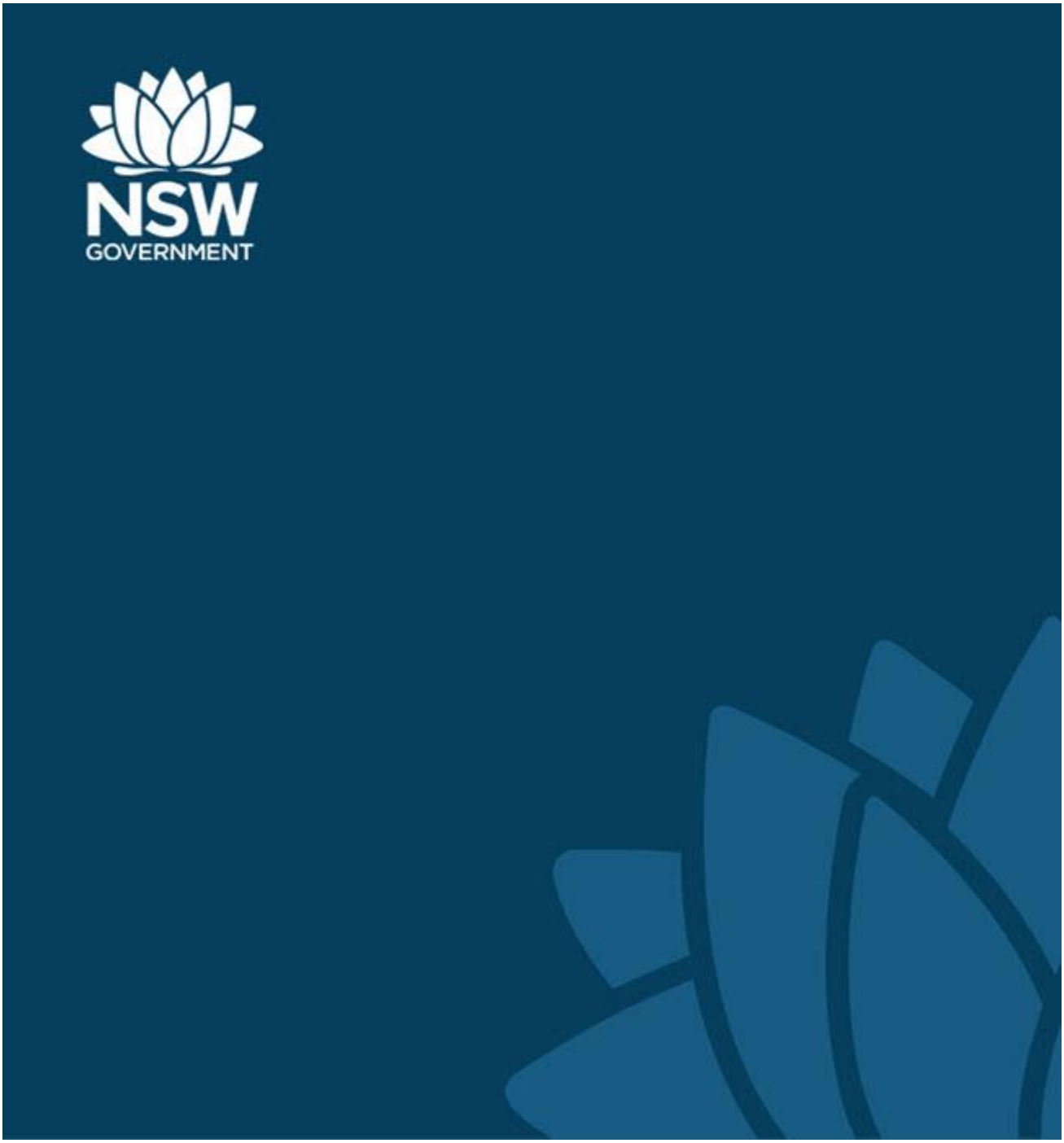

THE BASIN PLAN IMPLEMENTATION

Darling Alluvium Water Resource Plan

GW7 Water Resource Plan area

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Acknowledgement of Traditional Owners

The New South Wales Government proudly acknowledges the Aboriginal community of NSW and their rich and diverse culture and pays respect to their Elders past, present and future.

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, Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan Nations hold a significant connection to the lands in which the Darling Alluvium exists.

The Darling Alluvium is of spiritual, cultural and economic importance to the First Nations 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 Darling Alluvium landscape and natural resources.

NSW 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.

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

We thank the Elders, representatives of the Barkandji and Maljangapa, Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan Nations, and Aboriginal communities 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 DPE 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 Water Quality
APT	Annual Permitted Take
AWD	Available Water Determination
CEWH	Commonwealth Environmental Water Holder
Cth	Commonwealth
DIWA	Directory of Important Wetlands in Australia
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
km	Kilometre
LTAAEL	Long-Term Annual Average Extraction Limit
LTWP	Long-Term Water Plans
LWU	Local water utility
MDBA	Murray–Darling Basin Authority
MER	Monitoring, Evaluation and Reporting Plan
ML	Megalitre
NSW	New South Wales
NSWALC	New South Wales Aboriginal Land Council
PEW	Planned Environmental Water
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)
QAL	A qualitatively assessed risk outcome.
WMA 2000	*Water Management Act 2000*
WQMP	Water Quality Management Plan
WRP	Water Resource Plan
WRPA	Water Resource Plan Area
WSP	Water Sharing Plan

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How to read this document

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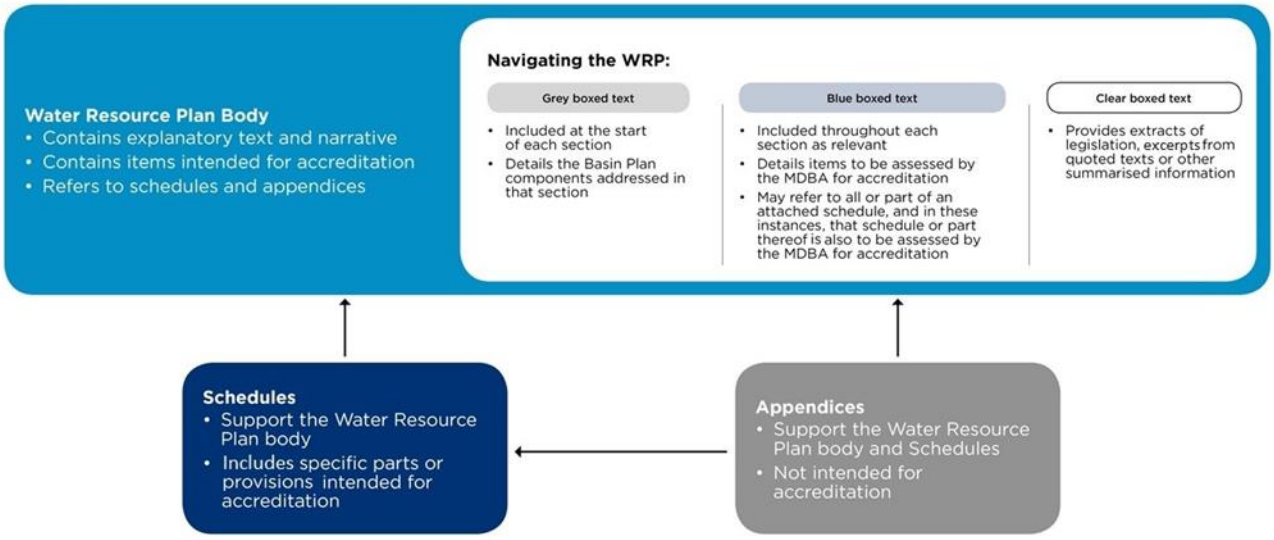


Diagram 1. Water resource plan structure

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 and methods 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 Murray-Darling Basin Authority (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
- 10.47 and 10.48 Review and amendment
- 10.52 Objectives and outcomes based on Indigenous values and uses

1.1. Purpose

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

- Upper Darling Alluvium (GS42)
- Lower Darling Alluvium (GS23)

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 Darling Alluvium WRP.

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

Ch. 10 Basin Plan Part	Matters addressed
10	Measuring and monitoring of the water take and the water resources of the Darling Alluvium WRPA
11	Reviews of this Darling Alluvium WRP and amendments of this Darling Alluvium WRP arising from those reviews
12	Scientific information and models on which this Plan is based
13	Planning for extreme events
14	Aboriginal values and uses in the Darling 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 Darling Alluvium WRPA through:

- the objectives in Part 2 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*
- the objectives of the Darling 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 Darling 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
- 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
- to optimise social, economic and environmental outcomes arising from the use of Basin water resources in the national interest
- 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
- productive and resilient water-dependent industries, and communities with confidence in their long-term future
- 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 NSW Darling Alluvium WRPA is located within the lands of, and is significant to, the Barkandji and Maljangapa, Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan 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 B to F of Schedule C.

Nations where consultation or consultation reports are not complete include:

- *Barkandji/Maliangapa*
    - 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 Schedule C of 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 Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan Nations can be seen in the following parts of the attachments to Schedule C of this Plan:

- Table 3 of Attachment B

- Tables 14, 15 and 16 of Attachment C
- Tables 11, 12 and 13 of Attachment D
- Tables 13, 14 and 15 of Attachment E
- Table 2 of Attachment F.

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 B
- Tables 18 - 22 of Attachment C
- Tables 15 - 19 of Attachment D
- Tables 17 - 21 of Attachment E
- Section 8 of Attachment F.

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.

Budjiti

The Budjiti Nation are the Paroo River people. The Budjiti people are deeply connected to their country and waterways. A deep attachment to the land, water and wildlife of Budjiti country means a healthy environment is the foundation of the Budjiti Nation. Caring for country is the essence of being Budjiti. With the granting of Native Title to the Budjiti nation, they know that their country gives them the chance to undertake cultural activities such as meetings, with both social and spiritual aspects, on their country. Ceremonies and gatherings help Budjiti elders with passing on traditional knowledge. Time on country helps Budjiti elders deal with modern day social issues such as incarceration. Bringing young people onto country, and introducing cultural practices and teachings, such as hunting, gathering and cooking can have a powerful effect with rehabilitation and healing.

Euahlayi

Euahlayi culture and spirituality are inextricably link to Country and Water. *'Culturally now our people for thousands of years relied on river, relied on water and we want that to keep going*.' For Euahlayi people, water 'is the essence of life.' The Euahlayi people are deeply connected to water, as it is connected to all things. For Euahlayi people, water plays an important part in spirituality. Dreaming stories are linked to water-dependent sites and Euahlayi people share Dreaming stories while on water. Water is also bound up in cultural knowledge, lore and ceremony. '*It gives us our rights and knowledge of things like marriage when we go to these places to learn.*' Cultural practice and lore is passed down through the transfer of knowledge from one generation to the next. Water bodies are meeting places for Euahlayi and other First Nations peoples. Euahlayi people enjoy social and recreational practices together by water. Changes in waterways on Euahlayi Country are making big impacts on these spiritual and cultural connections. Euahlayi people are coming together less as families, as they are unable to spend time by water. Many of their important ceremonial and cultural sites have been adversely impacted. This strongly affects their ability to pass on cultural knowledge. The Euahlayi people want water returned to their Country so they can replenish their spiritual and cultural connections.

Murrawarri

As 'river people', Murrawarri people have water at the core of their cultural identity. '*We're river people, and we love the river, we love going down to the river, you know, and seeing water in the river.*' The sovereign Nation of the Murrawarri Republic enables the continuity of ownership, custodianship, and traditional cultural practices of the Murrawarri people on their own Country. These practices are intimately connected with water and water systems. '*We rely on our water and that's for livelihood, cultural things and other purposes.*' Many cultural sites on Murrawarri Country are reliant on a naturally flowing, connected water system. These sites, such as Gooraman Swamp, the Murrawarri section of Narran Lakes (South-Western), Garera Springs and the Nghunnu (fish traps) have deep significance for the Murrawarri people, as locations where they

conduct ceremony, hold Nation gatherings and connect to their Dreaming. Their creation being, the Mundagudda or Rainbow Serpent, residing in a spring near Weilmoringle, is of extreme important to the Murrawarri people and culture. Murrawarri people also have strong connections to natural elements requiring water, particularly the River Red Gum, for spiritual purposes.

Ngemba

Some Ngemba people found it difficult to state what water means to them in words because it's not separate from them, their life and their culture. Water is at the centre of their community life, connecting the cultural, social, environmental, spiritual and economic aspects. Ngemba people see water as essential to their life and their identity as a Nation. '*It's our whole existence as us as a people.*' '*Without our river, we're nothing. Without our river, we've got nothing*.' Ngemba people depend on water for cultural knowledge, spirituality, community and cultural practice. '*Water is a major part of our culture, lifestyle and existence.*' Ngemba cultural knowledge is dependent on elements of water ecosystems. The Ngemba people use various components of the healthy, well-functioning ecosystem, reliant on water, as indicators for cultural practices and ceremony.

Wailwan

Above all, Wailwan people value water as life. They value and use water for cultural, social, environmental, spiritual and economic practices. They identify a wide variety of risks which impact heavily on their environment, their waterways and their cultural practices. Risks include types of land use; water management and planning practices; and governance practices. They would like to see water systems restored to good health. Employment opportunities and opportunities for control and First Nations management would enable them to continue their role as custodians as they have been practicing for millennia and are now prevented from doing by societal constraints.

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].

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

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

The objectives and outcomes as stated by the Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan 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 with the objectives in the *Water Sharing Plan for the NSW Darling Alluvial Groundwater Sources 2020*.

The Nation consultations have 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 Western Regional Water Strategy and Murray 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

[2] https://dpie.nsw.gov.au/water/plans-and-programs/nsw-water-strategy
[3] https://water.dpie.nsw.gov.au/plans-and-programs/regional-water-strategies

- 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 Darling 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 Darling 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 240 sites in the Darling 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.

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 B for the Budjiti Nation
    - Tables 14, 15 and 16 of Attachment C for the Euahlayi Nation
    - Tables 11, 12 and 13 of Attachment D for the Murrawarri Nation
    - Tables 13, 14 and 15 of Attachment E for the Ngemba Nation
    - Table 2 of Attachment F for the Wailwan 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 B for the Budjiti Nation
    - Tables 18 - 22 of Attachment C for the Euahlayi Nation
    - Tables 15 - 19 of Attachment D for the Murrawarri Nation
    - Tables 17 - 21 of Attachment E for the Ngemba Nation
    - Section 8 of Attachment F for the Wailwan 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 section 3 of Attachments B, C, and D and section 4 of Attachments E and F to Schedule C.
- The alignment of objectives and outcomes identified by the Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan Nations with objectives and outcomes in the *Water Sharing Plan for the Darling 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). 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 Western 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 Darling Alluvial Groundwater Sources 2020* (Schedule A) relevant to Aboriginal people in relation to water management in the Darling 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 plan.
- As groundwater water sharing plans are replaced, consultation with Aboriginal communities in the NSW Darling 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 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 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,
- extractive water use, and
- 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.

