
- Section 2 of Schedule E, *Lachlan Alluvium Incident Response Guide,* describes how the groundwater resources of the Lachlan Alluvium WRPA will be managed during an extreme event.
- An ‘extreme dry period’ as defined in the Basin Plan can affect groundwater resources. Section 1.1 of the *Lachlan Alluvium Incident Response Guide* (Schedule E) explains how ‘an extreme dry period’ is interpreted and accounted for in groundwater resources.
- Section 3 of Schedule E, *Lachlan Alluvium Incident Response Guide,* sets out the possible operational measures available to manage groundwater resources, including meeting critical human water needs, in the Lachlan Alluvium WRPA during an extreme event.
- Section 4 of Schedule E, *Lachlan Alluvium Incident Response Guide,* provides for a review process and triggers for that review in relation to determining when a change in management response to an extreme event is required.

Within the past 50 years, there has been no suspension of any statutory regional water plans that apply to the water resources in the Lachlan Alluvium WRPA.

6. Water quality management

This section includes the following components of the Basin Plan:

- 10.29 Water resource plan to include a water quality management plan (WQMP)
- 10.35A WQMP to identify the causes, or likely causes of water quality degradation
- 10.35B WQMP must identify water quality target values for fresh water-dependent ecosystems, irrigation water and water used for recreational purposes.
- 10.35C WQMP must, if considered desirable, include measures against the effects of elevated levels of salinity and other types of water quality degradation
- 10.35D WQMP must, if considered desirable, include measures against the effects of elevated levels of salinity and other types of water quality degradation for Western Porous Rock, Gunnedah-Oxley Basin MDB, Sydney Basin MDB and Goulburn-Murray: Sedimentary Plain SDL resource units.

This section focuses on the causes, or likely causes of water quality degradation and identifies current and future measures to protect and maintain water quality in the Lachlan Alluvium WRPA. For the purpose of this management plan, water quality includes salinity as defined in s1.07 of the Basin Plan.

Water quality in NSW is managed across many legislative and regulatory instruments by several government agencies, as outlined in Table 1-2.

For the purpose of section 10.29 of the Basin Plan, a water quality management plan for the Lachlan Alluvium WRPA is attached at Schedule F (the WQMP).

The Lachlan Alluvium WRPA is made up of only groundwater SDL resource units (s3.06 of the Basin Plan), therefore the WQMP is made in accordance with Part 7 Division 3 – Groundwater (s10.29(b) of the Basin Plan). Requirements under Division 2 (s10.30 – s10.35 of the Basin Plan) are not relevant in the Lachlan Alluvium WRPA as it applies to surface water SDL resource units.

Water quality in the Lachlan Alluvium water resource plan area varies. Salinity levels in the Belubula Alluvium are low, the water is fresh and generally less than 1,000 mg/L. The Upper Lachlan Alluvium varies between the shallow and deep aquifers. The shallow is quite variable but mostly found to be fresh (<1,600 mg/L) upstream from the village of Fairholme. Downstream and to the south from Fairholme the salinity in the shallow aquifer is variable and generally > 1,600 mg/L.

Groundwater salinity in both the shallow and deep aquifers of the Lower Lachlan Alluvium is low and generally less than 1,700 mg/L (2,500 µS/cm) east of the Cobb Highway, with the lowest salinity groundwater occurring closest to the Lachlan River near Hillston. Salinity in the shallow alluvium increases from east to the west where it can be greater than 7,000 mg/L, which is higher than the salinity in the deeper aquifers that ranges between 1,500–7,000 mg/L.

The water quality based on salinity is suitable for multiple beneficial uses including drinking water supply, irrigation and stock water supply. A number of councils access the Upper Lachlan alluvium for town water supply including Parkes Shire, Forbes Shire, Lachlan Shire and Cowra Shire Councils. Central Tablelands Water also supplies water to a number of townships.

Figure 6-1 shows the salinity in the Lower Lachlan alluvium (shallow aquifer). Water quality (salinity) maps for the deeper sediment layers (Calivil Formation and Renmark Groups) are shown in Appendix D of Schedule F.

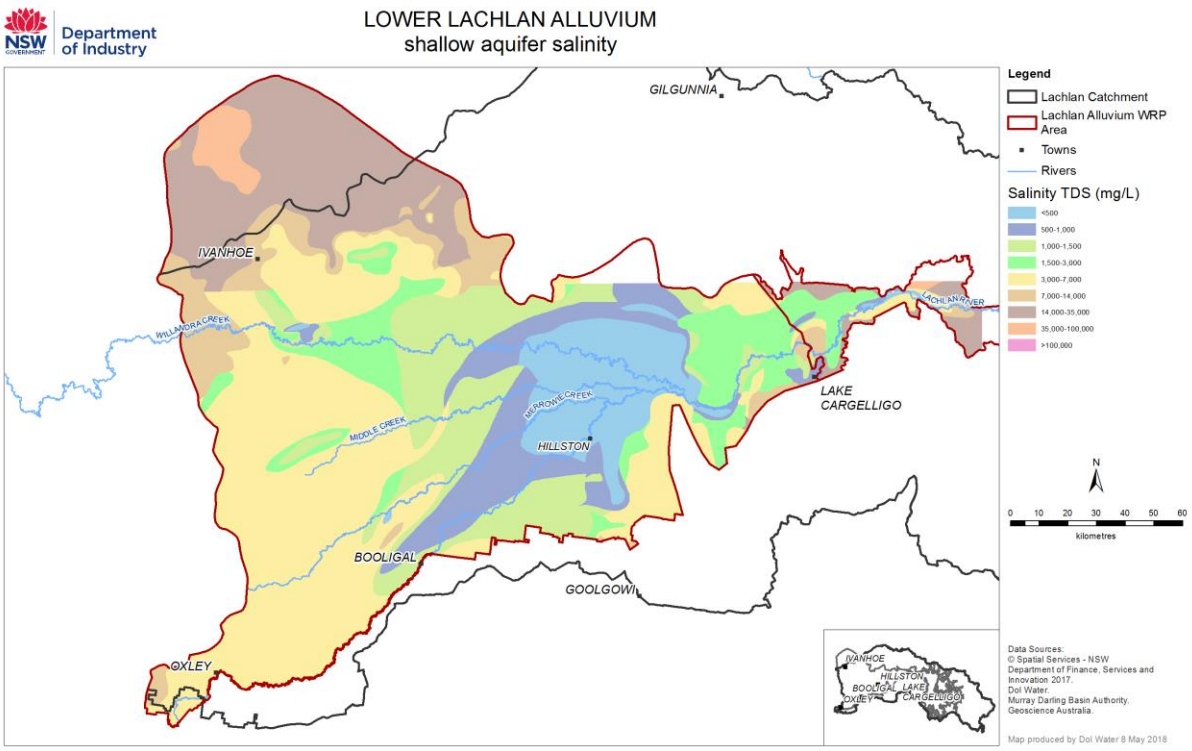


Figure 6-1. Groundwater salinity in the Lower Lachlan Alluvium (shallow aquifer).

For the purpose of section 10.35A of the Basin Plan, Table 3 of the WQMP (Schedule F) identifies causes, or likely causes of water quality degradation in the Lachlan Alluvium WRPA.

Regard has been had to the key causes of water quality degradation identified in Part 2 of Chapter 9 and set out in Schedule 10 of the Basin Plan.

For the purpose of section 10.35B(1) of the Basin Plan, Table 7 of the WQMP (Schedule F) identifies water quality target values that apply to the Lachlan Alluvium water resource plan area.

Table 3 of the WQMP (Schedule F) identifies that risks of water quality degradation other than salinity are low in the Lachlan Alluvium water resource plan area. Target values for water quality parameters other than salinity have therefore not been identified.

For the purpose of section 10.35B(2)(a) of the Basin Plan, water quality target values for freshwater-dependent ecosystems in Table 7 of the WQMP (Schedule F) specify alternative values to those referred to in s9.16 of the Basin Plan. Therefore, section 10.35B (3) has been applied.

Salinity is used to describe the water quality within the aquifer and the suitability of its use. An alternative salinity target has been adopted to apply to fresh water-dependent ecosystems, as the salinity target listed in Schedule 11 of the Basin Plan is a surface water salinity target for the purpose of long-term salinity planning (s.9.19).

For the purpose of section 10.35B(2)(b) of the Basin Plan, water quality target values for irrigation water set out in s.9.17 and objective s.9.06 are not required as there are no irrigation infrastructure operators that deliver services in the Lachlan Alluvium water resource plan area.

For the purpose of section 10.35B(2)(c) of the Basin Plan, water quality target values for recreational purposes set out in s.9.18 and objective s.9.07 are not provided as groundwater is not used for recreational purposes in the Lachlan Alluvium water resource plan area.

Section 6.6 of the Risk Assessment (Schedule D) assesses risks to GDEs from land and waste management practices as low-QAL.

In the absence of comprehensive monitoring, NSW considers the EPA's risk based licensing and approval system adequately manages the major causes of water quality degradation from major contaminants (other than salinity) entering the groundwater SDL source units and hence adequately mitigates likelihood. Further explanation is provided in Table 11 of the WQMP (Schedule F).

The causes or likely causes of water quality degradation in the Lachlan Alluvium WRPA are documented fully in the WQMP (Schedule F). A summary of measures to address the identified likely causes of water quality degradation is presented below (Table 6-1). These findings align with the Table 8-7 of the Risk Assessment (Schedule D) and include measures that contribute to the achievement of Basin Plan objectives (s9.04–s9.08).