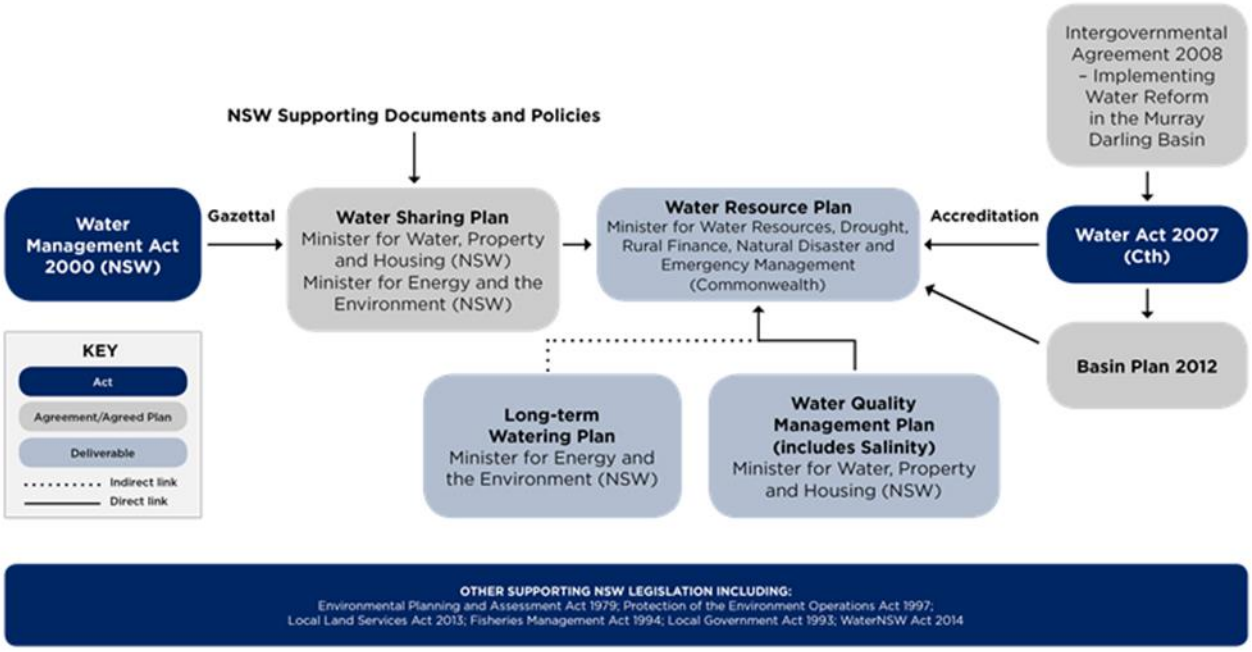


Figure 1-2. Relationship between Basin Plan, WRP and other instruments.

NSW has amended WSPs where necessary to meet the relevant Basin Plan requirements. For the Darling 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 Darling Alluvium WRP, is the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020,* at Schedule A (the WSP). This WSP establishes the rules for water sharing in the two Darling Alluvium SDL resource units. It incorporates provisions previously in the *Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012* in relation to the Upper Darling Alluvial Groundwater Source, the *Water Sharing Plan for the Intersecting Streams Unregulated and Alluvial Water Sources 2011* in relation to the Warrego Alluvial and Paroo Alluvial groundwater sources, and the *Water Sharing Plan for the Lower Murray-Darling Unregulated and Alluvial Water Sources 2012* in relation to the Lower Darling Alluvial Groundwater Source.

The groundwater sources make up the two sustainable diversion limit (SDL) resource units of the Darling Alluvium WRPA as follows:

- the Upper Darling Alluvium resource unit (GS42), which includes the Upper Darling Alluvial, Warrego Alluvial and Paroo Alluvial groundwater sources, and
- the Lower Darling Alluvium resource unit (GS23), which includes the Lower Darling Alluvial Groundwater Source.

Where the Darling 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 as part of the Darling 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 WMA 2000.

Many stakeholders have a broad range of water quantity and quality obligations and provide a range of products and services relevant to development and implementation of this Plan. Table 1-2 shows the key stakeholders along with 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.

	Links to Water Resource Management / WRP	Primary Instruments[4]
Minister responsible for Water 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*
Environment Protection Authority	The primary environmental regulator for NSW. Responsibilities for responding to pollution incidents and	*Protection of the Environment Operations Act 1997*

[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.

	Links to Water Resource Management / WRP	Primary Instruments[4]
	emergencies and enforcing environmental regulation (both of which may impact on WRP objectives).	*Protection of the Environment Administration Act 1991*
Fire and Rescue NSW and other emergency services including Rural Fire Service, State Emergency Services 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. Local governments may be responsible for development and implementation of an Integrated Water Cycle Management Strategy (IWCMS). Parts of Bourke Shire Council, Cobar Shire Council, Central Darling Shire Council and Wentworth Shire Council are within the Darling Alluvium WRPA. Parts of the Darling Alluvium are in the Unincorporated Area, which is not governed by a local council and forms part of the Western Division.	*Local Government Act 1993* *Environmental Planning and Assessment Act 1979*
Local water utilities (LWUs)	Must hold a WMA 2000 water access licence. Must develop and maintain a drinking water management system, 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 IWCMS. LWUs holding groundwater licences in the Darling Alluvium WRPA are: Central Darling Shire Council.	*Dams Safety Act 1978* *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 Local Land Services strategic plans and other plans such as for Natural Resource Management. Role in natural disaster planning and management. The Darling Alluvium WRPA is in the Western Local Land Service region.	*Local Land Services Act 2013*

	Links to Water Resource Management / WRP	Primary Instruments[4]
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. National Parks and Wildlife Service declares sites of special cultural significance to the Aboriginal people as Aboriginal Places under the *National Parks and Wildlife Act 1974*. National Parks and Wildlife Service 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 drinking water management system.	*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 forms 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 Darling Alluvium 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 Darling 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 Darling 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 Darling Alluvial Groundwater Sources 2020* that are directly referenced in this 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* (Cth).
- 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 Darling 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 Authority 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* (Cth).

For the purposes 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 3 of each of Attachments B to D and Section 4 of Attachment E and F to Schedule C demonstrate how the consultation process is viewed as informed participation. Specifically:
- 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 Darling Alluvium WRP are specified in Part 5 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*. A Native Title determination has been made for the Barkandji Traditional Owners #8.
    - A Native Title claim has been registered by the Ngemba, Ngiyampaa, Wangaaypuwan and Wailwan nations over areas that are relevant to the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*. Subject to determination of the claim, 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 the Department of Planning and Environment - Environment and Heritage Group, has also been considered as part of the development of Long-Term Water Plans (LTWPs) 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 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 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 plan 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, 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 were discussed during consultation.
  - The risks and impacts raised by the Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan Nations during consultation are summarised in Table 3-3 of this WRP.
  - The risks to Aboriginal values and uses for the Darling Alluvium WRP area are also included in the Attachments to Schedule C for each Nation (Table 4 of Attachment B, Table 17 of Attachment C, Table 14 of Attachment D, Table 16 of Attachment E and Table 3 of Attachment F).

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 Darling Alluvium WRPA describe their heritage in their own terms. Information shared about cultural heritage is included in the Darling 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 Darling Alluvium WRP area

First Nation	Information shared about cultural heritage
Budjiti	• Budjiti cultural sites are comprehensively water dependent, but also take in other important landscapes away from water features.
Euahlayi	• Euahlayi cultural sites and water bodies are being damaged and impacted by lower flow and level.
Murrawarri	• Many cultural sites on Murrawarri Country are reliant on a naturally flowing, connected water system.
Ngemba	• Cultural sites are being damaged and impacted by lower flow and level and the Ngemba people are losing access to their sites and waterways.
Wailwan	• Special memories and spiritual and physical cultural connections to identified waterways on Wailwan Nation country, including significant locations Beemunnel Reserve Aboriginal Place and “Tin City”.

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.

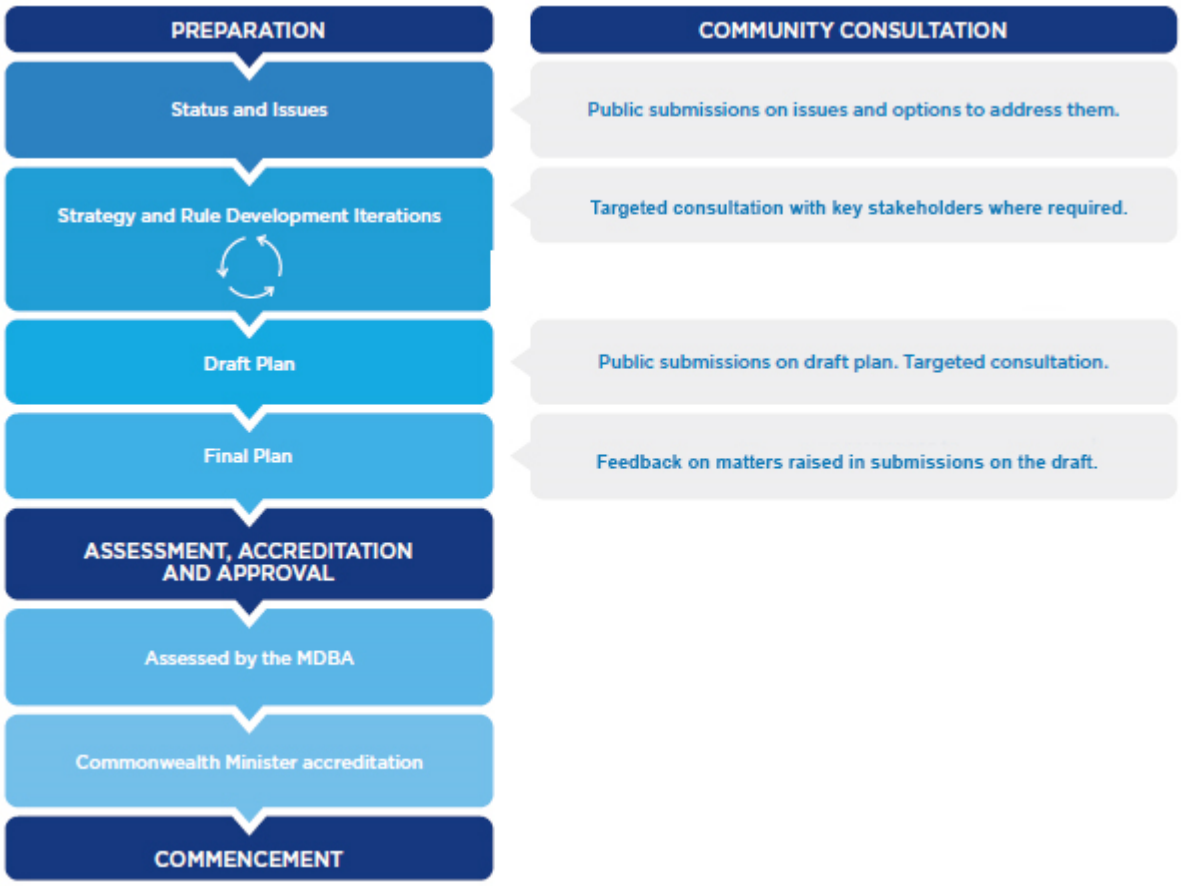


Figure 1-3. Consultation processes in WRP development.

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 four 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

iii. consultation with Aboriginal people

iv. consultation with Queensland and Victoria on shared aquifers who had the opportunity to contribute during public consultation.

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 Plan, please see Schedule C to this Plan.

1.7.1. Aboriginal consultation

In order 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 B – F of Schedule C to this Plan.

The consultation being 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 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 km². The Native Title claim was lodged in 1997 and determined in 2015. This determination covers a number of water resource plan areas, including the Darling 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 Darling Alluvial Groundwater Sources 2020*.

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

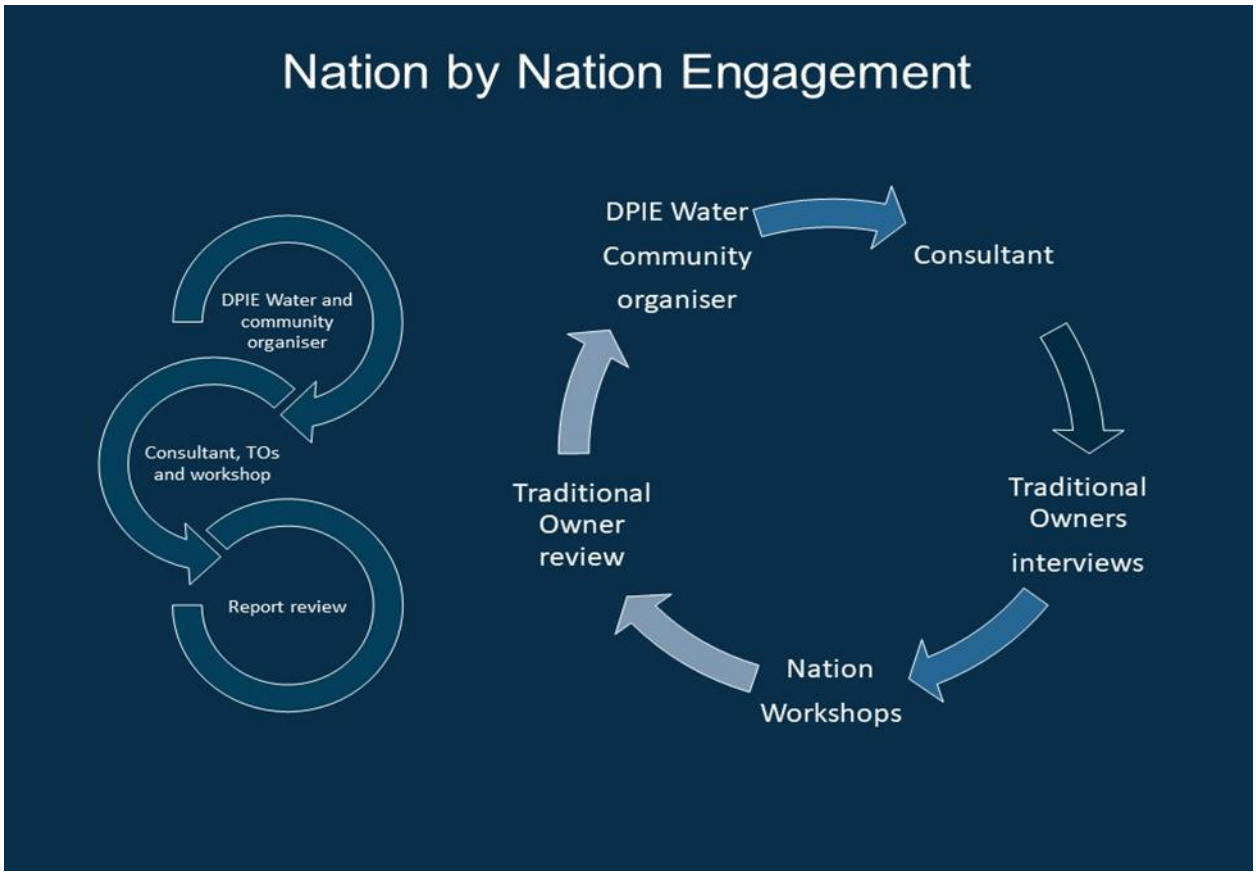


Figure 1-4. Nations engagement plan overview.

A consultation program was undertaken for each of the Barkandji and Maljangapa, Budjiti, Euahlayi, Murrawarri, Ngemba and Wailwan 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 Budjiti Nation Consultation Report is available at Attachment B to Schedule C
- The Euahlayi Nation Consultation Report is available at Attachment C to Schedule C
- The Murrawarri Nation Consultation Report is available at Attachment D to Schedule C
- The Ngemba Nation Consultation Report is available at Attachment E to Schedule C
- The Wailwan Nation Consultation Report is available at Attachment F to Schedule C.