For the purpose of section 10.35C(1) of the Basin Plan:

- regard was had for the need to include measures that support the maintenance of water quality in the Lachlan Alluvium WRPA against the effects of elevated levels of salinity and other types of water quality degradation listed as causes or likely causes of water quality degradation in Table 3 of the WQMP (Schedule F), and to the water quality targets listed in Table 7 of the WQMP (Schedule F)
- measures are included in Table 6 of the WQMP (Schedule F)

For the purpose of section 10.35C(2) of the Basin Plan, column 4 of Table 6 of the WQMP (Schedule F) details the relevant provisions in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) and other instruments that:

- specify times, places and rates water can be taken from the Lachlan Alluvium water resource plan area at locations where water quality is at risk of impacts
- limit consumptive water extraction thereby maintaining resource condition limits, supporting the maintenance of salinity levels and other types of water quality degradation
- preserve water for the environment and limit consumptive water extraction to prevent exceedance of resource condition limit

Explanatory text is provided in Table 11 of the WQMP (Schedule F).

Section 3 of Schedule I sets out the process for considering triggers and actions, including for water quality.

For the purpose of section 10.35C(2)(d) of the Basin Plan, NSW currently does not have a water quality monitoring program for groundwater sources. Should a water quality monitoring program be established, a register of monitoring bores for salinity will be established.

For the purpose of section 10.35C(3) of the Basin Plan:

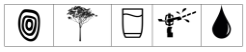
- Table 6 of the WQMP (Schedule F) identifies measures that support the maintenance of water quality in the Lachlan Alluvium WRPA against the effects of elevated levels of salinity, and other causes of water quality degradation listed in Table 3 of the WQMP (Schedule F). Each measure has been prepared having regard to the water quality targets listed in Table 7 of the WQMP (Schedule F) and addresses medium and high risks arising from water quality degradation identified in Table 8-7 of the Risk Assessment (Schedule D).
- The measures identified as 'A' in Table 6 of the WQMP (Schedule F) are provided for accreditation. Those measures identified as 'N' are for information only and are not for accreditation.
- A measure is recommended for accreditation in the WQMP if:

- the level of risk is medium or high
- appropriate water quality target values are identified in Section 5 of Schedule F.
- the measure is an action within the scope of the *Water Act 2007* (Cth) and NSW *Water Management Act 2000,* and
- the measure is fit-for-purpose and cost effective.

For the purpose of section 10.35D of the Basin Plan, the Lachlan Alluvium water resource plan area does not include any of the water resource plan areas listed in this clause, therefore this requirement does not apply in this water resource plan.

Table 6-1. Summary of objectives and measures that support the maintenance of water quality in the Lachlan Alluvium WRP area.

Objectives	Strategies	Water management actions and mechanisms
WQ1) Manage groundwater salinity by ensuring extraction does not result in a change in the beneficial use category Risk identified for induced connection with poor quality water (R2): ***High Risk*** *Upper Lachlan Alluvium and Lower Lachlan Alluvium* *10.41(2)(d) (Lachlan Alluvium Risk Assessment GW10 WRPA*  See table 4 of Schedule F for a key to symbols	Limit seasonal drawdown in high risk areas.	Manage extraction at water supply works to prevent decline in groundwater levels resulting in poor water quality to maintain GDE vegetation. Set back distance rules to limit drawdown. Set bore extraction limits on production bores in high risk areas to limit drawdown. Temporarily restrict access under the WMA 2000 s.324 when there are water shortages.
	Limit total water extraction (basic rights and groundwater take) between and within each groundwater source/SDL resource unit to predetermined sustainable amounts.	Reserve all water above the long-term average annual extraction limit (LTAAEL) for the environment as PEW. Manage compliance to limits. Require all take to be licensed except for BLR or where a policy indicates otherwise. Sustainable Diversion Limits. Set extraction limits on production bores in high risk areas to limit drawdown. Compliance with individual extraction limits. Trade limits or prohibitions between groundwater plan areas, water sources, and management zones to manage extraction. Prohibit trade between surface water and groundwater sources.
	Ensure bore construction standards are adhered to.	Manage to standards to reduce risk of cross contamination of aquifers with different quality groundwater.
	Reduce induced flow from high salinity groundwater.	Manage assessment criteria considering minimal impacts to aquifer.

Objectives	Strategies	Water management actions and mechanisms
		Temporarily restrict access under the WMA 2000s.324 when there are water shortages, threat to public health or safety, or to manage water for environmental purposes.
	Improve knowledge used to assess risks and evaluate the effectiveness of existing strategies.	Reviews resulting from application of risk treatments will contribute to fulfilling the knowledge gap and evaluate the effectiveness of existing strategies.
WQ2) Manage salinity in connected surface waters 	Improve land management practices including the planting of deep-rooted vegetation to reduce rainfall recharge displacing saline groundwater to surface water systems.	No levers within scope of water planning. Natural resource management agencies provide advisory services that support and enable landholders to implement improved natural resource and agricultural management practices.
WQ3) Manage nutrients from organic matter, animal waste, fertilisers, wastewater discharges (sewage treatment facilities, septic and stormwater) entering the groundwater SDL resource unit. ***Knowledge gap*** *All areas* Risk rating: Low –QAL *(Lachlan Alluvium Risk Assessment GW10 WRPA: QL3* 	Reducing nutrients entering the water resource is largely related to land, vegetation and natural resource management. Strategies include best management practices for chemical handling and application, cropping practices, runoff management from agricultural land and licence assessment and conditions for onsite and sewage treatment plants.	No levers within scope of water planning to reduce nutrients entering groundwater source. WSP rules have offset distances from known contamination sites and plumes to limit mobilisation of plume induced from pumping.
		Natural resource management agencies provide advisory services that support and enable landholders to implement improved natural resource and agricultural management practices.
		Manage known or potential sources of nutrients entering the groundwater source causing a decline in groundwater quality including assessments during licence approvals and licencing conditions.
WQ4) Manage pesticides and other contaminants including industrial discharges entering the groundwater SDL resource unit.  ***Knowledge gap*** *All areas* Risk rating: Low –QAL *(Lachlan Alluvium Risk Assessment GW10 WRPA: QL3*.	Reducing pesticides and other contaminants from entering the water resource is largely related to land, vegetation and natural resource management. Strategies include best management practices for chemical handling, application and waste management, runoff management from agricultural land and discharges from industries and mine sites.	No levers within scope of water planning to reduce pesticides entering groundwater source. Natural Resource Management agencies provide advisory services that support and enable landholders to implement improved natural resource and agricultural management practices.
		Manage known or potential sources of groundwater contamination to limit decline of groundwater quality.
		WSP rules have offset distances from known contamination sites and plumes to limit mobilisation of plume induced from pumping.

Objectives	Strategies	Water management actions and mechanisms
		Temporarily restrict access under the WMA 2000 s.324 when there are water shortages, threat to public health or safety, or to manage water for environmental purposes.
WQ5) Manage contamination from pathogens entering the groundwater source  ***Knowledge gap*** *All areas* Risk rating: Low –QAL *(Lachlan Alluvium Risk Assessment GW10 WRPA: QL3*	Reduce microbial contamination to groundwater sources from animal faeces.	No levers within scope of water planning to reduce pathogens entering the groundwater source. Natural Resource Management agencies provide advisory services that support and enable landholders to implement improved natural resource and agricultural management practices.
	Reduce point and diffuse contamination from discharges from sewage – onsite and sewage treatment facilities.	Manage known or potential sources of groundwater contamination to limit the decline of groundwater quality including assessments during licence approvals and licencing conditions.
		WSP rules have offset distances from known contamination sites and plumes to limit mobilisation of plume induced from pumping.

Explanatory text is included in Table 11 of the WQMP (Schedule F) for how measures:

- contribute to the maintenance of water quality against the likely causes identified in Table 3 of the WQMP (Schedule F)
- contribute to meeting the target values listed in Table 7 of the WQMP (Schedule F)
- prevent resource condition limits being exceeded.

7. Measuring and monitoring

This section includes the following components of the Basin Plan:

- 10.44 Information relating to measuring take–water access entitlements
- 10.45 Supporting measuring
- 10.46 Monitoring water resources.

Several NSW agencies have responsibilities for measuring and monitoring water and related resources, as well as water take.

WaterNSW now takes carriage of monitoring both groundwater levels in the Lachlan Alluvium WRPA and metered take associated with water access licences.

Across the Lachlan Alluvium WRPA there are 498 groundwater monitoring bores at 41 sites providing real time data.

7.1. Information relating to measuring take

Section 5.3 of this Plan outlines how actual take is measured or estimated for each class of water take on an ongoing basis.

The NSW Government is committed to delivering a robust metering framework across NSW. The NSW Non-Urban Water Metering Policy commenced on 1 December 2018 when metering requirements were included in the *Water Management (General) Regulation 2018* and will improve the standard and coverage of non-urban water meters in NSW. This is a commitment under the NSW Water Reform Action Plan released in December 2017.

Under the framework, all works authorised for the take of groundwater under an access licence in the Lachlan Alluvium WRPA will require a meter, regardless of infrastructure size. Meters are not required for water supply works that are solely used to take water under basic landholder rights.

All new and replacement meters installed from 1 April 2019 must be pattern-approved and installed by a duly qualified person in accordance with the requirements of Australian Standard 4747 (AS4747).

By 1 December 2022, users with existing meters on works must ensure the meters are either pattern approved and validated by a duly qualified person or meet requirements for accuracy. Users will not need to replace existing accurate, well-performing meters if they can demonstrate that the measurement performance of the meter *in situ* is within the limits of error of +/-5% by December 2022. Users will also need to install a data-logger, and tamper-evident seals, if not already installed.

Table 7-1 shows the average measured and estimated take for each class of access right in each SDL resource unit in the Lachlan WRPA from the 2000/01 water year to the 2015/16 water year[12].

For the purpose of section 10.44 of the Basin Plan:

- Table 7-1shows, in relation to each class of water access right relating to the water resources of the water resource plan area:
  - (a) the best estimate of the total long-term annual average quantity of water taken that is measured

[12] Water use by year for each groundwater source can be found on the NSW Water Register (https://waterregister.waternsw.com.au/water-register-frame)

(b) the best estimate of the total long-term annual average quantity of water taken that is not measured

(c) how the quantities under paragraphs (a) and (b) were calculated.

- The proportion of take that is measured in accordance with standards for measuring agreed by the Basin States and the Commonwealth is 0% at the commencement of this Plan, as meter verification has not been completed.

For the purpose of sections 10.45 of the Basin Plan:

- Divisions 1 and 2 of Part 11 and clauses 55 to 57 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* specify the mandatory conditions for access licences and water supply works approvals, including the mandatory conditions imposed by the *Water Management (General) Regulation 2018* outlined below.
- Section 101A of the WMA 2000 imposes a mandatory condition on all water supply work approvals requiring metering equipment to be installed, used and properly maintained. Exemptions to this requirement are prescribed in the *Water Management (General) Regulation 2018* clauses 229 (1) to 233.
- Section 115 of the WMA 2000 provides for the making of regulations to impose mandatory conditions on access licences and water supply approvals in specified circumstances, including in relation to metering equipment and measurement of water flows and reporting of water take.
- Clause 229 of the *Water Management (General) Regulation 2018* imposes mandatory metering requirements, and clauses 230 to 234 specify exemptions to these requirements, either for a specified period or more generally.
- Division 3 of Part 10 and Schedule 8 of the *Water Management (General) Regulation 2018* specify the standard to which take must be measured under the regulation (metering equipment standards).
- Sections 91H, 91I, 91J and 91K of the WMA 2000 impose penalties respectively for:
    - failure to install, use or maintain metering equipment as prescribed
    - taking water when metering equipment is not working
    - failure to keep metering records as required
    - tampering with water meters.

For the purpose of section 10.44 of the Basin Plan, Table 7-1 sets out measured and estimated long term annual average quantities of water taken under different water access rights. The methods for determining the listed quantities are also described. It should be noted that the quantities listed, and methods described are specific to the purpose of meeting the requirements of section 10.44. Where long term average quantities of take are described elsewhere in this WRP, those methods and quantities are specific to meeting the requirement in question and may be different to the methods and quantities listed in Table 7-1.

Table 7-1. Information relating to measuring take - water access rights.

Class of water access right	SDL Resource Unit	Long-term annual average quantity of water taken that is measured (ML/yr)	Long-term annual average quantity of water taken that is not measured (ML/yr)	Calculation method
Aquifer	Lower Lachlan	90,364	0	Metered average 00/01 to 15/16
	Upper Lachlan	45,863	0	Metered average 00/01 to 15/16
Local water utility	Lower Lachlan	1,096	0	Metered average 00/01 to 15/16
	Upper Lachlan	3,351	0	Metered average 00/01 to 15/16
Aquifer (high security)	Belubula Valley	1,398	0	Metered average 00/01 to 15/16
Domestic and stock access licences	Upper Lachlan	1,238	0	Metered average 00/01 to 15/16
Basic rights	Lower Lachlan	0	9,000	See Schedule I (1.2 & 1.3)
	Upper Lachlan	0	6,280	See Schedule I (1.2 & 1.3)
	Belubula Valley	0	36	See Schedule I (1.2 & 1.3)

7.2. Monitoring water resources

The groundwater resource monitoring programs for the Lachlan Alluvium WRPA are summarised in Table 7-2 with particular reference to the monitoring required to inform reports of matters 8, 9, 12 and 19 of Schedule 12 to the Basin Plan that are as follows:

- Matter 8: The achievement of environmental outcomes at an asset scale
- Matter 9: The identification of environmental water and the monitoring of its use
- Matter 12: Progress towards the water quality targets in chapter 9
- Matter 19: Compliance with water resource plans

An Environmental Monitoring, Evaluation and Reporting Plan (EMER Plan) has been prepared for all NSW Basin groundwater resources (Schedule H). Parts of the EMER Plan relating to the Lachlan Alluvium WRPA have been informed by the:

- Objectives, strategies and performance indicators in Part 2 of the *Water Sharing Plan for the Lachlan Alluvium Groundwater Sources 2020* (Schedule A)
- Risk Assessment for the Lachlan Alluvium Water Resource Plan Area (Schedule D)

The objectives, strategies and performance indicators in the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (Schedule A) have been updated to make them more SMART (specific, measurable, achievable, relevant and time bound) than previous objectives, and relate to

the environmental, economic, social and cultural outcomes of management of the groundwater resources of the Lachlan Alluvium WRPA.

The EMER Plan explains the approaches and groundwater level and environmental monitoring programs associated with the NSW groundwater WRPAs. Appendix A of the EMER Plan shows the historical usage, monitoring bores and GDE environmental indicators in the Lachlan WRPA.

Table 7-2. Water level and GDE monitoring in the Lachlan Alluvium WRPA.

Resource monitoring	SDL resource unit	Site(s)[13]	Relevant risks	Relevant Schedule 12 matters
Groundwater levels	Lower Lachlan	Existing program at approximately 250 sites - Figure 5 of Appendix A to the EMER Plan (Schedule H)	R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, QL1, QL2, QL3, QL4, QL5, QL6, QL7 Monitoring extent not restricted by medium or high risk outcomes. Monitoring extent responsive to actions identified in Schedule I (e.g., s.324 orders)	Matters 8, 9, 12 and 19 Also contributes to matters 4, 10, and 18
	Upper Lachlan	Existing program at approximately 150 sites - Figure 5 of Appendix A to the EMER Plan (Schedule H)		
	Belubula	Existing program at approximately 90 sites - Figure 5 of Appendix A to the EMER Plan (Schedule H)		
Groundwater dependent vegetation extent and condition	Lower Lachlan	New program, EMER Plan Appendix A, Figure 6 - River red gum communities, Black box communities, Coolibah communities, Lignum communities, Coolibah-black box EEC.	R9 Monitoring extent determined by medium and high risk outcomes. Monitoring not required in the Belubula as the risk outcome is low.	Matters 8, 9, and 19. Also contributes to matters 4, 10, and 18.
	Upper Lachlan	New program, EMER Plan Appendix A, Figure 6 - River red gum communities, Black box communities, Lignum communities, Blakely's red gum- yellow box woodlands EEC.		
	Belubula	Nil.		

[13] These sites are proposed at the commencement of this plan. The program may be adapted over time to better inform evaluation questions and reporting requirements.

Groundwater take	All SDL resource units	As per provisions for accreditation in section 7.1 – all groundwater take.	R1, R2, R3, R4, R5, R6, R7, R9, R10, R13, R14, QL1, QL2, QL3, QL4, QL5, QL6, QL7 Monitoring extent not restricted by medium or high risk outcomes. Monitoring extent responsive to actions identified in Schedule I (e.g., s.324 orders)	Matters 9 and 19. Also contributes to matters 4 and 18.
Groundwater quality	Lower Lachlan	Sites proposed under new program.	R2, QL3, QL5 Proposed monitoring extent determined by medium and high risk outcomes. Monitoring extent responsive to actions identified in Schedule I (e.g., s.324 orders).	Matters 12 and 19 Also contributes to matters 4, 14, and 18
	Upper Lachlan	Sites proposed under new program.		
	Belubula	Nil – low risk.		

For the purpose of 10.46 of the Basin Plan:

- Table 7-2 specifies the monitoring of the groundwater resource levels and groundwater dependent ecosystem extent and condition within the Lachlan Alluvium WRPA.
- This resource monitoring will contribute to enabling NSW to fulfil its reporting obligations under section 13.14 and matters 4, 8, 9, 10, 12, 14, 18 and 19 of Schedule 12 to the Basin Plan.
- NSW will continue to use an existing process of reporting via the annual reporting required under section 71 of the *Water Act 2007* (Cth).
- Data and monitoring requirements for NSW to fulfil Schedule 12 Basin Plan obligations are subject to ongoing discussion and collaboration between the MDBA and Basin States.

8. Information and methods used to prepare the WRP

This section includes the following components of the Basin Plan:

- 10.49 Best available information
- 10.50 Methods used to develop water resource plan

Much of the information used to develop the Basin Plan has also been used in the WRP development process. Likewise, the MDBA's *Handbook for Practitioners*, and its other guidelines and position statements have guided the WRP development.

For the purposes of section 10.49 and 10.50 of the Basin Plan, Table G-1 of Schedule G. identifies and describes information and methods used in developing this WRP that are not otherwise explicitly identified and described elsewhere in this Plan. The reports and other information sources are listed for the purposes of identifying significant sources of information and are not intended to be accredited for the purposes of the Basin Plan section 10.49 and 10.50.

Information and methods explicitly identified and described elsewhere in the Plan should be read as additional information and methods.

The best available information has been used in the development of the WRP.