Table 1-4. Aboriginal consultation undertaken in respect to the Darling 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
Budjiti Nation	Darling Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Great Artesian Basin Shallow, Intersecting Streams and Warrego—Paroo—Nebine	27th – 28th August 2019	Cunnamulla and Eulo	2
Euahlayi Nation	Darling Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Great Artesian Basin Shallow, Intersecting Streams, QLD Border Rivers – Moonie and Condamine—Balonne	4th November 2019	Walgett	Not supplied (16 participants)
Murrawarri Nation	Darling Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Great Artesian Basin Shallow, Intersecting Streams, Barwon—Darling Watercourse and Warrego—Paroo—Nebine	9th August 2019	Brewarrina	Not supplied (13 participants)
Ngemba Nation	Darling Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Great Artesian Basin Shallow, Intersecting Streams, Macquarie–Castlereagh and Barwon—Darling Watercourse	October and November 2018	Bourke and Brewarrina	Not supplied
Wailwan Nation	Darling Alluvium, Macquarie-Castlereagh	March 2018	Gilgandra and Warren	Not supplied

	Alluvium, NSW Murray-Darling Basin Fractured Rock, NSW Great Artesian Basin Shallow, Macquarie–Castlereagh			

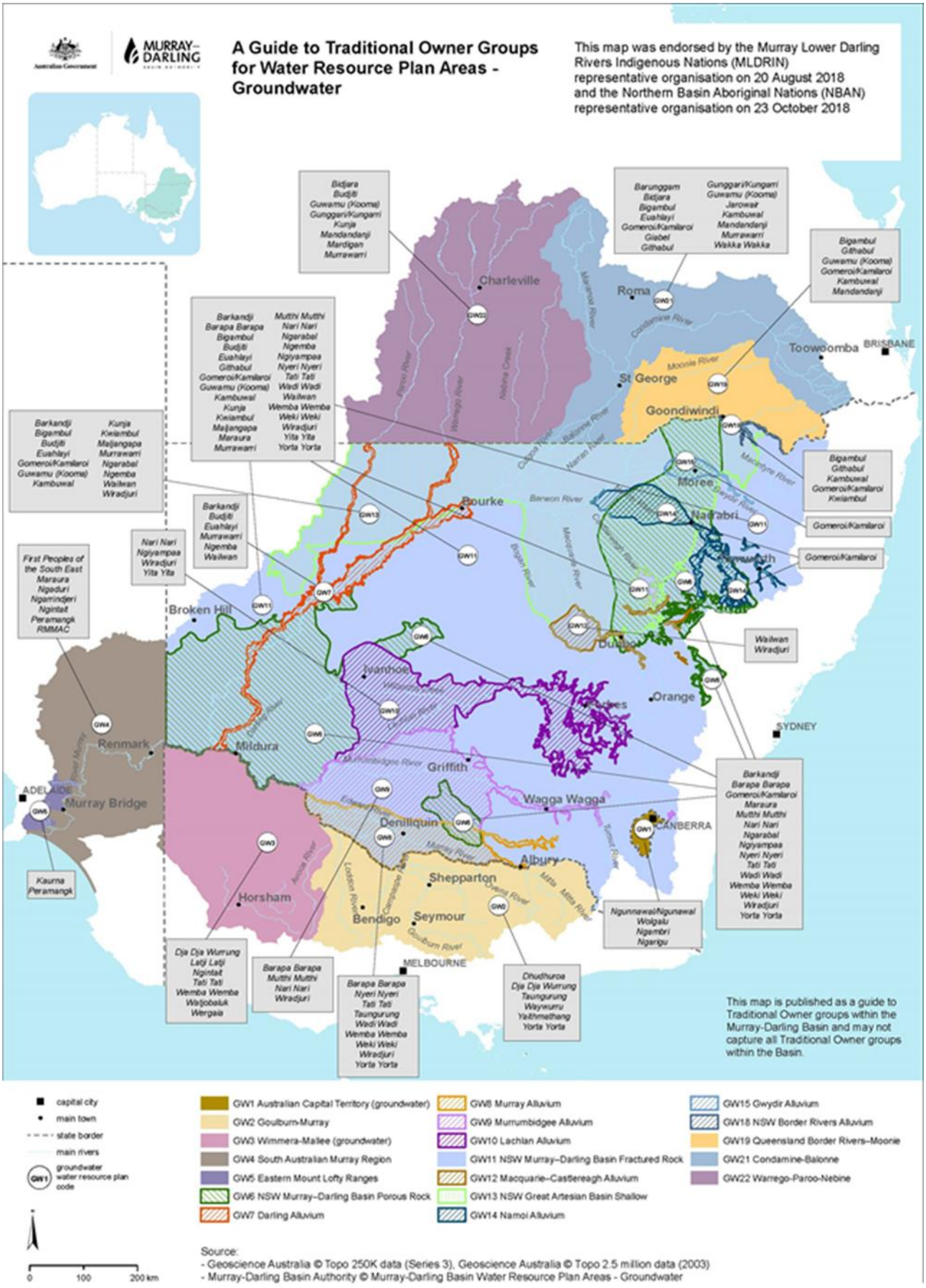


Figure 1-5. Traditional owner groups of the groundwater WRPAs.

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 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 3 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 Darling 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 WRP area
- 10.19 Groundwater and surface water connections

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

For the purpose of section 10.02 of the Basin Plan:

- This Plan applies to the Darling Alluvium WRPA and the water resources specified in section 3.06(c) of the Basin Plan as the Darling 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 Darling 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 Darling Alluvium WRPA as described in section 6.03 and Schedule 4 to the Basin Plan within the Darling 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 Darling 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 the plan applies.

A full description of the Darling Alluvium WRPA is provided at Appendix A and Figure 2-1 is an indicative map of the area.

The Darling Alluvium (GW7) is composed of two SDL resource units, the Upper Darling Alluvium (GS42) and the Lower Darling Alluvium (GS23).

- Upper Darling Alluvium (GS42) includes alluvial deposits associated with:
  - the section of the Paroo River from the Queensland border to the rivers junction with the Darling River near Wilcannia
  - the section of the Warrego River from the Queensland border to the rivers junction with the Darling River downstream of Bourke
  - the upper Darling River, commencing east of Bourke and extending south west to a channel constriction between Menindee and Wilcannia.

These three areas correspond to the Paroo Alluvial Groundwater Source, the Warrego Alluvial Groundwater Source and the Upper Darling Alluvial Groundwater Source in the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*.

- Lower Darling Alluvium (GS23), corresponds to the Lower Darling Alluvial Groundwater Source in the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* commencing at the channel constriction between Menindee and Wilcannia and extending south to the Murray River at Wentworth.

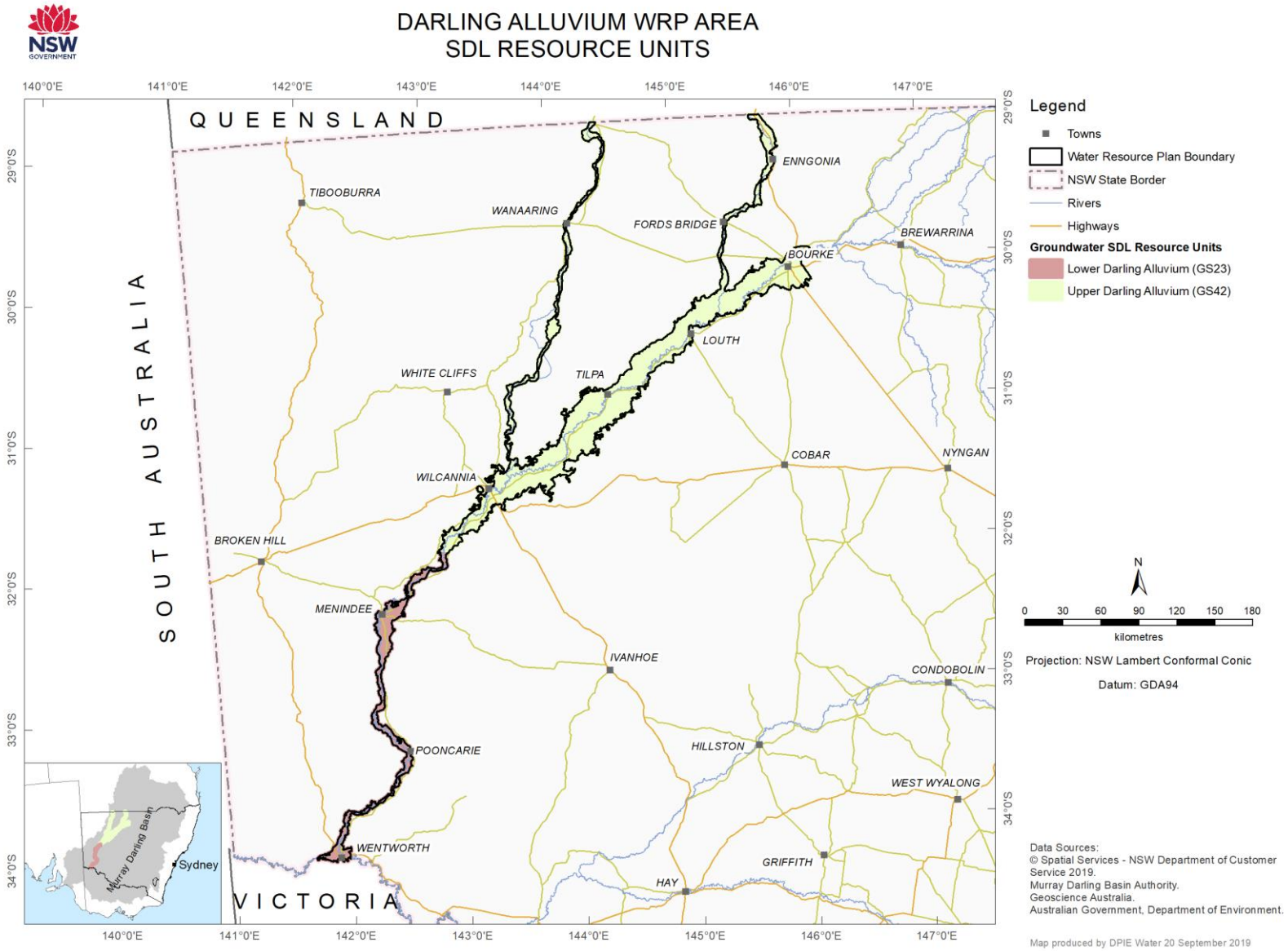


Figure 2-1. Map of Darling Alluvium Water Resource Plan Area.

2.2. Regard to other water resources

For the purpose of section 10.05 of the Basin Plan:

- The Darling Alluvium WRP has been prepared having regard to the management and use of connected water resources as described in Section 3.3 of the Darling Alluvium Risk Assessment (GW7 WRPA).
- Division 1, Part 6 of the Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020 (Schedule A) sets the long-term average sustainable diversion limits (SDLs) for the Darling Alluvium SDL resource units and manages extraction within these over the long term having regard to connected surface water and groundwater resources. Clause 65 of the Darling Alluvial Water Sharing Plan 2020 (Schedule A) has regard to the significant hydrologic connection in common aquifers with Victoria and Queensland and provides for changes to allow interstate trade subject to there being in place an interstate agreement and appropriate administrative systems and processes.
- Clauses 37(3) and 41 of the Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020 (Schedule A) have regard to the significant hydrologic connection between the groundwater of the Lower Darling Alluvium SDL resource unit, the surface water resources of the Lower Darling, 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, the Upper Darling Alluvium is adjacent to the Great Artesian Basin (GAB), a non-Basin water resource. Connectivity is outlined in Section 3.3 of the Darling Alluvium Risk Assessment (GW7 WRPA).

The four groundwater sources in two SDL Resource Units of the Darling Alluvium WRPA have varying degrees of connectivity to their associated surface water systems. Long-term average annual extraction limits (LTAAELs) are established in the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* for each groundwater source having regard to acceptable impacts on the connected surface water resources and recognising that groundwater extraction can, over time, potentially impact on the surface water/groundwater flux. Available water determinations (AWDs) are used to control growth in extractions to the LTAAEL in each groundwater source within the SDL resource units.

The Paroo and Warrego groundwater sources within the Upper Darling Alluvium are considered to have low levels of hydraulic connectivity to the ephemeral Paroo and Warrego Rivers however there is no data available to characterise the degree of connectivity. As these rivers are ephemeral, groundwater resources are managed independently from surface waters and extraction is limited to the surface and groundwater SDLs and LTAAELs. These alluvial systems are managed at a groundwater source scale and limitations to take and trade are in place between the Paroo, Warrego and Upper Darling groundwater sources within the Upper Darling Alluvium resource unit. The Lower Darling Alluvium and the Darling alluvial groundwater source within the Upper Darling Alluvium are hydraulically connected to the Darling River.

Large river flow or flood events recharge the shallow aquifers of the Darling Alluvium WRPA and in some areas or during low river flow, groundwater discharges to the channel. In some reaches of the Lower Darling, low flows have been observed to result in impervious clay layers lining the riverbed, partially disconnecting the river from the underlying alluvium. Aquifer recharge is prevented until high flow scours the channel. This clay veneer and mineral precipitation in the bed and banks of the river near Menindee inhibits leakage from the river which means there will be minimal impact on the river and associated pools during low-flow conditions when access in the Lower Darling Alluvium is permitted.

The alluvial systems of the Darling, Paroo and Warrego Rivers are a continuous sequence of unconsolidated sediments deposited as valley fill, and are connected to similar deposits in the Paroo-Warrego-Nebine WRPA (GW22) along the Paroo and Warrego Rivers in Queensland. Groundwater connectivity across the border is limited by the narrow width of the aquifers. Within

NSW, the sediments of the Upper Darling Alluvium are bound by the NSW Great Artesian Basin Shallow (GW13) in the north and the NSW Murray-Darling Basin Fractured Rock (GW11) and the NSW Great Artesian Basin (not a Murray-Darling Basin resource) in the centre. The permeability of these is much lower than the permeability of the alluvium and groundwater exchange is limited. These units and the alluvial systems are considered hydraulically disconnected.

In the south, the Lower Darling Alluvium and the southernmost section of the Upper Darling Alluvium are adjacent to the Western Porous Rock (GS50) in NSW and the Wimmera-Mallee Sedimentary Plain (GS9b). The permeabilities of the Alluvium and Porous Rock are similar and these units are considered hydraulically connected.

Extraction from the Upper Darling Alluvium and the Lower Darling Alluvium SDL resource units is managed via compliance with the LTAAELs for the four groundwater sources, which were established understanding and accounting for the connectivity of these NSW and interstate water sources. The LTAAELs (and SDLs) for these groundwater sources are 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.

As flagged above, the groundwater resources along the border regions of Queensland and NSW, and Victoria and NSW, are variously contained within shared or common aquifers. The existing state legislation enables policy and management to deliver equitable water sharing of stock and domestic rights, groundwater entitlements and entitlements of linked surface water users and dependent or partially dependent ecosystems. However, despite common hydrological characteristics of much of the border region, there is no policy or statutory imperative for addressing the impacts of groundwater extraction in one state, on other uses across the border.

In their 2012 report on the 'Potential for the alignment of management of common aquifers along the NSW-Victorian border' SKM reported that there was a number of aspects that require consideration within the context of shared aquifers. These include:

- complete return of all currently overallocated or overused systems to "environmentally sustainable levels of extraction"
- progressive removal of barriers to trade in water, and opportunities for trading within and between States and Territories, where water systems are physically shared or hydrologic connections and water supply considerations will permit water trading
- addressing future adjustment issues that may impact on water users and communities
- recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource
- in the case of water access entitlements, be compatible across jurisdictions to improve investment certainty.

NSW and Victoria have agreed to further explore joint management and the *Darling Alluvial Water Sharing Plan 2020* includes provisions to give effect to any future arrangements.

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 Darling 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 risk to:

a. insufficient water available for the environment
b. water being of a quality unsuitable for use
c. poor health of water-dependent ecosystems.

The full Darling Alluvium Risk Assessment (GW7) (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 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 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 Darling Alluvium WRPA.
- Sections 2.2, 2.3, 4.1, 5.1, 6.1 and 7 of the Risk Assessment describe the methods used to identify current and future risks to the condition and continued availability of the water resources of the Darling Alluvium WRPA.
- The following sections in the Risk Assessment detail the methods used to assess current and future risks to the condition and continued availability of the water resources of the Darling Alluvium WRPA, 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 consequence 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, 6.2.3, 6.3.2, 6.4.2, 6.5.2, 6.6.1, 6.7.1, and 6.8.1 of the Risk Assessment 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.

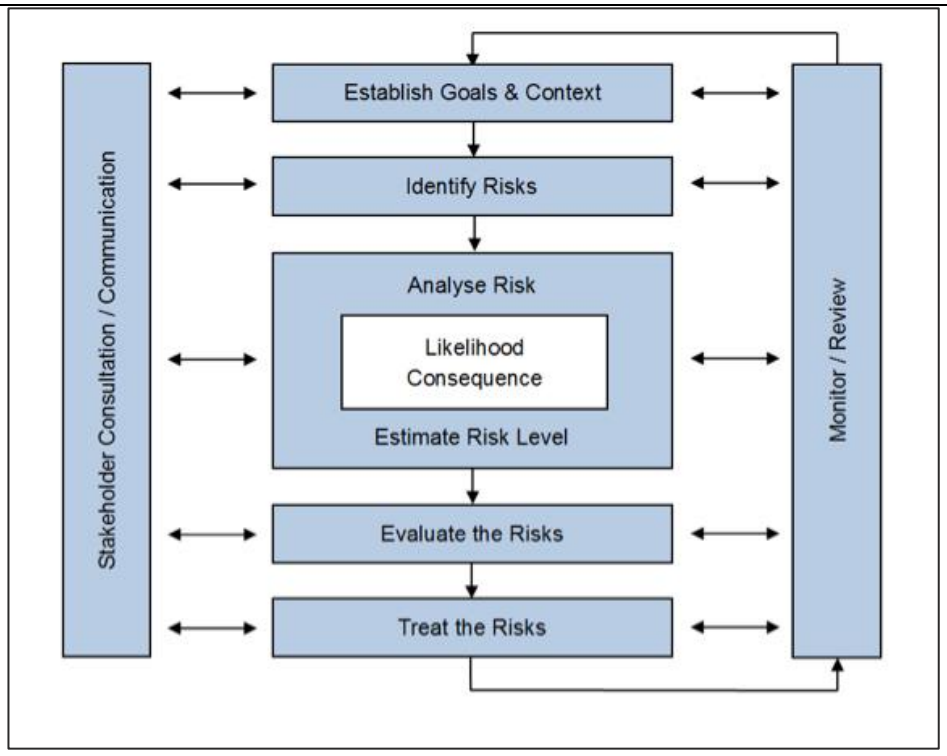
The risk assessment approach taken for each NSW WRP follows the process illustrated in Box 3-1. This process is consistent with the National Water Initiative Policy Guidelines for Water Planning and Management and NSW's Basin Plan obligations. The risk assessment framework adopts a cause/threat/impact 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 Basin 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 Darling Alluvium WRPA.
- Figures 4-1 to 4-8, 5-1 to 5-7, 6-1 and 6-7 to 6-12 of the Darling Alluvium Risk Assessment (GW7 WRPA) detail factors that contribute to the medium or high risks.

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

Risk		SDL resource unit	Groundwater source	Risk outcome[5]
Risks to consumptive users				
R1	Risk to structural integrity of the groundwater systems	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R2	Risk of groundwater extraction inducing connection with poor quality groundwater	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R3	Risk of localised drawdown in bores reducing groundwater access by consumptive users	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Low
QL1	Risk of sediment compaction impacting surface water users	Intersecting Streams (SS17)		Low-QAL
		Lower Darling (SS18)		Low-QAL
		Barwon-Darling Watercourse (SS19)		Low-QAL
		Macquarie-Castlereagh (SS20)		Low-QAL
QL2	Risk of groundwater extraction impacting water users in adjacent groundwater systems	Kanmantoo Fold Belt MDB (GS19)		Nil-QAL
		Lachlan Fold Belt MDB (GS20)		Nil-QAL
		NSW GAB Warrego Shallow (GS35)		Nil-QAL
		NSW GAB Central Shallow (GS36)		Nil-QAL
		Western Porous Rock (GS50)		Nil-QAL
		Great Artesian Basin (non –Basin resource)		Nil-QAL
		Sediments above the Great Artesian Basin: Warrego - Paroo – Nebine (GS60)		Low-QAL
		Warrego Alluvium (GS66)		Low-QAL

[5] GDEs are groundwater-dependent ecosystems, IEVs are groundwater-dependent instream ecological values, and QAL indicates that a qualitative risk assessment was undertaken

Risk		SDL resource unit	Groundwater source	Risk outcome[5]
		Wimmera - Mallee Sedimentary Plain (GS9b)		Low-QAL
QL3	Risk of poor water quality to water users	Upper Darling Alluvium		Low-QAL
		Lower Darling Alluvium		Low-QAL
Risks to Aquifer Access Licence holders				
R4	Risk of climate change reducing recharge and groundwater availability	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R5	Risk of growth in Basic Landholder Rights reducing groundwater availability	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Lower Darling Alluvial	Medium
R6	Risk of growth in Local Water Utilities reducing groundwater availability	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R7	Risk of increases in irrigation efficiency and improved water delivery reducing recharge	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R8	Risk of plantation forestry intercepting recharge	Upper Darling Alluvium	Upper Darling Alluvial	Nil
			Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Nil
QL4	Risk of growth in mining reducing groundwater availability	Upper Darling Alluvium	Upper Darling Alluvial	Low– QAL
			Warrego Alluvial	Low– QAL
			Paroo Alluvial	Low– QAL
		Lower Darling Alluvium	Lower Darling Alluvial	Low– QAL
Risks to water available for the environment				
R9	Risk of groundwater extraction causing local drawdown and impacting on GDEs	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R10	Risk of groundwater extraction	Upper Darling Alluvium	Upper Darling Alluvial	Low

Risk		SDL resource unit	Groundwater source	Risk outcome[5]
	causing local drawdown and impacting on instream ecological values		Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R11	Risk of growth in plantation forestry intercepting recharge and impacting on GDEs	Upper Darling Alluvium	Upper Darling Alluvial	Nil
			Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Nil
R12	Risk of growth in plantation forestry intercepting recharge and impacting on instream ecological values	Upper Darling Alluvium	Upper Darling Alluvial	Nil
			Warrego Alluvial	Nil
			Paroo Alluvial	Nil
		Lower Darling Alluvium	Lower Darling Alluvial	Nil
R13	Risk of climate change reducing recharge and groundwater availability and impacting on GDEs	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Lower Darling Alluvial	Low
R14	Risk of climate change reducing recharge and groundwater availability and impacting on instream ecological value	Upper Darling Alluvium	Upper Darling Alluvial	Low
			Warrego Alluvial	Low
			Paroo Alluvial	Low
		Lower Darling Alluvium	Upper Darling Alluvial	Low
QL5	Risk of poor water quality to the environment (land and waste management practices)	Upper Darling Alluvium	Upper Darling Alluvial	GDEs- Low– QAL
				IEVs – Low - QAL
			Warrego Alluvial	GDEs- Low– QAL
				IEVs – Low - QAL
			Paroo Alluvial	GDEs- Low– QAL
				IEVs – Low - QAL
		Lower Darling Alluvium	Lower Darling Alluvial	GDEs- Low– QAL
				IEVs – Low - QAL
	Land management induced water quality (salinity) deterioration	Upper Darling Alluvium	Upper Darling Alluvial	GDEs - Nil – QAL
				IEVs – Low - QAL
			Warrego Alluvial	GDEs - Nil – QAL
				IEVs - Nil – QAL
			Paroo Alluvial	GDEs - Nil – QAL
				IEVs - Nil – QAL
		Lower Darling Alluvium	Lower Darling Alluvial	GDEs - Low– QAL

Risk		SDL resource unit	Groundwater source	Risk outcome[5]
				IEVs – Low - QAL
	Pumping induced water quality (salinity) deterioration	Upper Darling Alluvium	Upper Darling Alluvial	GDEs -Low– QAL
				IEVs – Low - QAL
			Warrego Alluvial	GDEs -Low– QAL
				IEVs – Low - QAL
			Paroo Alluvial	GDEs -Low– QAL
				IEVs – Low - QAL
		Lower Darling Alluvium	Lower Darling Alluvial	GDEs -Low– QAL
				IEVs – Low - QAL
QL6	Risk of growth in BLR and LWU reducing groundwater availability to the environment (GDEs and instream ecological values	Upper Darling Alluvium	Upper Darling Alluvial	Nil – QAL
			Warrego Alluvial	Nil – QAL
			Paroo Alluvial	Nil – QAL
		Lower Darling Alluvium	Lower Darling Alluvial	Nil – QAL
QL7	Risk of growth in mining reducing groundwater availability	Upper Darling Alluvium	Upper Darling Alluvial	GDEs -Low
				IEVs - Low
			Warrego Alluvial	GDEs -Low
				IEVs - Low
			Paroo Alluvial	GDEs -Low
				IEVs - Low
		Lower Darling Alluvium	Lower Darling Alluvial	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 detail the strategies to manage the current and future risks to the condition and continued availability of the groundwater resources of the Darling Alluvium.
- Column 6 of Table 8-7 of the Risk Assessment identifies for each strategy the related requirements of other parts of Chapter 10 of the Basin Plan and the strategies listed in 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 8-1 and 8-3 of the Risk Assessment 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 10.41(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 Darling 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 8-1 and 8-3, 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 Darling 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 Darling 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 & 6 - *Water Sharing Plan for the Darling 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 on:	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 Darling 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. Section 324 *Water Management Act 2000* (temporary water restrictions). Section100, 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). Section 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/Maljangapa Nation.

Figure 3-1 is 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 of 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)*

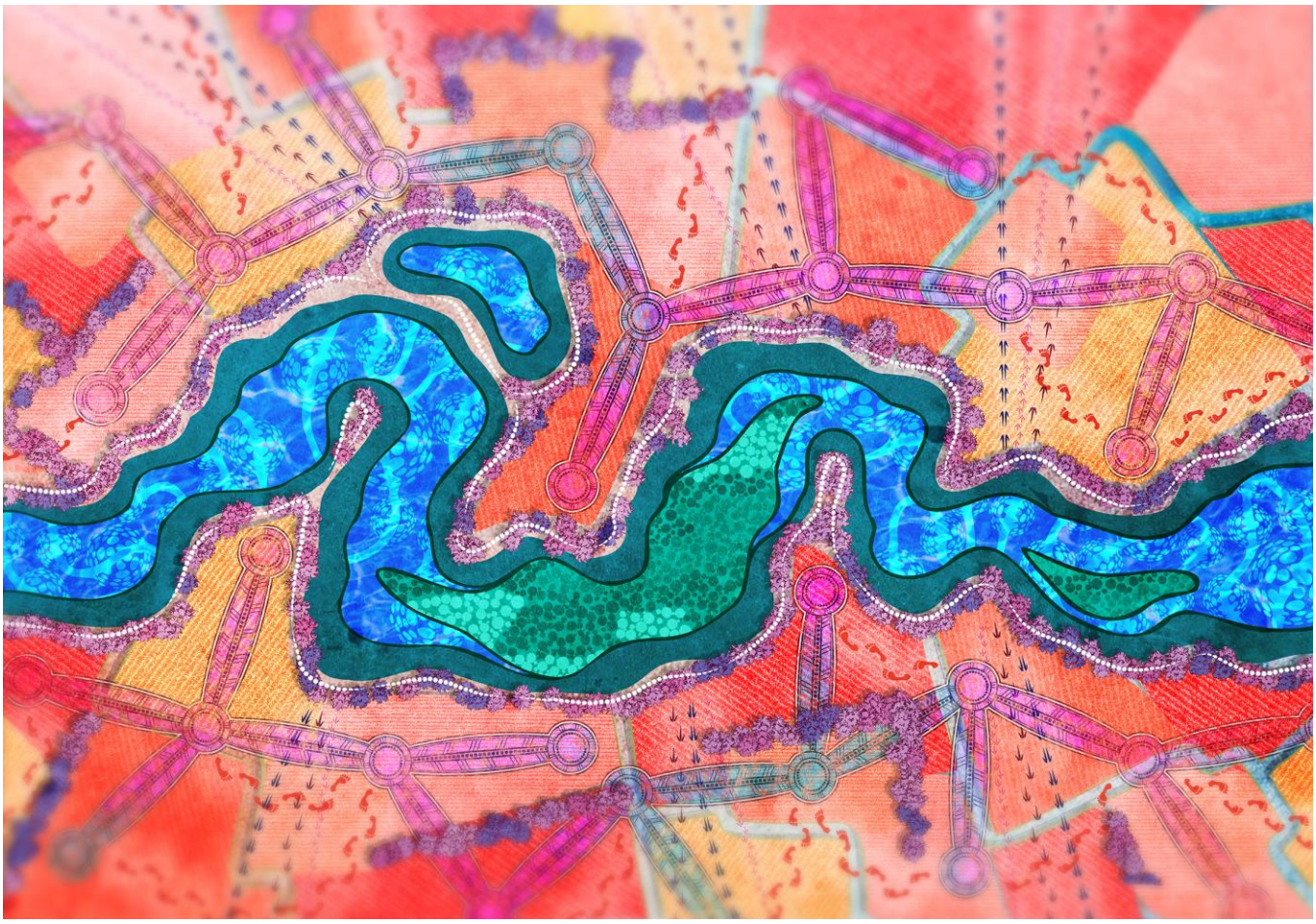


Figure 3-1. *Ghi-dhuray* – Connection to the River (*Wiradjuri – having river, artist Nathan Peckham 2021*)

Work undertaken with First Nations of the Darling 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 Darling 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.

"*We can hear the water running. We sit down there. It's peaceful. It's good for your mental wellbeing. It's a stress release. It's peace. Chuck my line in. Put my feet in the water and everything leaves me*." From Ngemba Nation consultation.

"*Not one part of the Country can work without the other. Everything is connected on the land. If something goes crook you get crook. If we lose our river we die. We lose our blood we die, it's the same thing.*" From Euahlayi Nation consultation.

"*Water to me is like a river running in my veins. We take our kids onto the river. Making them more aware of what's in the river and how to look after the river*." From Murrawarri Nation consultation.

The risks identified by the First Nations during workshops across NSW 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://www.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.

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
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		
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	Conservation/heritage management (public and private land). Fisheries management. NSW Water Strategy. Regional Water Strategy.

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
	targets for water dependent ecosystems FPH: Regulation of floodplain harvesting	
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
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	NSW Water Strategy Regional Water Strategy

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
	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.	
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.
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).

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
		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 minimise saline groundwater intrusion. WRP and WQMP.	NSW Water Strategy. Regional Water Strategy.
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	WRP and WSP engagement process.	NSW Water Strategy. Regional Water Strategy.

Risks identified by First Nations	Relevant water management/ instrument	Other management/ policy area
not care about cultural concerns.		
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.
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
- 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
- 10.21 Environmental outcomes relating to 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 two separate ways or a combination of two 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 - Water 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 Darling Alluvium WRPA

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 Darling Alluvial Groundwater Sources 2020* (the WSP) reserves for the environment all water in 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 Darling 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 aquifer access licence accounts via AWDs 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 accounts. 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 Darling Alluvial Groundwater Sources 2020* apply:

- Clauses 15 and 16
- Division 1 of Part 6
- Division 1 of 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 Lower Murray-Darling Unregulated and Alluvial Water Sources 2011*[8] (Lower Murray-Darling 2011 WSP), *Water Sharing Plan for the Intersecting Streams Unregulated and Alluvial Water Sources 2011*[9] (Intersecting Streams 2011 WSP), and the *Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012*[10] (Barwon-Darling 2012 WSP) included provisions committing, identifying and maintaining PEW in the Darling alluvial groundwater sources immediately before the commencement of the Basin Plan.

The Lower Murray-Darling 2011 WSP, Intersecting Streams 2011 WSP and Barwon-Darling 2012 WSP also included provisions for unregulated water sources not relevant to the Darling Alluvium WRP.

When developing the WRP, NSW reviewed the water sharing rules and arrangements for the Darling alluvial groundwater sources and included all Darling alluvial groundwater sources in the *Water Sharing Plan for the Darling 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 Darling Alluvial Groundwater Sources:

- Provisions removed from:
  - Part 4 - Subclauses under Clause 14 (Lower Murray-Darling 2011 WSP), Clause 15 (Intersecting Streams 2011 WSP) and Clause 16 (Barwon-Darling 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 15 (Lower Murray-Darling 2011 WSP), Clause 16 Intersecting Streams 2011 WSP) and Clause 17 (Barwon-Darling 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 no longer reference the share components of salinity and water table management access licences (as referenced under Clause 15 (Lower Murray-Darling 2011). Provisions changed:
  - Part 6 – The LTAAEL for the Lower Darling Alluvial Groundwater Source is now expressed as a specific number (2,230 ML/year) – incorporating the estimated shares (701ML/year) for the ongoing extraction of the Curlwaa Groundwater Protection Scheme for salinity and water table management purposes. The LTAAEL for the Lower Darling Alluvial Groundwater Source aligns with the BDL and SDL for the Lower Darling Alluvium SDL resource unit.
  - Part 6 – LTAAELs were reduced in the Paroo Alluvial, Warrego Alluvial and Upper Darling Alluvial groundwater sources to align with the Upper Darling Alluvium SDL.
  - Part 6 - When assessing compliance with the LTAAEL, the 2020 WSP (Clause 26) assesses average annual extraction over 5 years instead of over 3 years in the Warrego and Paroo alluvial groundwater sources (Intersecting Streams 2011 WSP) and in the Upper Darling Alluvial Groundwater Source (Barwon-Darling 2012 WSP).