Additional information and methods explicitly identified and described elsewhere include information contained in:

- Schedule C—Aboriginal issues, values and objectives
- Schedule D—Risk assessment
- Schedule E—Extreme events
- Schedule F—Water quality management plan
- Schedule H—Environmental Monitoring, reporting and evaluation
- Schedule I—Water take, measurement and estimation of usage

A number of information products were also developed as part of the WRP development process. These are outlined and described in Table G-2 of Schedule G and available at

https://www.industry.nsw.gov.au/water/plans-programs/water-resource-plans.

Schedule A. Placeholder for water sharing plan

This Schedule links to the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*.

The development of water resource plans (WRP) under the Basin Plan 2012 involves the remake or amendment of existing water sharing plans (WSPs). In addition to making changes to WSP rules to address requirements of the Basin Plan, WSPs have been updated to reflect current water policy frameworks and drafting requirements.

Schedules are available at https://www.industry.nsw.gov.au

Schedule B. Water resource plan index

As outlined in section 1.5 of this Plan, all text that is boxed and highlighted blue forms part of this Plan for accreditation purposes. Where reference is made in that text to all or part of any schedule to this Plan, the provisions in the schedule also form part of this Plan for accreditation purposes.

Likewise, a reference made in this index to a section in the main document refers only to the boxed and highlighted text within that section. Where those boxed and highlighted sections refer to all or part of a schedule to the plan, this index should be read as referring to those referenced provisions as well. A reference made in this index to a schedule, refers only to the provisions in the schedule identified in the boxed and highlighted blue parts of the relevant section.

This Schedule details the requirements of Chapter 10 of the *Basin Plan*, the parts of the water resource plan that address each requirement and the body responsible for implementing that part of the water resource plan.

BP Requirement	Section of this Plan that addresses the requirements/s	Responsible person
10.02 Identification of water resource plan area and water resources	S. 2.1	Department of Planning and Environment
10.03 Identification of SDL resource units and water resources	S. 2.1	Department of Planning and Environment
10.04 Form of water resource plan	S. 1.5 S. 2.1	Minister for Water*
10.05 Regard to other water resources	S. 2.2	Minister for Water*
10.06 Matters relating to requirements of Chapter	S. 1.5	Minister for Water*
10.07 Consultation to be demonstrated	S. 1.7 Schedule C	Department of Planning and Environment
10.08 Water access rights must be identified	S. 5.1.2	Department of Planning and Environment
		The holder of a water access right.
10.09 Identification of planned environmental water and register of held environmental water	S. 4.1.1 S. 4.1.3	Department of Planning and Environment
10.10 Annual determinations of water permitted to be taken Note – 10.1(5) not addressed in Lachlan Alluvium WRP	S. 5.4.2 and S. 5.3.2	Minister for Water* (or delegate) 10.10(5) only applies to surface water and is not addressed in this groundwater plan
10.11 Rules for take, including water allocation rules	S. 5.5.2	Minister for Water*

BP Requirement	Section of this Plan that addresses the requirements/s	Responsible person
10.12 Matters relating to accounting for water	S. 5.4.2 S. 5.3.2	Department of Planning and Environment
10.13 Limits on certain forms of take	Not addressed in Lachlan Alluvium WRP	10.13 only applies to surface water and not addressed in this groundwater plan
10.14 Effects, and potential effects on water resources of the water resource plan area	S. 2.2	Take from a non-Basin groundwater source does not affect or have potential to affect resources of the SDL resource units of this WRPA
10.15 Determination of actual take must be specified	S. 5.3.2	Department of Planning and Environment
10.16 Sustainable use and management of water resources	There are no specific requirements to be addressed in this section.	Descriptive requirement only. Not assessed
10.17 Priority environmental assets and priority ecosystem functions	S. 4.2	Department of Planning and Environment
10.18 Priority environmental assets dependent on groundwater	S. 4.2	Department of Planning and Environment
10.19 Groundwater and surface water connections	S. 4.2	Department of Planning and Environment
10.20 Productive base of groundwater	S. 4.3	Department of Planning and Environment
10.21 Additional requirements for Western Porous Rock, Gunnedah Oxley Basin MDB, Sydney Basin MDB and Goulburn Murray: Sedimentary Plain SDL resource units	Not required as this Plan is not a WRP relating to the Western Porous Rock, Gunnedah-Oxley Basin MDB, Sydney Basin MDB or Goulburn-Murray: Sedimentary Plain SDL resource units	Section 10.21 applies to groundwater resources that are not included in the Lachlan Alluvium WRP area
10.22 Description of how requirements have been met	S. 4.2 S 4.3	Department of Planning and Environment
10.23 Listing types of interception activity	S. 5.6	Department of Planning and Environment
10.24 Monitoring impact of interception activities	S. 5.6	Department of Planning and Environment

BP Requirement	Section of this Plan that addresses the requirements/s	Responsible person
10.25 Actions to be taken	S. 5.6	Department of Planning and Environment
10.26 Planning for environmental watering	S. 1.7 S.4.2	Minister for Water*
10.27 Enabling environmental water between connected water resources	There are no specific requirements to be addressed in this section.	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP.
10.28 No net reduction in the protection of planned environmental water	S.4.1.2	Minister for Water*
10.29 Water resource plan to include WQM Plan	S. 6	Department of Planning and Environment
10.30 WQM Plan to identify key causes of water quality degradation	There are no specific requirements to be addressed in this section	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP
10.31 Measures addressing risks arising from water quality degradation	There are no specific requirements to be addressed in this section	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP
10.32 WQMP to identify water quality targets values	There are no specific requirements to be addressed in this section	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP
10.33 WQMP to identify measures	There are no specific requirements to be addressed in this section	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP
10.34 WQMP to identify locations of targets for irrigation water	There are no specific requirements to be addressed in this section	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP
10.35 Impact of WQMP on another Basin State	There are no specific requirements to be addressed in this section	Requirement applies to WRPA that contain surface water and as such out of scope of this groundwater WRP
10.35A WQMP to identify key causes of water quality degradation	S. 6	Department of Planning and Environment

BP Requirement	Section of this Plan that addresses the requirements/s	Responsible person
10.35B WQMP to identify water quality targets values	S. 6	Department of Planning and Environment
10.35C Consideration to be given to rules or measures	S. 6	Department of Planning and Environment
10.35D Additional requirement for Western Porous Rock, Gunnedah-Oxley Basin MDB, Sydney Basin MDB and Goulburn-Murray: Sedimentary Plain SDL resource units	Not required as this Plan is not a WRP relating to the Western Porous Rock, Gunnedah-Oxley Basin MDB, Sydney Basin MDB or Goulburn-Murray: Sedimentary Plain SDL resource units.	Requirement applies to groundwater sources that are out of scope of this WRPA
10.36 Application of Part	S. 5.7.2	Department of Planning and Environment
10.37 Circumstances in which conditions in section 12.24 are met	S. 5.7.2	Minister for Water*
10.38 Circumstances in which conditions in section 12.25 are met	S. 5.7.2	Minister for Water*
10.39 Circumstances in which conditions in section 12.26 are met	S. 5.7.2	Minister for Water*
10.40 Definitions	There are no specific requirements to be addressed in this section	Descriptive requirement only. Not assessed
10.41 Risk identification and assessment methodology	S. 3 S 3.1 S 3.2 S 3.3	Department of Planning and Environment
10.42 Description of risks	S. 3.2	Department of Planning and Environment
10.43 Strategies for addressing risks	S. 3.3	Department of Planning and Environment
10.44 Information relating to measuring take – water access rights	S. 7.1	Department of Planning and Environment
10.45 Supporting measuring	S.7.1	Department of Planning and Environment
10.46 Monitoring water resources	S.7.2	Minister for Water*

BP Requirement	Section of this Plan that addresses the requirements/s	Responsible person
10.47 Review of water resource plans	S.1.8	Minister for Water*
10.47A Additional requirements for Western Porous Rock, Gunnedah - Oxley Basin MDB, Sydney Basin MDB and Goulburn Murray: Sedimentary Plain SDL resource units	Not required as this Plan is not a WRP relating to the Western Porous Rock, Gunnedah-Oxley Basin MDB, Sydney Basin MDB or Goulburn-Murray: Sedimentary Plain SDL resource units	Section 10.47A applies to groundwater sources that are not included in the Lachlan Alluvium WRPA
10.48 Amendment of water resource plan	S. 1.8	Minister for Water*
10.49 Best available information	S. 8	Department of Planning and Environment
10.50 Methods used to develop water resource plan	S. 8	Department of Planning and Environment
10.51 Measures in response to extreme events	S. 5.8	WaterNSW, Department of Planning and Environment / This could involve multiple agencies from time to time
10.52 Objectives and outcomes based on Indigenous values and uses	S. 1.3.1	Department of Planning and Environment
10.53 Consultation and preparation of water resource plan	S. 1.7	Department of Planning and Environment
10.54 Cultural Flows	S. 4.4.1	Department of Planning and Environment
10.55 Retention of current protection	S. 4.4.3	Minister for Water*

** Means the NSW Minister who from time to time has responsibility for management of Murray-Darling Basin water resources in NSW.*

Schedule C. Placeholder for consultation information

A *Consultation Report for the Lachlan Alluvium Water Resource Plan* has been prepared which covers consultation undertaken during WSP preparation, any additional consultation for WRP, Aboriginal consultation as well as processes, outputs and outcomes.

Schedules are available at https://www.industry.nsw.gov.au.