[8] https://legislation.nsw.gov.au/view/html/2012-07-06/sl-2012-0022#sec.4 – version 6 July 2012 to 30 June 2020

[9] https://legislation.nsw.gov.au/view/html/2012-07-06/sl-2011-0573#sec.4 – version 6 July 2012 to 30 June 2020

[10] https://legislation.nsw.gov.au/view/html/2012-10-04/sl-2012-0488#sec.4 – version 4 October 2012 to 4 July 2013

- Provisions added to the 2020 WSP:
    - Part 6 - Clause 28 of Part 6 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 - 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.

The effect of all other provisions identifying, establishing, and maintaining PEW remain unchanged between the Lower Murray-Darling 2011 WSP, Intersecting Streams 2011 WSP, the Barwon-Darling 2012 WSP, and the 2020 WSP. This includes provisions under Division 1 of 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 in a water year as:
    - maximum allocation + allocations bought + allocations recredited under s76 WMA 2000
- The Lower Murray-Darling 2011, the Intersecting Streams 2011, and the Barwon-Darling 2012 WSPs set the maximum volume of water that can be 'taken' in any water year as:
    - sum of allocation (+ allocations bought – allocations sold) + allocations recredited under s76. (This is equivalent to take + allocations sold = sum allocation + allocations bought + allocations recredited under s76)
- Maximum available water determinations and carryover limits have not changed between plans.

Amendments to the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*

After July 2020, an amendment was made to the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* that does not affect the planned environmental water rules or arrangements.

The order amended clause 37(3) to remove the requirement that water can only be taken for the purpose of perennial horticulture. This requirement applied to aquifer access licences that were originally issued in 2003 to high-security regulated river licence holders who had perennial plantings. Licences were issued under an exemption to the embargo on new groundwater licences to give drought relief for permanent plantings when surface water was not available. Most licence holders removed their perennial plantings in 2020 under an agreement with the Australian Government designed to reduce surface water demand from the Darling River system.

Removing this subclause allows affected licence holders to use the water for other purposes, benefiting the welfare of regional communities during dry periods, while maintaining environmental protections. The volume permitted to be extracted has not changed, extraction is accounted for against the LTAAEL and SDLS as required under Clause 25 of the 2020 WSP, and access remains limited to periods of low surface water availability defined by low regulated river (general security) available water determinations, temporary water restrictions in the regulated river or low flows in the regulated river.

Salinity and water table management provisions

Prior to the commencement of the Basin Plan, water was taken from groundwater for salinity and water table management purposes in both the Lower Darling Alluvial and Upper Darling Alluvial groundwater sources.

A salinity and water table management access licence (3,300 ML/year) was issued under the Barwon-Darling 2012 WSP in the Upper Darling Alluvial Groundwater Source, with a condition imposed on this licence to ensure that it is used only for the purpose of managing salinity levels in the water source.

Clause 35(1)(a) of the Lower Murray-Darling 2011 WSP and subclause 34(2) of the 2020 WSP allow a salinity and water table management licence to be issued in the Lower Darling Alluvial Groundwater Source, for the Curlwaa Groundwater Protection Scheme. Section 66 (2A) of the WMA 2000 requires the Minister to impose a condition on this licence to ensure that it is used for the purpose of salinity and water table management.

The LTAAEL for the Lower Darling Alluvial Groundwater Source specified in the Lower Murray-Darling 2011 WSP (subclause 26(3)) included an allowance for the salinity and water table management shares yet to be issued. In the 2020 WSP, 701 ML/year was added to the LTAAEL to recognise the capacity and likely shares of the Curlwaa salinity and water table management scheme. This estimated maximum volume of take under these arrangements was also incorporated into the BDL and SDL (1,529 ML/year + 701 ML/year = 2,230 ML/year) at commencement of the Basin Plan in 2012[11].

Application of the Lower Murray-Darling 2011, Intersecting Streams 2011 and the Barwon-Darling 2012 WSPs

The application of the Lower Murray-Darling 2011, Intersecting Streams 2011 and the Barwon-Darling 2012 WSPs 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 (in Division 1 of Part 6) and
  - account rules (Division 1 of Part 8).

While clauses in the Lower Murray-Darling 2011, Intersecting Streams 2011 and the Barwon-Darling 2012 WSPs include AWD provisions as maintaining PEW, the mechanisms that allow AWDs to be reduced following an assessment of non-compliance with the LTAAEL is applied by Division 1 of Part 6 of these WSPs, not by Division 2 of Part 6.

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

The 2020 WSP provides for:

- the equivalent effectiveness and legal protection of PEW as the Lower Murray-Darling 2011, Intersecting Streams 2011 and the Barwon-Darling 2012 WSPs
- the equivalent volume of PEW as the Lower Murray Darling 2011 WSP
- increases the volume of PEW compared to the Intersecting Streams 2011 and Barwon-Darling 2012 WSPs.

Effects of changes to Part 4 – planned environmental water

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 limits clauses and account management rules remain in the 2020 WSP (Division 1 of Part 6 and Division 1 of Part 8).
- Clause 15 in the Lower Murray-Darling 2011, Clause 16 in the Intersecting Streams 2011 and Clause 17 in the Barwon-Darling 2012 WSPs did not protect a percentage of rainfall

[11] p. 129. *Groundwater Report Cards*, Murray-Darling Basin Authority, 2020. https://www.mdba.gov.au/sites/default/files/pubs/Groundwater%20Report%20Cards_November%202020.pdf

recharge as PEW. Rather they provided an estimate of the percentage of recharge established as PEW arising from applying the LTAAELs. Removing these recharge estimates which may change over time does not reduce the protection of PEW.

- While Clause 15(2)(a)(iii) in the Lower Murray-Darling 2011, Clause 16(2)(a)(iv) in the Intersecting Streams 2011 and 17(1)(a)(iii) in the Barwon-Darling 2012 WSPs 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 of Part 6 and Division 1 of Part 8 of the 2020 WSP.

- Clause 16 of the 2020 WSP no longer references share components of salinity and water table management access licences as the way the LTAAEL for the Lower Darling Alluvial Groundwater Source is expressed has changed, explained further below.

Effects of changes to Part 6 – limits to availability of water

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 Warrego and Paroo Alluvial Groundwater Sources (Intersecting Streams 2011 WSP) and in the Upper Darling Alluvial Groundwater Source (Barwon-Darling 2012 WSP) 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 change in how the LTAAEL is expressed (2,230 ML/year) for the Lower Darling Alluvial Groundwater Source in the 2020 WSP does not reduce the volume of PEW as the Lower Murray-Darling 2011 WSP set the LTAAEL as 1,529 ML/year plus the share components for any salinity and water table management access licences granted under Clause 35 of that plan. The additional estimated volume of take (up to 701ML/year) for salinity and water table management purposes was in effect in 2011 (i.e. prior to commencement of the Basin Plan) and has been incorporated into the BDL and SDL defined in the Basin Plan for this SDL resource unit[12].

There is an increase in the volume of PEW in the Upper Darling Alluvium SDL resource unit from changes to Part 6 as:

- The LTAAELs in the Upper Darling, Paroo and Warrego Alluvial Groundwater Sources were reduced to align with the respective SDLs increasing the volume of PEW in each of these groundwater sources.

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 the limits provisions.

[12] p. 129. *Groundwater Report Cards*, Murray-Darling Basin Authority, 2020. https://www.mdba.gov.au/sites/default/files/pubs/Groundwater%20Report%20Cards_November%202020.pdf

Changes in Part 6 to allow AWDs to increase after 1 July do not change the effectiveness, volume or legal protection of PEW. The Lower Murray-Darling 2011, Intersecting Streams 2011 and Barwon-Darling 2012 WSPs were silent on this matter. This change improves transparency on how NSW assesses and manages compliance to limits, reflecting the operational practice of the department. A reduced AWD 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 may be increased up to limits specified in Part 6. This supports the socio-economic objectives of the WSP while maintaining PEW.

Effects of Division 1 of Part 8 – water allocation account management rules

Division 1 of Part 8 of the 2020 WSP maintains the protection of PEW provided by the Lower Murray-Darling 2011, Intersecting Streams 2011 and Barwon-Darling 2012 WSPs 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.

Overall effect of rules

In total, these rules ensure there is no 'net' reduction in the protection of planned environmental water 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 Darling 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 15 and 16, 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 Division 1 of Part 8.
- Clause 16 no longer commits or compares PEW to the estimated percentage of recharge and storage in the groundwater sources.
- Clause 16 no longer references share components of salinity and water table management access licences in relation to the Lower Darling Alluvial Groundwater Source.
- The assessment of compliance with LTAAEL in Division 1 of Part 6 compares the LTAAELs with average annual extraction over 5 years instead of 3 years for the Warrego, Paroo and Upper Darling Alluvial Groundwater Sources.
- The LTAAELs for the Warrego, Paroo and Upper Darling Alluvial Groundwater Sources have reduced in Clause 24.
- The LTAAEL for the Lower Darling Groundwater Source in Clause 24(1) is expressed as 2,230 ML/year instead of 1,529 ML/year plus share components for salinity and water table management access licences (estimated 701ML/year).

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 reserve 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 Commonwealth Environmental Water Holder and the NSW Department of Planning and Environment – Environment and Heritage Group.

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 NSW that records:

- the characteristics of held environmental water in this WRPA (for example, quantity, licence category, licence type), and
- 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, there are no HEW access licences within the Darling Alluvium WRPA. The register is updated when there are changes to HEW licences.

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

The Darling 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 WRP and WSP updates. This mapping work includes GDEs based on vegetation types with a high probability of groundwater dependency. It is also 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). The LTWP identifies these base flow assets.

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 forms part of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* and is reproduced below at Figure 4-1. These assets are areas of very high and high ecological value vegetation and Ramsar/Directory of Important Wetlands in Australia (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.

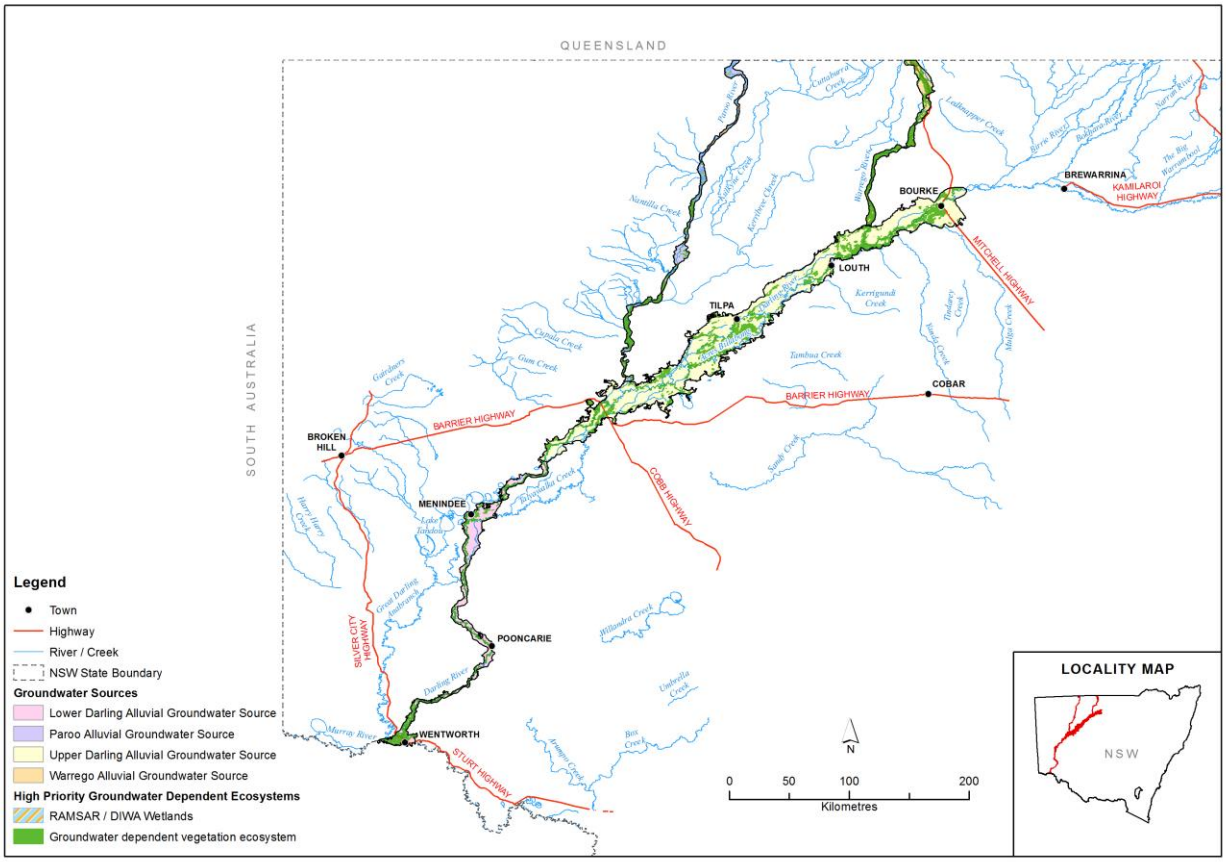


Figure 4-1. Darling Alluvium high priority environmental assets and values dependent on groundwater.

Table 4-1. Key ecological assets and values of the Darling Alluvium WRPA.

Key ecological assets
• Paroo Wetlands (Upper Darling) • Menindee Wetlands • Patches of very high and high ecological value
Key ecological values
• Eight groundwater dependent woodland forests and wetlands including black box, coolibah, lignum, and river red gum • Two non woody 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.

These restrictions do not apply to GDEs shown on the High Priority Groundwater Dependent Ecosystem Map in the *Water Sharing Plan for the Darling 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 currently 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 are generally determined with reference to data such as 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 of 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 low in the Darling 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 Map (GDE021_Version 1) referred to in clause 4(5) of the WSP (Schedule A) specifies the priority environmental assets that depend on groundwater in this WRPA.
- Surface water systems with significant hydrologic connection to the groundwater resources in the WRPA are identified in section 2.2 of this WRP.
- Table 3-1 of 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 this WRPA.
- Tables 8-1 and 8-3 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 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 this WRP:
    - Division 1 of Part 6 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* that limits the long-term average annual rates of extraction.
    - Clause 41 and Clauses 43(1)(b), 43(1)(c), 43(2) and 43(3) of the *Water Sharing Plan for the Darling 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 35 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* that defines the maximum water account debit.
    - The process outlined in Figure I-3 and Table I-2 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 relevant long-term water plans for the Darling Alluvial WRPA provides for environmental watering that relates to the surface water component of the environmental watering requirements of groundwater dependent priority environmental assets and ecosystem functions, and that regard was had to the most recent version of those plans. The provisions in the long-term water plans are given effect by the respective surface water WRP.

4.3. Productive base of groundwater

The sustainable management of groundwater in these SDL resource units ensures the ongoing viability of groundwater sources. The *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* establishes LTAAEL for the groundwater sources in the SDL resource units, 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.

Clause 37 (2) of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* restricts take in the Lower Darling Alluvial Groundwater Source unless the electrical conductivity is less than 3000 µS/cm. This reduces the risk of saltwater intrusion into the freshwater lens of the Lower Darling Alluvial Groundwater Source from groundwater extraction induced lateral migration of poorer quality groundwater from the Western Murray Porous Rock Groundwater Source.

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

- There are no non-renewable groundwater resources in the Darling Alluvium WRPA.
- Table 3-1 of this Plan identifies the level of risk of structural damage to an aquifer in this 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 this 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 this WRPA:
  - Division 1 of Part 6 of the *Water Sharing Plan for the Darling 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 Darling 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 35 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* that defines the maximum annual water account debit.
  - The process outlined in Figure I-3 and Table I-2 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.
  - Clause 57(1) of the *Water Sharing Plan for the Darling 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.
  - Clause 37 (2) of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* that restricts take in the Lower Darling Alluvial Groundwater Source unless the electrical conductivity is less than 3000 µS/cm.

4.4. Cultural connections to groundwater and retention of current level of protection of 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*[13] and *Cultural Flows—A guide for First Nations*[14].

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 B to F 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 cultural 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.

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.

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

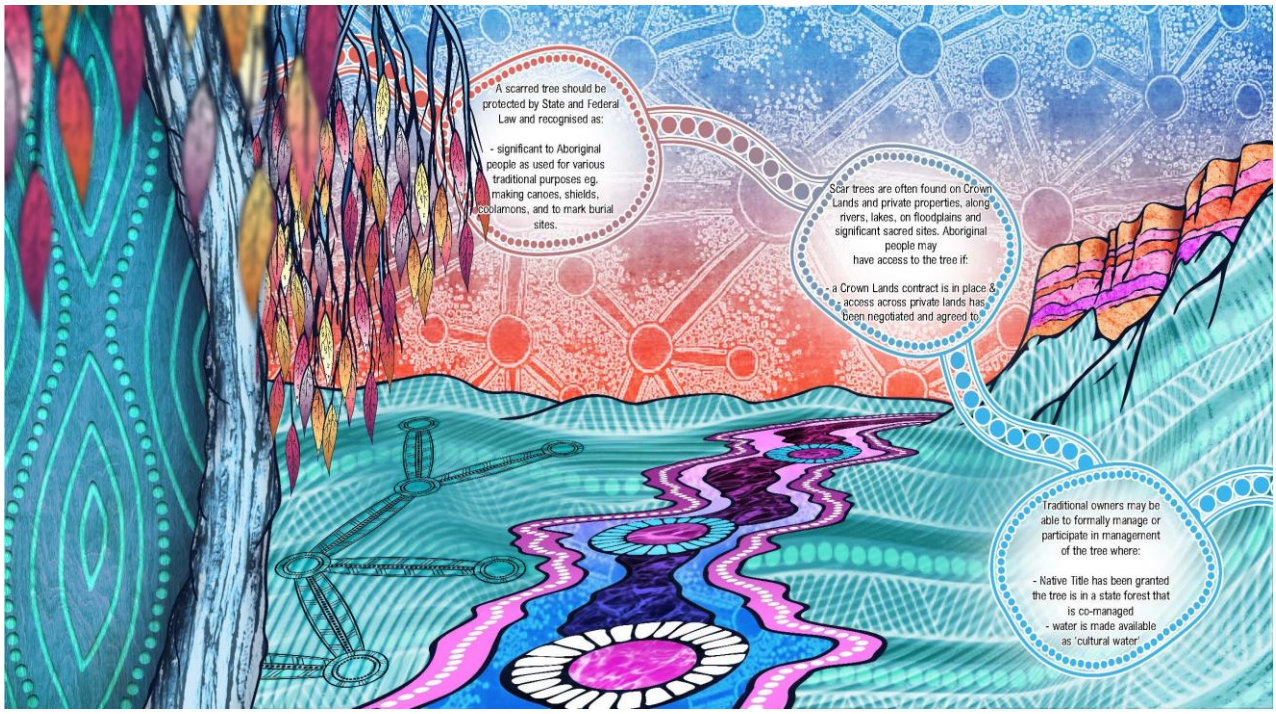


Figure 4-2. Cultural heritage protection of a scarred tree *(artist Nathan Peckham, 2021)*.

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.
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.

NSW Legislation	Relevance to Aboriginal cultural heritage protection
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 WSPs in NSW. Table 4-3 summarises the key provisions in the protection and development of Aboriginal peoples' groundwater values and uses in this 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 Darling 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 Darling Alluvial Groundwater Sources 2020.* Part 9 of the *Water Sharing Plan for the Darling Alluvial. Groundwater Sources 2020* also applies rules for managing	Retained from pre WRP arrangements

	water supply works near groundwater dependent culturally significant areas.	
s.5 (3) and 9 (1) of WMA 2000	Clause 28 of the *Water Sharing Plan for the Darling 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 an 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 Darling 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 Darling 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 Aboriginal 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

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 Darling 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 Darling Alluvium SDL Resource Unit (the *Water Sharing Plan for the Lower Murray-Darling Unregulated and Alluvial Water Sources 2011)* and the Paroo and Warrego Alluvial Groundwater Sources of the Upper Darling Alluvium SDL resource unit *(Water Sharing Plan for the Intersecting Streams Unregulated and Alluvial Water Sources 2011).* An interim WRP operated for the Upper Darling Alluvial Groundwater Source of the Upper Darling Alluvium SDL Resource Unit (*Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012)*. This plan retains or improves the protection of Indigenous values and uses.

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 Darling 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.

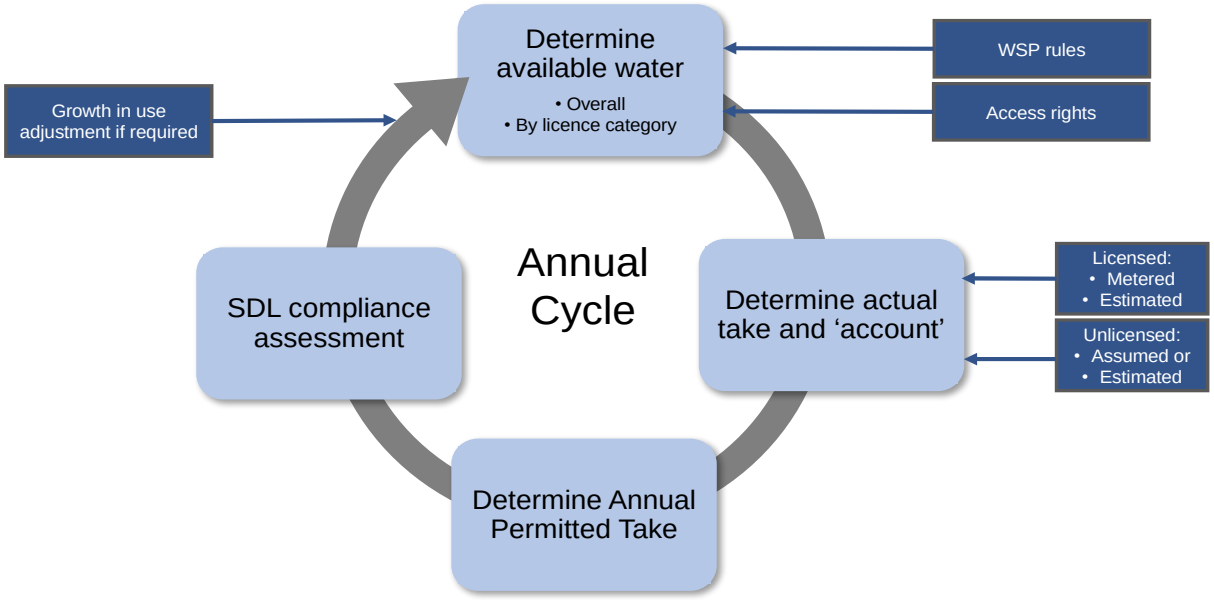


Figure 5-1. NSW approach to determining water available for 'take' and compliance with SDLs in groundwater WRPAs.

5.1. Water access rights

5.1.1. Identifying water access rights

Water access rights in the Darling 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 Darling Alluvium WRPA and is 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 Darling 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 Darling Alluvial Groundwater Sources 2020 sets* out the conditions to be imposed on all access licences in the Darling 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 Darling 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 Darling 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 Darling Alluvium WRPA.

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

Basin Plan requirement section 10.08(1)(a),(b)		Basin Plan requirement section 10.08(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 21 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	As specified under Part 11 of the *Water Sharing Plan for Darling 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 22 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	
	Domestic and Stock Access Licence	As specified in clause 20 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	
	Salinity and Water Table Management Access Licence	As specified in clause 23 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	
Take under basic rights	Basic Landholder Rights - Domestic and Stock	As specified in clause 18 of the *Water Sharing Plan for the Darling 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 19 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	Statutory right under s.55 of the WMA 2000. Subject to any further restrictions as imposed by s.324 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 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 Darling Alluvium WRPA, the 'SDL resource units' specified under the Basin Plan geographically relate to the 'Groundwater Sources' specified in the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* as follows:

- the Upper Darling Alluvium SDL resource unit (GS42) includes the Upper Darling Alluvial, Warrego Alluvial and Paroo Alluvial groundwater sources.
- the Lower Darling Alluvium SDL resource unit (GS23) equates to the Lower Darling Alluvial Groundwater Source.

The SDL for each SDL resource unit is specified in Schedule 4 to the Basin Plan. For the Lower Darling Alluvium SDL resource unit, the SDL is equivalent to the long-term average annual extraction limit (LTAAEL) for the Lower Darling Alluvial Groundwater Source specified in clause 24 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*

For the Upper Darling Alluvium SDL resource unit, the SDL is the sum of the LTAAELs specified in Clause 24 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* for the Upper Darling, Warrego and Paroo alluvial groundwater sources.

Table 5-2 shows these fundamental relationships between key elements of Basin Plan and the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* as well as 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 Darling Alluvial Groundwater Sources 2020***	
SDL resource unit	**SDL**	**Groundwater Source**	**LTAAEL**
Upper Darling Alluvium (GS42)	6.59 GL/yr	Upper Darling Alluvial	6,009 ML/yr
		Warrego Alluvial	289 ML/yr
		Paroo Alluvial	292ML/yr
Lower Darling Alluvium (GS23)	2.23 GL/yr	Lower Darling Alluvial	2,230ML/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

5.3.1. General overview

The average annual take (AAT) for each SDL resource unit is the sum of the quantity of water that is actually 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 AAT

In each of the Darling Alluvium SDL resource units, 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 salinity and water table management access licences is measured or estimated as outlined in section 1.1 of Schedule I.

Take under basic rights pursuant to domestic and stock basic landholder rights in each SDL resource unit in the Darling Alluvium WRPA is estimated as being the total amount of water specified in clause 18 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* for the relevant groundwater sources. 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 be taken from the Darling Alluvium 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. 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 in relation to areas of the Darling Alluvium WRPA.

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

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

SDL resource unit	Form of take	Class of water access right	Take determination method
Upper Darling Alluvium	Take from groundwater	Local Water Utility, Domestic and Stock Access Licences, Salinity and Water Table Management Access Licences and Aquifer Access Licences	Measured and estimated 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 18 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*.
		Basic Landholder Right—Native Title	Estimated in accordance with process outlined in section 1.3 of Schedule I. Native Title determinations relevant to the Darling Alluvium WRPA are identified in Division 2 of Part 5 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.* 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.
Lower Darling Alluvium	Take from groundwater	Local Water Utility, Domestic and Stock Access Licences, Salinity and Water Table Management Access Licences and Aquifer Access Licences	Measured and estimated 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 18 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*
Basic Landholder Right - Native Title	Estimated in accordance with process outlined in section 1.3 of Schedule I. Native Title determinations relevant to the Darling Alluvium WRPA are identified in Division 2 of Part 5 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.* 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

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 (APT) under section 10.10(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 are no water entitlements associated with an access licence used for environmental purposes (held environmental water) in these groundwater sources.

For the purposes of sections 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 annual actual take.
- water sourced from the Great Artesian Basin (GAB) 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 annual permitted take (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 the simple method in the Darling Alluvium SDL resource units, as outlined in Table 5-4.

The simple method defines the APT for take under basic rights, and for take from groundwater, to be equal to the proportion of SDL component attributable to each form of take.

Table 5-4. APT method and application.

Type	Take	Method	Where Applied
Simple	Take under basic rights	APT equals the volume for the relevant SDL resource unit specified in Division 2 of Part 5 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	Upper Darling Alluvium Lower Darling Alluvium
	Take from groundwater	APT equals the volume for the relevant SDL resource unit specified in clause 24 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* minus the volumes for the relevant SDL resource unit specified in Division 2 of Part 5 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020.*	Upper Darling Alluvium Lower Darling Alluvium

For the purpose of section 10.10 of the Basin Plan:

- Table 5-4 sets out the method for determining the annual permitted take for each SDL resource unit in the Darling Alluvium WRPA, and for each form of take. This method is consistent with the other provisions in this WRP.
- The maximum quantity of water that this Plan permits 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 Darling Alluvial Groundwater Sources 2020*, the maximum quantity of water that this Plan permits for take from groundwater during a water accounting period for each SDL resource unit in the Darling Alluvium WRPA, is the annual permitted take.
- A simple APT method applies in the Upper Darling and Lower Darling Alluvium SDL resource units 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 SDL compliance if applied over a repeat of the historical climate conditions
    - has an appropriate level of regard to the availability of water resources.
- 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 Darling 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 AAT from the water accounting periods since 1 July 2019 exceeds the sum of the 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 preceding 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 control.

SDL compliance will be assessed in accordance with 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 to 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 Darling Alluvial Groundwater Sources 2020* to comply with the SDLs.

5.5.2. Ensuring SDL compliance

The primary tool for ensuring SDL compliance is the *Water Sharing Plan for the Darling 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 clause 32 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* specifies the limits to take groundwater from the Darling 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.

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 WRPA.

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 activities impacting on the quantity of water in immediate or nearby water sources. In most of the Basin, including the Darling 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 Australian Governments' Bioregional Assessments Program which identifies no potential for growth in coal and coal seam gas mining activities in the area.

An assessment of the risk of growth in commercial plantations 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. Combining the likelihood and consequence ratings, the results in the overall risk of growth in commercial plantations 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 Darling Alluvium WRPA or any hydrologically connected water resources 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 5-5 summarises the dealings available under different sections of the WMA 2000. Note that basic rights cannot be traded, and as such the dealings provision do not apply to this form of access rights.

Table 5-5. 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 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 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 Darling Alluvium WRPA

Trade between a Darling Alluvium groundwater SDL resource unit and any surface water SDL resource unit is prohibited.

Trade between groundwater SDL resource units within the Darling Alluvial WRPA are prohibited.

Trade between two locations as defined under the Basin Plan within a groundwater SDL resource unit is prohibited in the Darling 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 section 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 the rules within Part 10 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* (Schedule A). 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 section 10.37 of the Basin Plan, trade ‘between two locations’ within a Darling Alluvium SDL resource unit is not permitted.

For the purpose of section 10.38 of the Basin Plan, trade between groundwater SDL resource units in the Darling Alluvium WRP area and with other SDL resource units is not permitted.

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

For all other matters relating to trade within the Darling 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 Darling Alluvium Incident Response Guide (IRG) at Schedule E outlines how the groundwater resources in the Darling 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 process 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 level of the event.

For the purposes of section 10.51 of the Basin Plan:

- Appendix A of Schedule E, *Darling Alluvium Incident Response Guide,* establishes the applicability of the IRG to the Darling Alluvium WRPA.
- Section 2 of Schedule E, *Darling Alluvium Incident Response Guide* describes how the groundwater resources of the Darling 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 *Darling 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, *Darling Alluvium Incident Response Guide*, sets out the possible operational measures available to manage groundwater resources, including meeting critical human water needs, in the Darling Alluvium WRPA during an extreme event.
- Section 4 of Schedule E, *Darling 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, Clause 42(3) of the *Water Sharing Plan for the Lower Murray-Darling Unregulated and Alluvial Water Sources 2011* was suspended. Clause 42(3) allows access to groundwater when surface water access is limited. This clause was suspended from 21 July 2015

until 30 June 2016 because the clause prohibited groundwater access even though surface water access was limited. The access rule (subclause 37(3)(b)) was revised in the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* to better define when access to surface water is limited. Similar events will not result in the suspension of this WSP clause in the future.

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, 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 Darling Alluvium WRPA. For the purpose of this management plan, water quality includes salinity as defined in section 1.07 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 of this Plan.