Schedule D. Placeholder for risk assessment information

This Schedule contains the technical 'risk assessment' for the water resource plan area. WRPs must be prepared having regard to current and future risks to the condition and continued availability of the water resources of the WRPA. Risks include that water quality or quantity is insufficient to meet consumptive, economic, environmental, and public benefit (social, cultural, Aboriginal) uses and values. The assessment includes identification of the risk pathways, the likelihood and consequence of manifestation of risks, categorisation of risks (high, medium or low), and identification of measures to address the medium and high risks.

Schedules are available at https://www.industry.nsw.gov.au.

Schedule E. Placeholder for extreme events information

This Schedule includes an Incident Response Guide (IRG) for managing access to water during extreme events. An extreme event is a severe water shortage or water quality event.

The IRG is based on the principles of the NSW Extreme Events Policy and provides a progressively expanding toolkit of approaches for water managers to select from as an extreme event becomes more severe. This approach balances the need to be adaptive in response to changing circumstances, with the need for certainty, to improve longer term planning.

Schedules are available at https://www.industry.nsw.gov.au.

Schedule F. Placeholder for water quality management plan

This Schedule is the water quality management plan (WQMP) for the water resource plan area, as required by the *Basin Plan.* The WQMP identifies key causes of water quality degradation, water quality target values and measures that support the maintenance of water quality within a WRP area.

Schedules are available at https://www.industry.nsw.gov.au.

Schedule G. Information and methods used in preparing WRP

This Schedule details the data sets and methods, and other key policy and information sources used in formulating the WRP.

Information sources and methods used in the development of the WRP are shown in Table G-1.

Table G-1. Data sets and methods used in the formulation of the Lachlan Alluvium WRP

Information	Description
Spatial data - ArcGIS 10 file geodatabase	Spatial data for areas gazetted as Water Sources and management zones in which Water Sharing Plan rules are applied. The most current data available at the time was used for the development of this WRP.
BOM Climate data	Bureau of Meteorology – climate data online in accordance with national standards.
Groundwater level and quality	Groundwater Data System (GDS). The most current data available at the time was used for the development of this WRP.
Water quality	Pineena WQ Historical water quality database for NSW. Database that records water quality data from the state-wide water quality monitoring program. This data is quality coded and analysed at a NATA laboratory.
SEED Database	A NSW government portal for Sharing and Enabling Environmental Data (www.seed.nsw.gov.au/en/EDPHome/About.aspx) To facilitate collation, access and visualisation of data relevant to the ongoing implementation of this WRP.
Access licences	NSW water register - Public access to information about water licences, approvals, water allocations water dealings (trading), environmental water and other matters related to water entitlements in NSW (waterregister.waternsw.com.au). Definitive information source.
Cth regulatory instruments	www.legislation.gov.au All Commonwealth regulatory instruments. Definitive information source.
NSW regulatory instruments	www.legislation.nsw.gov.au All State regulatory instruments. Definitive information source.
Submissions Database System	A system used to facilitate collation and assessment of stakeholder feedback on issues papers, draft plans and other documentation associated with the WRP. Informed by submissions from individuals and SAP relating to WRP development.
Groundwater numerical model	Hydrogeological models developed for the Lower Lachlan, Upper Lachlan Alluvial, and Belubula Valley Alluvial groundwater sources. Peer reviewed.
Water Quality Index (WaQI)	Tool for evaluating changes in water quality over the life of a water quality management or water resource plan. Can be calculated both for individual water quality parameters and as an overall integrated score. The WaQI scores water quality data collected by DPI Water (now Department of Planning and Environment – Water Group) against predetermined water quality targets. Results derived from mathematical formulae inputting data collected the department.

Information	Description
IAP2 Resources	International Association of Public Participation Resources—including the Core Values for Public Participation for use in the development and implementation of public participation processes to help make better decisions which reflect the interests and concerns of potentially affected people and entities. Recognised methods for effective public participation and developing consultation strategies.

Table G-2 shows other key NSW information outputs supporting the WRP preparation process, including those presented to the NSW Groundwater Stakeholder Advisory Panel (SAP), Statewide policy documents, and Lachlan Alluvium specific plans. Available at https://www.industry.nsw.gov.au.

Table G-2. Key NSW information outputs supporting the Lachlan Alluvium WRP preparation process.

Name	Description
SAP terms of reference	Terms of reference to facilitate good governance and expectations for outcomes from the Stakeholder Advisory Panel as part of the consultation process for this WRP.
Lachlan Alluvium WRP Status and Issues Paper	Summarises the status of water resources and issues that Department of Planning, Industry and Environment will consider when developing the Lachlan Alluvium WRP
Water resource plans for alluvium in NSW: Issues Assessment report	Collates, assesses and responds to issues raised by stakeholders prior to and including issues raised in submissions received in response to the release of the Status and Issues Paper for the Lachlan Alluvium WRP
Extreme Events Policy	Outlines what the NSW Government will do to manage water resources should an extreme water shortage or water quality event occur that requires a change to normal water sharing arrangements.

The many documents and information relied upon in the preparation of the Basin Plan have also been used in the preparation of this WRP. In addition to these, the following key MDBA advisory and information documents have been used:

- MDBA, 2013, *Handbook for Practitioners – Water resource plan requirements*, Licensed from the Murray–Darling Basin Authority, under a Creative Commons Attribution 3.0 Australia Licence
- MDBA *Position Statements for some requirements of Chapter 10*
- MDBA, 2017, *Proposed Guidelines for meeting Basin Plan requirements for considering Aboriginal Values and Uses*, Draft version 2**,** Distributed to MLDRIN, NBAN, Basin States on 9 May 2017
- MDBA, 2016, Our water, our life: An Aboriginal study in the northern basin
- MDBA, 2014, Basin-wide environmental watering strategy, Licensed from the Murray–Darling Basin Authority, under a Creative Commons Attribution 3.0 Australia Licence

Schedule H. Placeholder for environmental monitoring, evaluation and reporting plan

This Schedule is the Environmental Monitoring, Evaluation and Reporting (EMER) Plan for the WRP area. It details the arrangements for monitoring, evaluation and reporting of water take, as well as of the resource itself (water flows or levels, and where applicable water quality), and of water dependent ecosystems.

EMER programs improve the performance of plans through measuring and assessing the outcomes and actions of specific environmental objectives. The EMER plan focuses on risk-informed performance indicators to determine if a relevant objective has been met. MER also provides a mechanism to reinforce, review and refine activities as part of the adaptive planning process.

Schedules are available at https://www.industry.nsw.gov.au.

Schedule I. Information relating to take for consumptive use

This Schedule contains more detailed information on Chapter 5 of the WRP. It details the methods for determining actual annual take, annual permitted take, and compliance with SDLs.

1. Determining AAT

1.1. Measuring and estimating take from groundwater under access licences

Take from groundwater in any water year for Local Water Utility, Domestic and Stock, Aquifer and Aquifer (high security) access licences in the Lachlan WRPA area will be measured and/or estimated.

The *Water Management (General) Regulation 2018* and associated metering policies require that in the Lachlan Alluvium WRPA:

- From 1 April 2019, all new and replacement meters are pattern-approved and installed and validated by a duly qualified person in accordance with the requirements of Australian Standard 4747.
- By 1 December 2022, all groundwater water supply works in this WRPA have a meter that is pattern approved and installed in accordance with AS4747.
- By 1 December 2022, those with existing meters must demonstrate that the meter is pattern-approved and validated, or accurate. They will also need to install a data logger and tamper-evident seals, if not already installed.

Meters are not required for water supply works that are solely used to take water under basic landholder rights.

Regardless of the size of the extractive work, all take under an access licence from groundwater in the Lachlan Alluvium WRPA, including take from domestic and stock access licences, will be required to be metered in accordance with the above.

Annual actual take from groundwater is determined as follows:

- Where meters are installed and operational, metered data will be used to measure take.
- Where meters are installed but not operational, an assessment will be used to estimate take.
- In fully metered SDL resource units where meters are not installed on a work, take will be estimated to be zero as that work will have been deemed to be inactive.
- In partially metered SDL resource units where meters are not installed on a work, take will be estimated by multiplying the unmetered proportion of the total shares made available in that water year for each class of access right as specified in Part 5 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* by either a specific or a general utilisation factor.

The utilisation factor is determined as follows:

- At the end a water year, all partially metered groundwater sources will be assessed to identify individual utilisation factors for water access rights.

- Where a significant[14] proportion of the total water access right has metered or estimated (in an approved form) usage, the median utilisation factor is determined to be the specific utilisation factor to be applied to that groundwater source.
- In groundwater sources where the proportion of total water access right metered or estimated (in an approved form) is assessed as insignificant, an average of all specific utilisation factors is used to determine a general utilisation factor; which is then applied to these groundwater sources.

The above process ensures that the AAT reflects the best available information.

The above process is the method that has been used to provide a best estimate of water for the purposes of 10.44 of the Basin Plan (Table 7-1 of this WRP).

1.2. Estimating take under domestic and stock rights

Take under basic rights for domestic and stock use in the Lachlan Alluvium WRPA is estimated as being the full utilisation of the total annual volume in each SDL resource unit specified in Clause 19 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* (see section 5.1). A geographical area-based method was used to specify these volumes. The method uses Australian Census household information and land use data to calculate take under basic rights for domestic and stock purposes.