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

The Darling Alluvium WRPA is made up of only groundwater SDL resource units (section 3.06 of the Basin Plan); therefore the WQMP is made in accordance with Part 7 Division 3 – Groundwater (section 10.29(b) of the Basin Plan). Requirements under Division 2 (sections 10.30 to 10.35 of the Basin Plan) are not relevant in the Darling Alluvium WRPA as it applies to surface water SDL resource units.

Groundwater quality in the Upper Darling Alluvium SDL resource unit ranges from a fresh value of about 192 mg/L to saline (around 33,300 mg/L). Fresh groundwater in the alluvium is due to rapid recharge mainly via the channel floor of the Darling River during high river flow and through the adjacent floodplain during flood events. Saline groundwater in the alluvium is due to evapo-concentration of the shallow groundwater table during relatively long dry periods.

The discharge of saline groundwater is significant at Glen Villa, about 30 kilometres west of Bourke, and is managed via the Upper Darling Salt Interception Scheme. The purpose of the scheme is to intercept and reduce saline groundwater inflows to the Darling River by pumping saline groundwater from five interception bores. The intercepted water, with an average salinity of 37,000 µS/cm, is transported to an evaporation basin.

Groundwater quality in the Lower Darling Alluvium SDL resource unit varies ranging from a fresh value of about 150 mg/L to a hypersaline value of around 70,000 mg/L (Figure 6-1). Fresh groundwater exists in unconfined alluvium within a few kilometres from the Darling River, its tributaries, and adjacent lakes Menindee and Wetherell, from which it is directly and rapidly recharged. The fresh groundwater is surrounded by semi-confined to confined, brackish to saline, regional groundwater which has evolved at greater depths and more distally from the surface waters. The most saline groundwater that has been measured occurs at the inlet to Menindee Lake and at the lower end of the Darling River immediately north of Wentworth.

The Curlwaa Salt Interception Scheme manages saline groundwater near Wentworth. Under this scheme groundwater is pumped into a salt management basin to control water table elevations and reduce the risk of salinisation to the irrigation district.

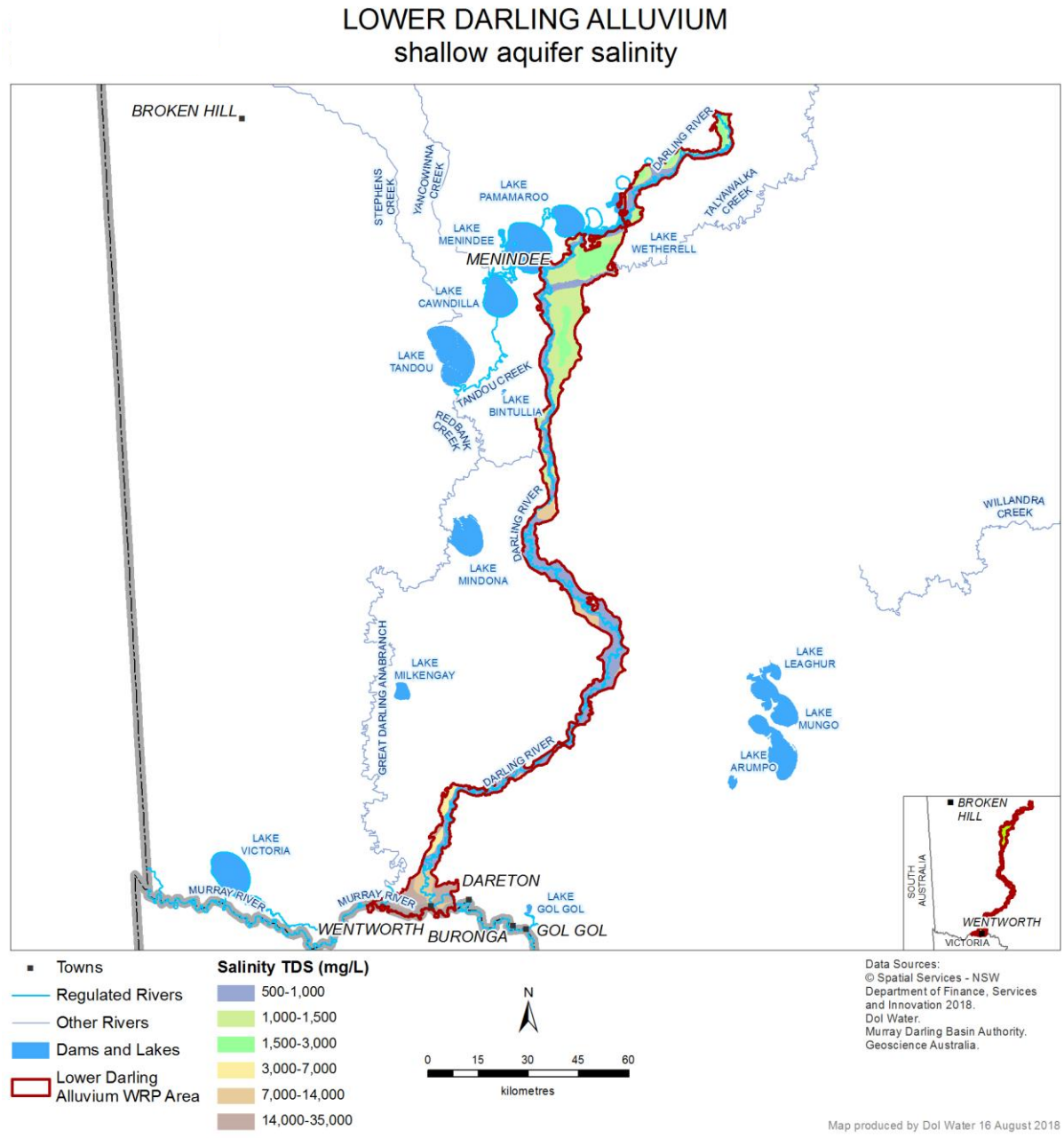


Figure 6-1. Groundwater salinity in Lower Darling Alluvium (shallow aquifer).

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 Darling 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 Darling Alluvium WRPA.

Table 3 of the WQMP (Schedule F) identifies that risks of water quality degradation other than salinity are low in the Darling Alluvium. 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 fresh water-dependent ecosystems in Table 7 of the WQMP (Schedule F) specify alternative values to those referred to in section 9.16 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 (section 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 section 9.17 and objective section 9.06 are not required as there are no irrigation infrastructure operators that deliver services in the Darling Alluvium WRPA.

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

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 Darling Alluvium WRPA are documented fully in the WQMP (Schedule F). A summary of measures to address key water quality degradation causes are presented below (Table 6-1). These findings align with Table 8-7 of the Risk Assessment (Schedule D) and include measures that contribute to the achievement of Basin Plan objectives (sections 9.04 to 9.08).

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 Darling Alluvium WRPA against the effects of elevated levels of salinity and other types of water quality degradation listed as causes and 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.
- 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 Darling Alluvial Groundwater Sources 2020* (Schedule A) and other instruments that:

- specify times, places and rates water can be taken from the Darling Alluvium WRPA 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 Darling 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 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 in 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 (Schedule F) if:
  - the level of risk is medium or high;
  - appropriate water quality target values are identified in Section 5 of the WQMP;
  - the measure is an action within the scope of the *Water Act 2007* and *NSW Water Management Act 2000,* and the measure is fit-for-purpose and cost effective.

Table 6-1. Summary of water quality objectives and measures to address water quality degradation in the Darling Alluvium WRPA.

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): ***Low Risk*** *Lower Darling Alluvium and Upper Darling Alluvium* 10.41(2)(d)(Darling Alluvium Risk Assessment (GW7 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. Sustainable Diversion Limits. Manage compliance to limits. Require all take to be licensed except for BLR or where a policy indicates otherwise. Set extraction limits on production bores in high risk areas to limit drawdown. 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. 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.

Objectives	Strategies	Water management actions and mechanisms
	Improve knowledge used to assess risks and evaluate the effectiveness of existing strategies.	Reviews resulting from the application of risk treatments will contribute to filling the knowledge gaps and evaluate the effectiveness of existing strategies.
WQ2) Manage salinity in connected surface waters. 	Limit impact of saline groundwater discharges on surface water systems.	The Curlwaa and Upper Darling salt interception schemes. Contribute to the end of basin salinity target by diverting saline groundwater before it enters the River Murray through salt interception and drainage diversion schemes.
	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 (Darling Alluvium Risk Assessment (GW7 WRPA): QL5. 	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 (Darling Alluvium Risk Assessment (GW7 WRPA): QL5.	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 WMA2000 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 (Darling Alluvium Risk Assessment (GW7 WRPA): QL5.	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
- prevent resource condition limits being exceeded.

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

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 Darling Alluvium WRPA, and metered take associated with water access licences.

In the Darling Alluvium WRPA there are currently 261 groundwater monitoring bores (128 in the Upper Darling and 133 in the Lower Darling). Currently 38 monitoring bore sites in the Darling Alluvium WRPA are providing real time data[15], with other bore data either logged manually or manually downloaded from data loggers.

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 to take groundwater under an access licence in the Lower Darling Alluvium SDL resource unit will require a meter, regardless of infrastructure size.

In the Upper Darling Alluvium SDL resource unit, meters will be required if a water supply work is currently required to be metered or if the water supply work is >199 mm diameter[16].

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 the commencement date specified in the *Water Management (General) Regulation 2018*[17], 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 the commencement date[18]. Users will also need to install a data-logger and tamper-evident seals, if not already installed.

[15] https://realtimedata.waternsw.com.au/water.stm
[16] Or >159mm if two bores are used, >129mm if three bores are used, or >119mm if four bores are used.
[17] The commencement date is 1 December 2021 for the Paroo, Warrego and Upper Darling alluvial groundwater sources and 1 December 2022 for the Lower Darling Alluvial Groundwater Source.

Table 7-1 shows the average measured and estimated take for each class of access right in each SDL resource unit in the Darling Alluvium WRPA from the 2003/04 or 2012/13 water year to the 2016/17 water year[18].

For the purpose of section 10.44 of the Basin Plan:

- Table 7-1 shows, in relation to each class of water access right relating to the water resources of this WRPA:

a) the best estimate of the total long-term annual average quantity of water taken that is measured
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 section 10.45 of the Basin Plan:

- Divisions 1 and 2 of Part 11 and clauses 54 to 56 of the *Water Sharing Plan for the Darling 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 works 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.

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

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

SDL Resource Unit	Class of water access right	Long-term annual average quantity of water taken that is measured (ML/year)	Long-term annual average quantity of water taken that is not measured (ML/year)	Calculation method
Upper Darling Alluvium	Aquifer access licences	0	1	Schedule I (section 1.1)[19]
	Local water utility access licences	0	37.4	Schedule I (section 1.1)[19]
	Domestic and stock access licences	N/A	N/A	Currently no licences of this class are issued
	Salinity and water table management access licences (specific purpose)	773	0	Metered average calculated over the period 2012/13 to 2016/17
	Basic rights	0	2762	Schedule I (section 1.2 & section 1.3)
Lower Darling Alluvium	Aquifer access licences	57	0	Average calculated over the period 2003/04 to 2016/17
	Local water utility access licences	N/A	N/A	Currently no licences of this class are issued
	Domestic and stock access licences	N/A	N/A	Currently no licences of this class are issued
	Basic rights	0	739	Schedule I (section 1.2 & section 1.3)
	Salinity and water table management access licences (specific purpose)	N/A	N/A	Currently no licences of this class are issued.

[19] There is no metered take for this category of access licence, a general utilisation factor of 17% has been applied (See Schedule I s1.1)

7.2. Monitoring water resources

The groundwater resource monitoring programs for the Darling 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 Darling Alluvium WRPA have been informed by:

- The objectives, strategies and performance indicators in Part 2 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* (Schedule A), and
- Darling Alluvium Risk Assessment (GW7 WRPA) (Schedule D).

The objectives, strategies and performance indicators in the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* have been updated to make them more specific, measurable, achievable, relevant and time bound (SMART) than previous objectives, and relate to the environmental, economic, social and cultural outcomes of management of the groundwater resources of the Darling Alluvium WRPA.

The EMER Plan explains the approaches and groundwater level and environmental monitoring programs associated with the NSW groundwater WRPAs. Appendix H of the EMER Plan shows the historical usage, monitoring bores and GDE environmental indicators in the Darling Alluvium WRPA. Table 7-2 summarises the groundwater resource monitoring programs for this WRPA.

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

Resource monitoring	SDL resource unit	Site(s)[20]	Relevant risks	Relevant Schedule 12 matters
Groundwater levels[21]	Upper Darling Alluvium	Existing program at approximately 99 bores - Figure 27 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
	Lower Darling Alluvium	Existing program at approximately 114 bores - Figure 27 to the EMER Plan (Schedule H)		
Groundwater dependent vegetation extent and condition	Upper Darling Alluvium	Nil	R9 Monitoring extent determined by medium and	Matters 8, 9, and 19 Also contributes to matters 4, 10,

[20] 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.
[21] Monitoring bore numbers are provided rather than site numbers. Bores are often nested at monitoring locations to provide information at a variety of depths. Approximately 240 sites are monitored across the WRP area.

Resource monitoring	SDL resource unit	Site(s)[20]	Relevant risks	Relevant Schedule 12 matters
	Lower Darling Alluvium	Nil	high risk outcomes. Monitoring not required in the Upper Darling or Lower Darling Alluvium as risk outcomes are low.	and 18
Groundwater take	All SDL resource units	As per provisions for accreditation in section 7.1 – all groundwater take Also see Figure 26 of Appendix H to the EMER Plan (Schedule H)	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	Upper Darling Alluvium	Nil	R2, QL3, QL5 Proposed monitoring extent determined by medium and high risk outcomes. Monitoring not required in the Upper Darling or Lower Darling Alluvium as risk outcomes are low.	Matters 12 and 19 Also contributes to matters 4, 14, and 18
	Lower Darling Alluvium	Nil		

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 (GDE) extent and condition within the Darling 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 of the Basin Plan obligations are subject to ongoing discussion and collaboration between the MDBA and Basin States.

8. Information and methods used in WRP development

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 sections 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 sections 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, evaluation and reporting
- 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 Darling 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 only 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 requirement/s	Responsible Person
10.02 Identification of WRP area and water resources	Section 2.1	Department of Planning and Environment
10.03 Identification of SDL resource units and water resources	Section 2.1	Department of Planning and Environment
10.04 Form of water resource plan	Section 1.5 Section 2.1	Minister for Water*
10.05 Regard to other water resources	Section 2.2	Minister for Water*
10.06 Matters relating to requirements of Chapter	Section 1.5	Minister for Water*
10.07 Consultation to be demonstrated	Section 1.7 Schedule C	Department of Planning and Environment
10.08 Water access rights must be identified	Section 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	Section 4.1.1 Section 4.1.3	Department of Planning and Environment
10.10 Annual determinations of water permitted to be taken Note - 10.10(5) not addressed in Darling Alluvium WRP	Section 5.3.2 Section 5.4.2	Minister for Water* (or delegate) 10.10(5) only applies to surface water and is not addressed in this groundwater plan

BP Requirement	Section of this Plan that addresses the requirement/s	Responsible Person
10.11 Rules for take, including water allocation rules	Section 5.5.2	Minister for Water*
10.12 Matters relating to accounting for water	Section 5.3.2 Section 5.4.2	Department of Planning and Environment
10.13 Limits on certain forms of take	Not addressed in Darling 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 WRPA	Section 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	Section 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	Section 4.2	Department of Planning and Environment
10.18 Priority environmental assets dependent on groundwater	Section 4.2	Department of Planning and Environment
10.19 Groundwater and surface water connections	Section 4.2	Department of Planning and Environment
10.20 Productive base of groundwater	Section 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.	Requirement applies to groundwater sources that are out of scope of the Darling Alluvium WRPA.
10.22 Description of how requirements have been met	Section 4.2 Section 4.3	Department of Planning and Environment

BP Requirement	Section of this Plan that addresses the requirement/s	Responsible Person
10.23 Listing types of interception activity	Section 5.6	Department of Planning and Environment
10.24 Monitoring impact of interception activities	Section 5.6	Department of Planning and Environment
10.25 Actions to be taken	Section 5.6	Department of Planning and Environment
10.26 Planning for environmental watering	Section 1.7 Section 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	Section 4.1.2	Minister for Water*
10.29 Water resource plan to include WQMP	S. 6	Department of Planning and Environment
10.30 WQMP 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.