The general assumptions behind this method are as follows:

- People tend to use surface water in preference to more costly bore water sources.
- Bore use predominates in areas capable of providing high yield and reasonable quality water economically.
- NSW can be subdivided into four zones based on rainfall reliability, evaporation rate, and topography and known reliance on groundwater sources. These four zones are coast, tablelands, slopes and plains. The proportion of each SDL resource unit within each zone was generated digitally using a GIS program. The SDL resource units in the NSW Border Rivers Alluvium WRPA fall entirely within the slopes zone, as shown in Figure I-1.
- Australian Census population and housing data, in consideration of housing proximity to watercourses and availability of ground water, can be used to estimate a volumetric allowance per house in areas without reticulated water.
- The extent of grazeable pasture available to stock within each zone is used to estimate stock watering usage.
- Urban areas with reticulated water and buffer areas around surface watercourses are excluded from groundwater source area calculations.

[14] Significant means the number of metered licences is greater than three and the proportion of metered share is 25% or greater.

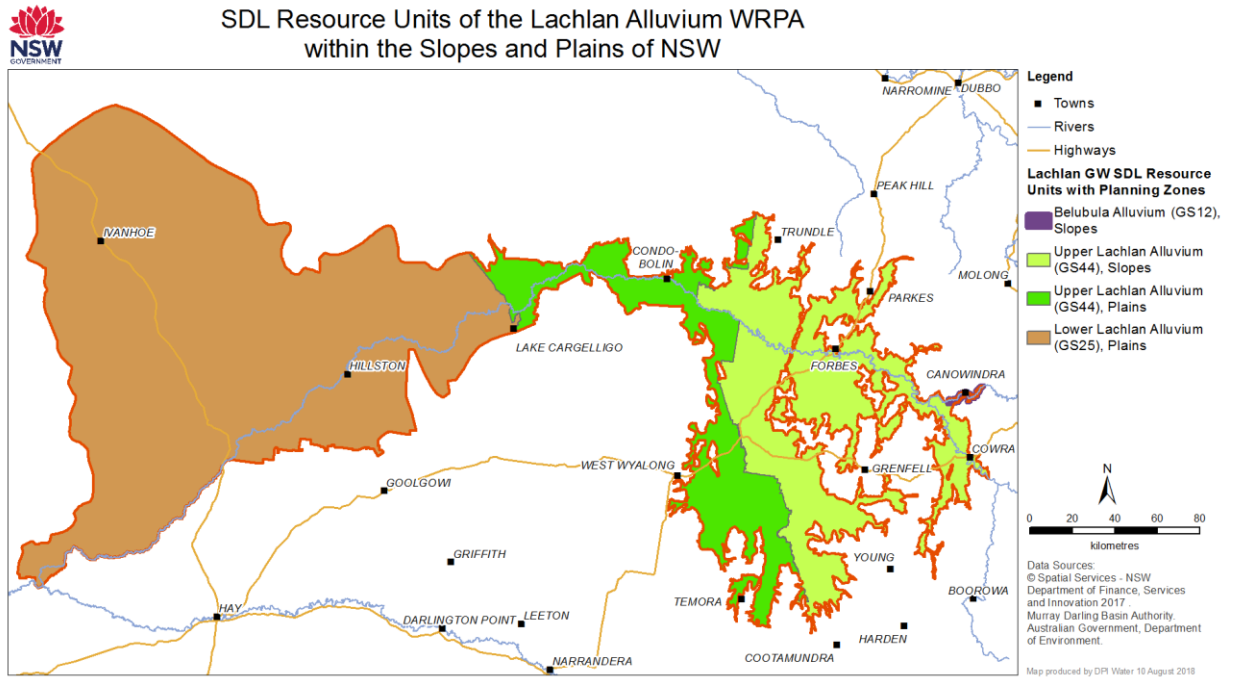


Figure I-1. SDL Resource units of the Lachlan Alluvium WRPA within the slopes and plains of NSW.

1.2.1 Estimating take under basic rights for domestic use

Estimated volume (in ML/yr) for domestic use = (houses in groundwater use area) X (domestic consumption estimated and adjusted for reliance on groundwater, based on zone). Where:

- houses in water source = (housing density) X (groundwater source area)
- housing density = (dwellings in relevant Census district)/(area of Census district)
- groundwater use area is the water source area excluding urban areas with reticulated water and buffer areas around surface water (where groundwater use is non-preferred)
- based on zone, domestic consumption estimated as per Table 1; Figure I-2 and adjusted for reliance on groundwater as per Table 2, Figure I-2.

1.2.2 Estimating take under basic rights for stock use

Estimated volume (in ML/yr) for stock use = (grazeable land area) x (stock consumption estimated and adjusted for reliance on groundwater, based on zone) x (stock watering usage estimate), where:

- grazeable land area is the water source area excluding urban areas with reticulated water and buffer areas around surface water (where groundwater use is non-preferred).
- based on zone, stock consumption estimated as per Table 3 Figure I-2 and adjusted for reliance on groundwater as per Table 2 Figure I-2.
- stock watering usage estimate is adjusted per zone, for pasture type (improved being sown pastures including pasture species of grasses and/or legumes and unimproved being locally native pastures) as per Table 3 Figure I-2.

Table 1: Estimated domestic water use for rural lots

Zone	Estimate (Ml/Yr)
1 Coastal	1.0
2 Tablelands	1.1
3 Slopes	1.4
4 Plains	2.1

Table 2: Groundwater reliance by Zone

Zone	Groundwater Reliance
1 Coastal	10% dwellings and 15% stock
2 Tablelands	25% dwellings and 40% stock
3 Slopes	35% dwellings and 50% stock
4 Plains	70% dwellings and 80% stock

Table 3: Stock watering estimate by Zone and pasture type

Zone	Pasture type	Estimate (ML/Ha/Yr)
1 Coastal	Unimproved pasture	0.025
	Improved pasture	0.045
2 Tablelands	Unimproved pasture	0.020
	Improved pasture	0.045
3 Slopes	Unimproved pasture	0.015
	Improved pasture	0.045
4 Plains	Unimproved pasture	0.010
	Improved pasture	0.020
All zones	Irrigated pasture	0.050

Figure I-2. Figures used for estimating take

1.3 Estimating take under Native Title basic rights

The Native Title rights as set out in any determination under the *Native Title Act 1993* (Cth) will determine the nature and extent of the water access rights in the Lachlan Alluvium WRPA. This is not a specified volume of water take. The volume of water take may be identified through Indigenous Land Use Agreement (ILUA) negotiations with the recognised Native Title holders. This volume of water take will vary between Native Title holder groups and WRPAs. The method for determining take volumes under Native Title basic rights will need to be determined on a case by case basis, noting these volumes are included with the LTAAEL. The method for estimating annual actual take will assume full utilisation based on the lesser of:

1. The allowable volume as set out in any determination under the *Native Title Act 1993 (Cth)*, or
2. An alternate volume estimated using best available information in relation to any determination under the *Native Title Act 1993 (Cth)*.

2. Verifying APT

2.1 Basin Plan Section 10.12 (1) considerations.

Table I-1. Matters to be accounted for under 10.12 (1) of the Basin Plan in relation to APT methods

Basin Plan Matter	Explanation
10.12(1)(a)	The annual permitted take methods account for each form of take for each SDL resource unit as per Table 5-4**.** There are two separate calculations applicable to take from groundwater and take under basic rights for each SDL resource unit.
10.12(1)(b)	Carryover of basic rights is not permitted. Water allocations in the water allocation accounts of access licences may (or may not) be carried over from one water account period to the next in accordance with Part 8 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* Part 6, Division 1 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* also restricts overall take in the long term to the SDL. In these ways, carryover is accounted for in the permitted take method for take from groundwater.
10.12(1)(c)	This requirement is not applicable to groundwater SDL resource units.
10.12(1)(d)	Trade (that results in a 'change of location') is not permitted within or between any SDL resource unit the Lachlan Alluvium WRP area as per Part 10 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020*, and therefore this requirement is not applicable. If any current or future held or acquired environmental water in an SDL resource unit of this WRP area is disposed of and then used for consumptive use, that use will be determined in accordance with the take method specified in Table 5-3 and section 1 of Schedule I for the take type and class of water access right, and included in the AAT.

Basin Plan Matter	Explanation
10.12(1)(e)	Significant hydrological connections are identified in 2.2 of this Plan. In setting the LTAAEL, and hence SDL for the Lower Lachlan Alluvium, Upper Lachlan Alluvium and Belubula Alluvium SDL resource units, the connectivity of groundwater and surface water resources has been taken into consideration. Access is managed to these SDLs under Division 1 Part 6 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.* By adopting the proportionate SDL volume as the annual permitted take volume for take under basic rights in the Lower Lachlan Alluvium, Upper Lachlan Alluvium and Belubula Alluvium, any connectivity will have no material impact on annual permitted take methods. By adopting the proportionate SDL volume as the annual permitted take volume for take from groundwater in the Upper Lachlan Alluvium and Belubula Alluvium and a variable percentage of the proportionate SDL volume for take from groundwater in the Lower Lachlan Alluvium, any connectivity will have no material impact on annual permitted take methods
10.12 (1)(f)	Take in the Lower Lachlan Alluvium, Upper Lachlan Alluvium and Belubula Alluvium SDL resource units is managed under Part 6 Division 1 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.* Any changes in the way groundwater is taken or held will not alter annual permitted take.
10.12(1)(g)	Growth in use for both take under basic rights and take from groundwater is managed in the Part 6 Division 1 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.* These rules limit actual take to the LTAAEL and SDL over the long term. Thus growth in use will have no material impact on the permitted take method.
10.12 (1)(h)	This requirement is not applicable and does not need to be accounted for in the annual permitted take, as GAB water is not being discharged to the Basin water resource in the Lachlan Alluvium WRPA because the GAB is not geographically connected to the SDL resource units.
10.12 (1)(i)	At the commencement of this Plan managed aquifer recharge (MAR) does not occur in Lachlan Alluvium WRPA. However, clause 69 of the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* allows the plan to be amended to include rules for managed aquifer recharge in the future. MAR is not included in the method of permitted take, as any future rules will account for MAR storage and take separately and restrict the net take of MAR to be less than or equal to the volume stored.