BP Requirement	Section of this Plan that addresses the requirement/s	Responsible Person
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
10.35B WQMP to identify water quality targets values	S. 6	Department of Planning and Environment
10.35C Considerations 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	Section 5.7.2	Department of Planning and Environment
10.37 Circumstances in which conditions in section 12.24 are met	Section 5.7.2	Minister for Water*
10.38 Circumstances in which conditions in section 12.25 are met	Section 5.7.2	Minister for Water*
10.39 Circumstances in which conditions in section 12.26 are met	Section 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	Section 3 Section 3.1 Section 3.2 Section 3.3	Department of Planning and Environment
10.42 Description of risks	Section 3.2	Department of Planning and Environment

BP Requirement	Section of this Plan that addresses the requirement/s	Responsible Person
10.43 Strategies for addressing risks	Section 3.3	Department of Planning and Environment
10.44 Information relating to measuring take – water access rights	Section 7.1	Department of Planning and Environment
10.45 Supporting measuring	Section 7.1	Department of Planning and Environment
10.46 Monitoring water resources	Section 7.2	Minister for Water*
10.47 Review of water resource plans	Section 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 Darling Alluvium WRPA.
10.48 Amendment of water resource plan	Section 1.8	Minister for Water*
10.49 Best available information	Section 8	Department of Planning and Environment
10.50 Methods used to develop water resource plan	Section 8	Department of Planning and Environment
10.51 Measures in response to extreme events	Section 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	Section 1.3.1	Department of Planning and Environment
10.53 Consultation and preparation of water resource plan	Section 1.7	Department of Planning and Environment
10.54 Cultural Flows	Section 4.4.1	Department of Planning and Environment
10.55 Retention of current protection	Section 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 Darling 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 Darling Alluvium WRPA. WRPs must be prepared having regard to current and future risks to the condition and continued availability of the water resources of this 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 information

This Schedule is the Water Quality Management Plan (WQMP) for the Darling Alluvium WRPA, 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 formulation of Darling 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 (https://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 (https://waterregister.waternsw.com.au). Definitive information source.
Cth regulatory instruments	https://www.legislation.gov.au All Commonwealth regulatory instruments. Definitive information source.
NSW regulatory instruments	https://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 Upper Murray and Lower Murray (Shallow and Deep) groundwater sources. Models developed in accordance with national guidelines.
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 the department against predetermined water quality targets. Results derived from mathematical formulae inputting data collected by the department.
IAP2 Resources	International Association of Public Participation Resources - including the Core Values for Public Participation for use in the development and implementation of public

Information	Description
	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), State-wide policy documents, and Darling Alluvium WRPA specific plans. Available at https://www.industry.nsw.gov.au.

Table G-2. Key NSW information outputs supporting the Darling 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.
Darling Alluvium WRP Status and Issues Paper	Summarises the status of water resources and issues that the department will consider when developing the Darling 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 Darling 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 - WRP 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. EMER 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, verifying 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 access, and salinity and water table management access licences in the Darling Alluvium WRPA will be measured and/or estimated.

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

- From 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 the Australian Standard 4747.
- By 1 December 2021, all groundwater water supply works in the Upper Darling Alluvium SDL resource unit have a meter that is pattern-approved and installed in accordance with Australian Standard 4747, unless exempt from the requirement for metering (see below).
- By 1 December 2022, all groundwater water supply works in the Lower Darling Alluvium SDL resource unit must have a meter that is pattern-approved and installed in accordance with Australian Standard 4747 (no size exemptions of the extractive work).
- By 1 December 2021, those works in the Upper Darling Alluvium 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 seal, if not already installed.
- Those works in the Lower Darling Alluvium with existing meters must demonstrate, by December 2022, that the meter is pattern-approved and validated, or accurate. They will also need to install a data logger and tamper evident seal, 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 Lower Darling Alluvium SDL resource unit, including take from domestic and stock access licences, will be required to be metered in accordance with the above.

Unless currently requiring metering, all take under an access licence from groundwater in the Upper Darling Alluvium SDL resource unit, including take from domestic and stock access licences, will be exempt from the requirement for metering when take under a single approval/landholding occurs from:

- one bore of diameter not more than 199 mm;
- two bores of diameter not more than 159 mm;
- three bores of diameter not more than 129 mm; or
- four bores of diameter less than 119 mm.

Where these thresholds to install a meter are not reached, licence holders will be required to record and provide estimated use to the NSW Department of Planning and Environment-Water in an approved form.

Annual actual take from groundwater will be 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 WSP 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[22] 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).

Estimating take for salinity and water table management purposes in the Lower Darling Alluvial SDL resource unit

A specific purpose access licence of up to 701 ML/year is expected to be issued for salinity and water table management purposes in the Lower Darling Alluvial Groundwater Source. The volume of 701 ML/year is estimated based on maximum system capacity of the salinity and water table management scheme and has been reflected in the LTAAEL, BDL and SDL for the Lower Darling Alluvial.

For each water year, current non-licenced take for salinity and water table management purposes in the Lower Darling Alluvial Groundwater Source must be monitored and reported to the department under annual reporting conditions. Until licenced, take for salinity and water management purposes in the Lower Darling Alluvial Groundwater Source will be estimated at the maximum volume reported in the annual compliance reports across the last five reported years.

Once licenced, the method outlined above for groundwater take will be used.

The department is undertaking the appropriate processes to ensure the correct licencing and authorisation of water taken for salinity and water table management purposes in the Lower Darling Alluvial Groundwater Source. Non-licenced take for salinity and water table management purposes does not occur in any other SDL resource unit of the Darling Alluvium WRPA. Licensed take for salinity and water table management purposes occurs in the Upper Darling Alluvial Groundwater Source and is measured and/or estimated based on the methods outlined above for groundwater take.

1.2 Estimating take under domestic and stock basic rights

Take under basic rights for domestic and stock use in the Darling Alluvium WRPA is estimated as being the full utilisation of the total annual volume in each SDL resource unit specified in Clause 18 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020* (see section 5.1 of this Plan). 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.

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

The general assumptions behind this method are:

- 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 SDL resource units in the Darling Alluvium WRPA fall wholly within the plains zone.
- Australian Census population and housing data, in consideration of housing proximity to water courses 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 water courses are excluded from groundwater source area calculations.

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 Figure I-1,Table 1 and adjusted for reliance on groundwater as per Figure I-1, Table 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 Figure I-1, Table 3 and adjusted for reliance on groundwater as per Figure I-1, Table 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 Figure I-1, Table 3.

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-1. Estimating water demand for basic rights (domestic and stock).

1.3 Estimating take under Native Title basic rights

1. 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 Darling 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 within the LTAAEL. The method for estimating annual actual take will assume full utilisation based on the lesser of: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 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 of the Plan.
10.12(1)(b)	Carryover of take under basic rights and take from groundwater is not permitted as per Part 8 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*.
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' for the purposes of the Basin Plan is not permitted within or between any SDL resource unit in the Darling Alluvium WRP area as per Part 10 of the *Water Sharing Plan for the Darling Alluvial Groundwater Sources 2020*, and therefore this requirement is not applicable.
10.12(1)(e)	Significant hydrological connections are identified in section 2.2 of this Plan. In setting the LTAAELs, and hence SDL for the Upper Darling Alluvium and Lower Darling 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 Darling Alluvial Groundwater Sources 2020.* By adopting the proportionate SDL volume as the annual permitted take volume for take under basic rights and take from groundwater within the SDL resource units of the Darling Alluvium WRPA, any connectivity will have no material impact on annual permitted take methods.
10.12 (1) (f)	Take in the Upper Darling Alluvium and Lower Darling Alluvium SDL resource units is managed under Division 1 of Part 6 of the *Water Sharing Plan for the Darling 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 Darling 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 Darling Alluvium WRPA because the GAB is not hydraulically connected to the SDL resource units.
10.12 (1) (i)	At the commencement of this Plan, managed aquifer recharge (MAR) does not occur in Darling Alluvium WRPA. However, clause 69 of the *Water Sharing Plan for the Darling 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.

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 this 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-2 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-2 below provides a 'guide' for assessing applications for dealings or new works where the risks of unacceptable impacts are medium or high.

Figure I-3 and Table I-2 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.

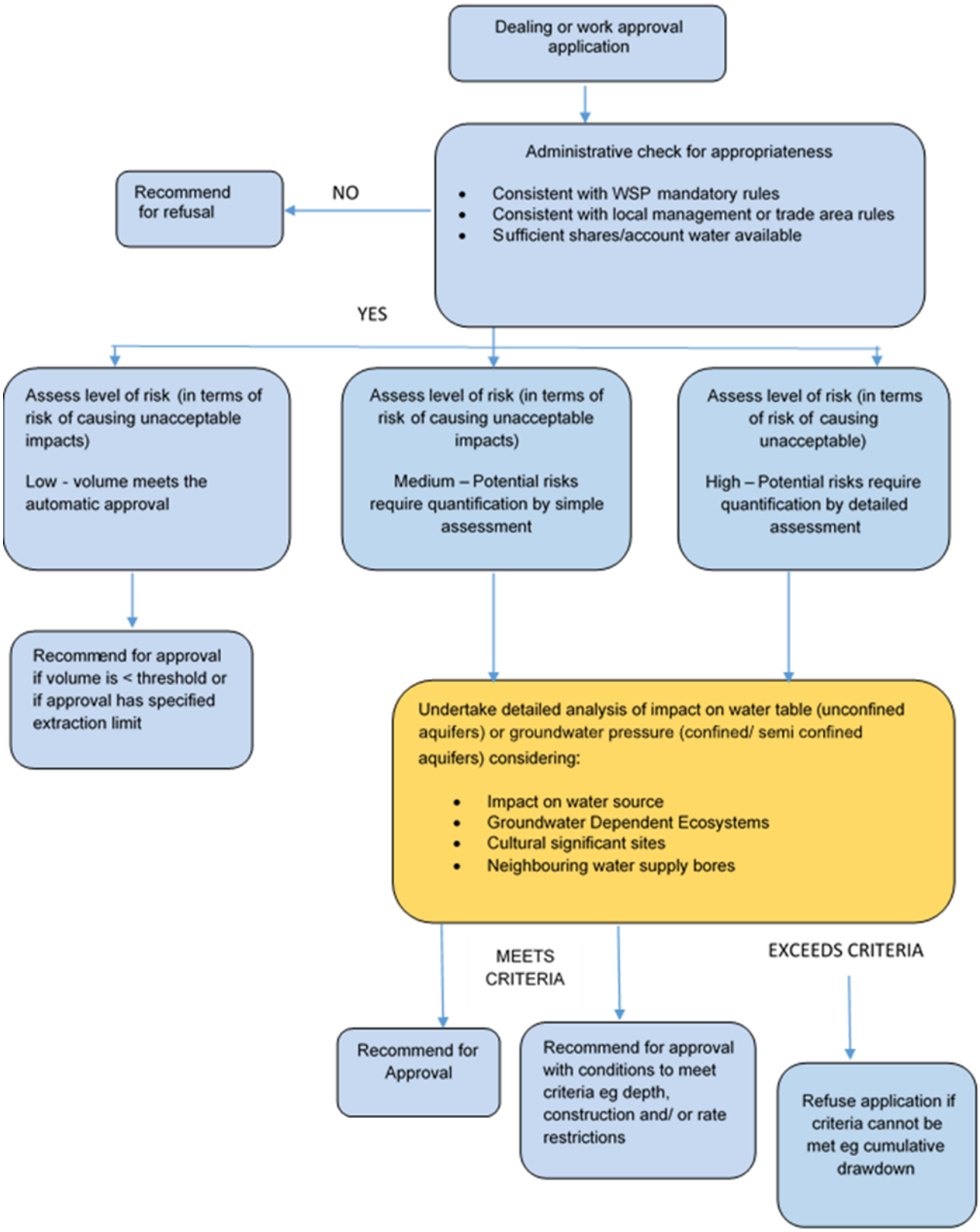


Figure I-2. Generalised process for assessing applications for dealings and new works.

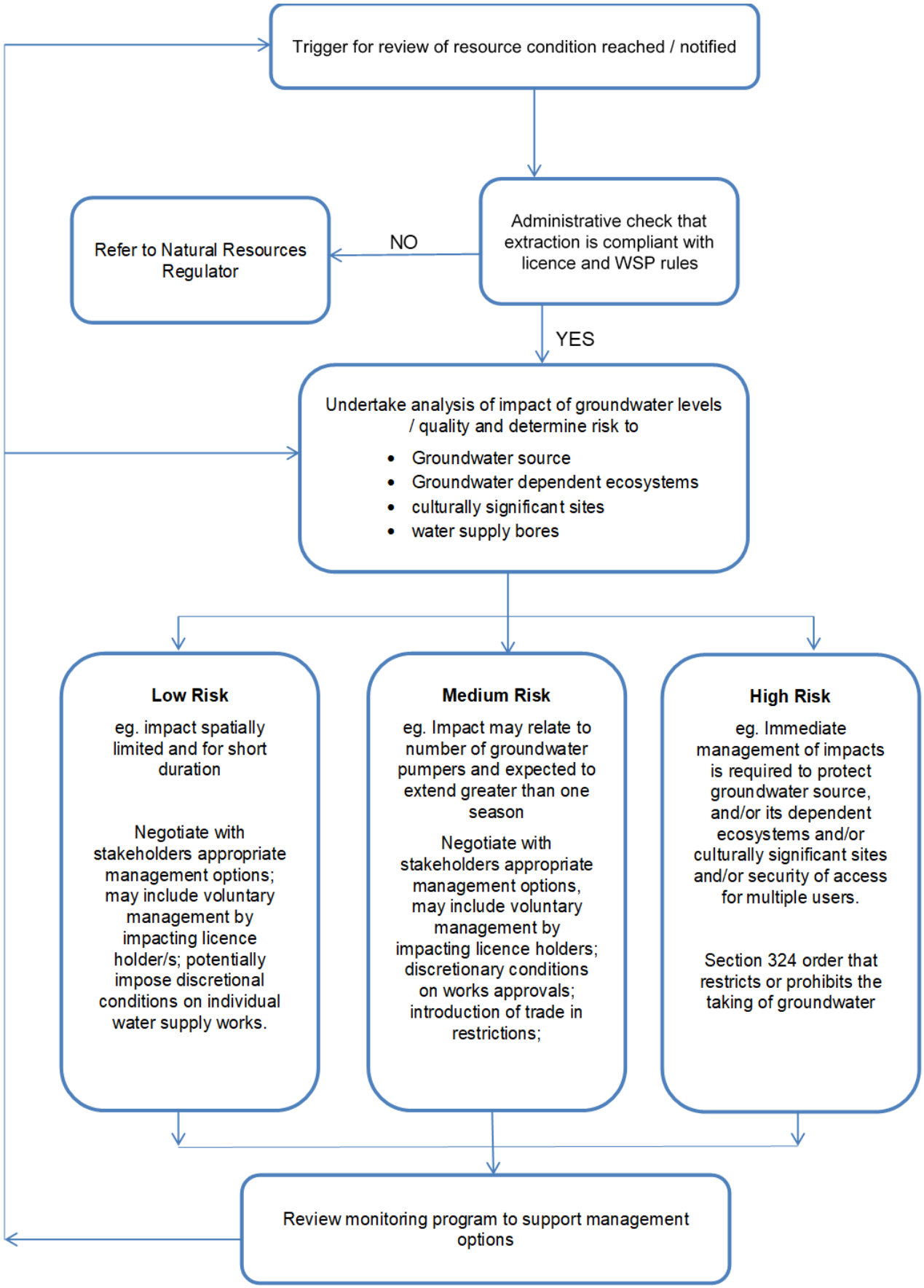


Figure I-3. Process if groundwater triggers are reached.

Table I-2. 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 • 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 go monitoring bore data • Section 324 order that may restrict or 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. Placeholder for Darling Alluvium Water Resource Plan Area description

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

Available at https://www.industry.nsw.gov.au.