2.2 SDL compliance using the complex method for APT

A variable method for annual permitted take, based on annual rainfall (July to June) observed at Hillston (Hillston Airport AWS BOM station number 075032) NSW, will be applied in the Lower Lachlan Alluvium SDL resource unit for take from groundwater (see section 5.4.2 of this Plan).

As the Basin Plan requires the method to show that the average permitted take over the nominated 114 year historic period be no more than the SDL, a continuous record of rainfall data was required over this period. This was sourced from the Scientific Information for Landowners (SILO) data base (https://www.longpaddock.qld.gov.au/silo/). These rainfall datasets are based on historic climate records and include interpolated data to provide complete spatial and temporal datasets.

Table I-2**Error! Reference source not found.** demonstrates the application of this method over a repeat of historical climate conditions, specifically a 114 year period from 1895–96 to 2008–09. The results show that the average cumulative permitted take over that nominated historic period equals that portion of the SDL attributable to take from groundwater in Lower Lachlan Alluvium SDL resource unit (108 GL).

For the purposes on implementing this WRP, the actual rainfall data observed and recorded by a BOM rainfall station will be used. In instances where the BOM rainfall data set is not complete, rainfall data will be sourced from the Scientific Information for Landowners (SILO) database which provides national coverage with interpolated infills for missing data.

Table I-2. Application of the variable permitted take method for take from groundwater in the Lower Lachlan Alluvium SDL resource unit over historical climate conditions.

Water year	Rainfall Hillston (mm)	Permitted take (GL)	Cumulative permitted take (GL)
1895–96	380.2	108.0	108.0
1896–97	304.4	113.4	221.4
1897–98	286.9	113.4	334.8
1898–99	270	113.4	448.2
1899–1900	378.5	108.0	556.2
1900–01	176.1	129.6	685.8
1901–02	172	129.6	815.4
1902–03	159.8	129.6	945.0
1903–04	265	113.4	1058.4
1904–05	437.4	97.2	1155.6
1905–06	410.8	102.6	1258.2
1906–07	299.3	113.4	1371.6
1907–08	380.6	108.0	1479.6
1908–09	352.6	108.0	1587.6
1909–10	315	113.4	1701.0
1910–11	424.6	102.6	1803.6
1911–12	292.2	113.4	1917.0
1912–13	576	86.4	2003.4
1913–14	230.5	124.2	2127.6
1914–15	199.3	129.6	2257.2
1915–16	307.2	113.4	2370.6
1916–17	622.1	86.4	2457.0
1917–18	550.8	86.4	2543.4
1918–19	237.7	124.2	2667.6
1919–20	149.4	129.6	2797.2
1920–21	616.1	86.4	2883.6
1921–22	265	113.4	2997.0
1922–23	274.6	113.4	3110.4
1923–24	387.8	108.0	3218.4
1924–25	464	97.2	3315.6
1925–26	293.6	113.4	3429.0
1926–27	150.3	129.6	3558.6
1927–28	463.1	97.2	3655.8
1928–29	168.5	129.6	3785.4

Water year	Rainfall Hillston (mm)	Permitted take (GL)	Cumulative permitted take (GL)
1929–30	368.4	108.0	3893.4
1930–31	594.1	86.4	3979.8
1931–32	334.9	108.0	4087.8
1932–33	204.9	129.6	4217.4
1933–34	344.9	108.0	4325.4
1934–35	324.4	108.0	4433.4
1935–36	350.5	108.0	4541.4
1936–37	369.1	108.0	4649.4
1937–38	121.1	129.6	4779.0
1938–39	600	86.4	4865.4
1939–40	289.2	113.4	4978.8
1940–41	240	124.2	5103.0
1941–42	253.7	113.4	5216.4
1942–43	257.8	113.4	5329.8
1943–44	272.2	113.4	5443.2
1944–45	206.6	129.6	5572.8
1945–46	409.9	102.6	5675.4
1946–47	327.4	108.0	5783.4
1947–48	533.9	86.4	5869.8
1948–49	349.1	108.0	5977.8
1949–50	558.2	86.4	6064.2
1950–51	372.2	108.0	6172.2
1951–52	393.6	108.0	6280.2
1952–53	290.2	113.4	6393.6
1953–54	342.6	108.0	6501.6
1954–55	379.5	108.0	6609.6
1955–56	630.5	86.4	6696.0
1956–57	272	113.4	6809.4
1957–58	261.8	113.4	6922.8
1958–59	386.5	108.0	7030.8
1959–60	356.6	108.0	7138.8
1960–61	303.2	113.4	7252.2
1961–62	358.4	108.0	7360.2
1962–63	357.7	108.0	7468.2
1963–64	226.7	124.2	7592.4
1964–65	260.3	113.4	7705.8
1965–66	289.4	113.4	7819.2
1966–67	227.7	124.2	7943.4
1967–68	340.8	108.0	8051.4
1968–69	547.3	86.4	8137.8
1969–70	335.6	108.0	8245.8
1970–71	452.4	97.2	8343.0
1971–72	373.9	108.0	8451.0
1972–73	355	108.0	8559.0
1973–74	752	86.4	8645.4
1974–75	336.1	108.0	8753.4
1975–76	440.5	97.2	8850.6
1976–77	455.9	97.2	8947.8
1977–78	294.1	113.4	9061.2
1978–79	404.5	102.6	9163.8
1979–80	329.3	108.0	9271.8
1980–81	380.8	108.0	9379.8
1981–82	335.2	108.0	9487.8
1982–83	308	113.4	9601.2
1983–84	563.6	86.4	9687.6
1984–85	331.2	108.0	9795.6

Water year	Rainfall Hillston (mm)	Permitted take (GL)	Cumulative permitted take (GL)
1985–86	427	102.6	9898.2
1986–87	514.8	86.4	9984.6
1987–88	393.4	108.0	10092.6
1988–89	670	86.4	10179.0
1989–90	333.5	108.0	10287.0
1990–91	268.5	113.4	10400.4
1991–92	239.9	124.2	10524.6
1992–93	533.6	86.4	10611.0
1993–94	471.8	91.8	10702.8
1994–95	315.2	113.4	10816.2
1995–96	388.3	108.0	10924.2
1996–97	320.9	113.4	11037.6
1997–98	332.4	108.0	11145.6
1998–99	506.6	86.4	11232.0
1999–2000	670.1	86.4	11318.4
2000–01	400.3	102.6	11421.0
2001–02	273.7	113.4	11534.4
2002–03	256	113.4	11647.8
2003–04	329.2	108.0	11755.8
2004–05	321.8	113.4	11869.2
2005–06	372	108.0	11977.2
2006–07	237.8	124.2	12101.4
2007–08	357	108.0	12209.4
2008–09	332.6	108.0	12317.4
		Average PT	**12,317 GL / 114 yrs = 108 GL/yr**

3. Process for determining access restrictions or bore locations

There are two general circumstances in which restrictions may be placed on groundwater take (extraction) in the WRPA:

1. If approval of a ‘dealing’ or trade, or application for a new work will result in increased extraction at a location, and there is the potential for that increased take to result unacceptable impacts on groundwater levels, water quality, groundwater dependent ecosystems, aquifer integrity, cultural values, or take by other authorised users, or
2. If existing take in an area is causing, or is likely to cause, unacceptable impacts on groundwater levels, water quality, groundwater dependent ecosystems, aquifer integrity, cultural values, or on take by other authorised users.

Figure I-3 below shows the general process that is undertaken when assessing a dealing application or application for a new work (bore). Where approval would result in a permanent or long term increase in extraction from an area, the assessment is undertaken assuming all existing access rights in the area are fully utilised. Where the approval would result in a temporary increase in extraction from an area (that is, just for the following water year), the assessment is undertaken based on current and historical use of existing access rights. Table I-3 below provides a ‘guide’ for assessing applications for dealings or new works where the risks of unacceptable impacts are medium or high.

Figure I-4 and Table I-3 guide decisions about managing impacts from existing authorised take, if this is causing, or is likely to cause, unacceptable impacts on groundwater levels, water quality, groundwater dependent ecosystems, aquifer integrity, cultural values, or on take by other authorised users.

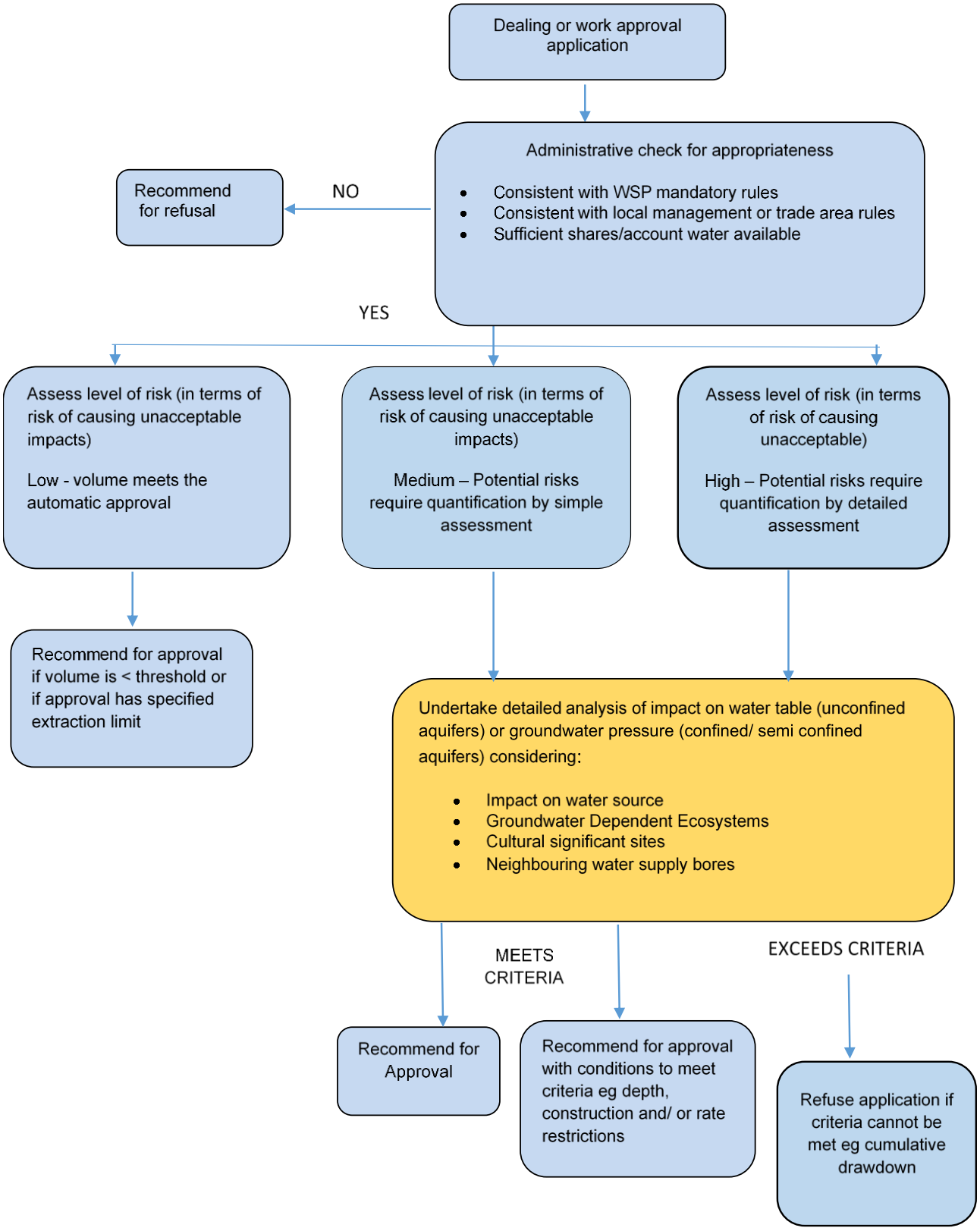


Figure I-3. Generalised process for assessing applications for dealings and new works.

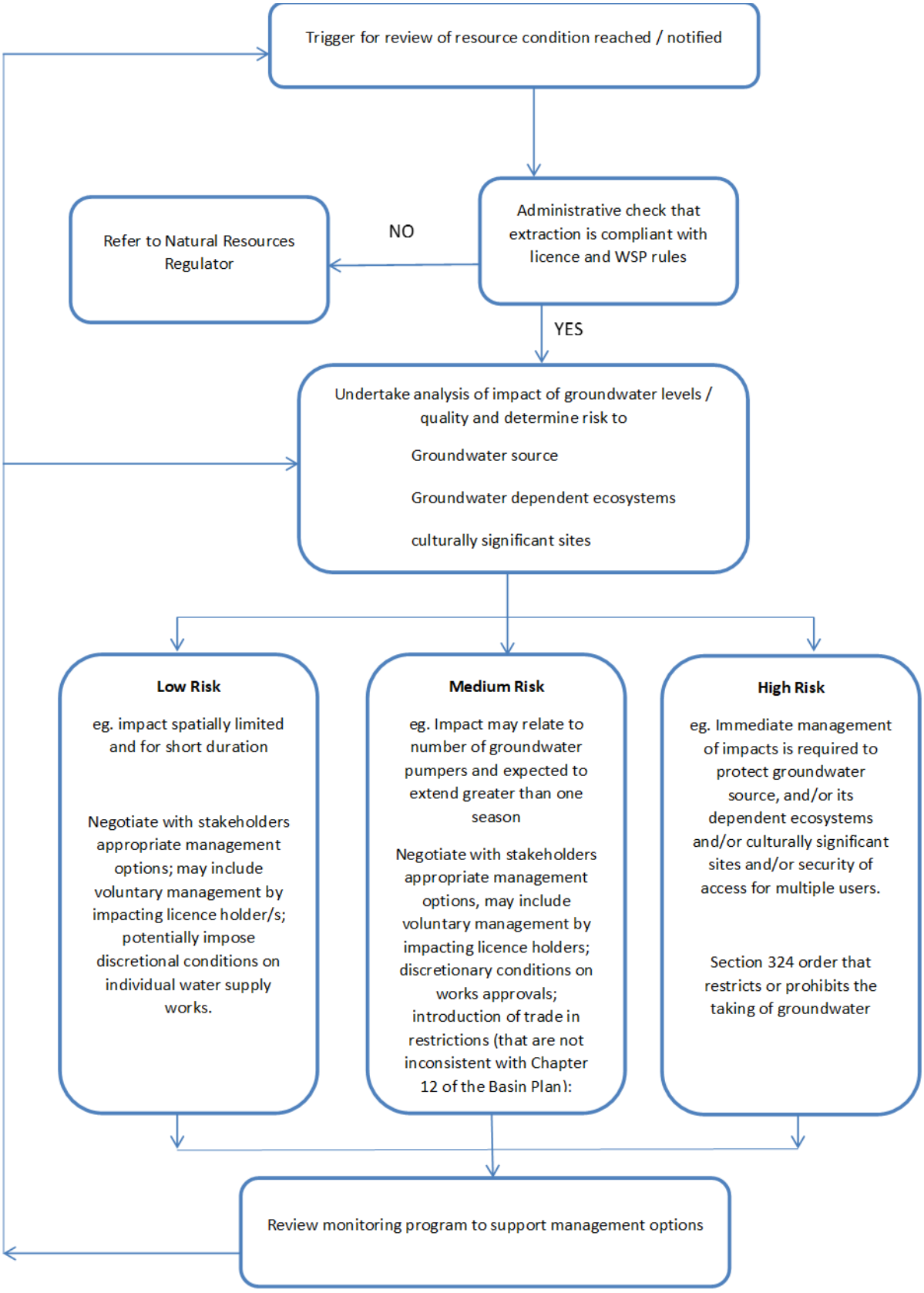


Figure I-4. Process if groundwater triggers are reached

Table I-3. Guide to triggers and actions for determining groundwater access restrictions.

ISSUE	POTENTIAL TRIGGERS	ACTIONS	OBJECTIVES	RESPONSE
Water levels	• Groundwater level declines exceed acceptable ranges given rainfall and recharge events; for the Lower Lachlan Alluvium this corresponds to a decline in the seasonally recovered water levels by no more than 20% of the 2012 seasonally recovered total available drawdown • Cumulative drawdown below 40% of the Total Available Drawdown (TAD), where TAD is pre-development water/pressure level referenced to the base of the groundwater source • Community concern/notification	• Metering of take • Groundwater level monitoring	• Limit decline in water levels to above trigger levels.	Depending on expected longevity of the induced change, magnitude of change or the consequences of these changes, there are a number of potential management responses. These include the following, are not necessarily sequential and depend on the issue. • Use of discretionary conditions on individual bores within an area e.g. annual extraction limits or extraction linked to monitoring bore data • Section 324 order that may restrict of prohibit the taking of groundwater • Voluntary restoration measures may also be undertaken. These are likely to be introduced ahead of the above management responses, where appropriate.
Water quality (salinity)	• Change in hydraulic gradient between water sources of significantly different qualities • Reported change in salinity of more than 20% of the beneficial use limit of that groundwater source	• Groundwater quality monitoring	• Limit drawdown at specified distance from surface water interface • Maintain hydraulic gradient	
Groundwater Dependent Ecosystems & Cultural sites	• Groundwater level declines impacting on groundwater availability to GDEs • Decline in water quality target values for freshwater dependent ecosystems in Zones 1 & 2 (zones as per the WQMP).	• Groundwater level monitoring • Groundwater quality monitoring • Verification of probable GDEs – location and likely dependency • Assessment of likely future impacts • Define water quality targets/thresholds for cultural sites	• Limit water level decline at 40m from GDE as determined by verification. • No change in quality of groundwater at 40m from the GDE.	

Other users	• Cumulative drawdown decline of 40% of pre-development total available drawdown (or lesser trigger as locally negotiated) • Community concern/notification	• Groundwater level monitoring • Assessment of likely future impacts	• Stabilise recovered water levels at or above trigger levels	
Compaction	• Evidence of land subsidence • Aquifer conditions change from confined to unconfined • Rapid/excessive seasonal drawdowns of water levels	• Groundwater level monitoring • Assessment of likely future impacts	• Maintain natural hydraulic relationships • Limit seasonal drawdown where impacts likely	

Appendix A. Lachlan Alluvium Water Resource Plan area description

This Appendix gives a more detailed description of the water resource plan area, including its physical setting, hydrology or geology and hydrogeology, environmental values, key uses and users, and water rights within the area.

This document is available at https://www.industry.nsw.gov.au