



Department of  
Primary Industries

# Lachlan Alluvium Water Resource Plan

Groundwater (GW10)

Status and Issues Paper

17 February 2017

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*NSW Lachlan Alluvium Water Resource Plan, Status and Issues Paper*

First published February 2017

**More information**

[www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

**Acknowledgments**



Australian Government  
Department of Agriculture  
and Water Resources

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (February 2017). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

Published by the Department of Primary Industries.

## Foreword

The NSW Government has agreed to develop water resource plans as part of implementing the Murray-Darling Basin Plan 2012 (the Basin Plan). The Lachlan Alluvium Water Resource Plan (GW10) covers all alluvial groundwater sources in the Lachlan Valley.

The [NSW Water Resource Plan Roadmap 2016–2019](#) sets out the key timelines, principles and processes that will guide development of the 22 water resource plans (WRPs) that NSW must deliver by 2019. Weekly progress reports and monthly newsletters will show how the Department is tracking against the project timelines in the Roadmap. Both will be available on the DPI Water website.

Water resource plans will align Basin-wide and state-based water resource management in that particular resource plan area. The plans will recognise and build on the state's existing water planning and management. They will include documents that set out the interrelated water management arrangements for each water resource plan area.

Before they can commence, final versions of water resource plans must meet Commonwealth accreditation requirements that ensure they are consistent with the Basin Plan.

This *Status and Issues Paper* summarises the status of water resources and issues that DPI Water will consider when developing the Lachlan Alluvium WRP. Additional issues raised during submission and consultation periods will be considered during the development process.

As the Lachlan Alluvium WRP development process progresses, DPI Water will publish additional technical reports to provide greater detail on many of the matters discussed in this paper.

## Have your say

Stakeholder input is an integral part of the development of each water resource planning process.

**The Lachlan Alluvium WRP deals only with groundwater resources.** It covers a smaller geographical area than that covered by the Lachlan Surface Water Resource Plan, which was released in November 2016 (submissions are now closed) (see Figure 1).

This first round of submissions ensures that all issues are on the table when the Lachlan Alluvium water resource planning process starts. Stakeholder input will help shape the water resource planning process to ensure that local issues and concerns are addressed.

A second round of submissions on the draft Lachlan Alluvium water resource plan will be invited later in the process. That submission period will be advertised in *The Land*, local papers and on the DPI Water website.

During the Status and Issues phase, Lachlan stakeholders, particularly groundwater users, are invited to make submissions on issues relating to water sharing that are **not** covered in Section 3 of this *Status and Issues Paper*, including:

- water sharing arrangements
- risks to the water resources
- risks to achieving water quality objectives
- complying with the Sustainable Diversion Limits
- managing in extreme events

Issues raised during the Status and Issues submissions process will be used to develop a full list of issues to be considered during the development of the draft Lachlan Alluvium WRP.

**All submissions, from brief emails to full technical papers, are welcome and will be given full consideration.**

**Submissions must be received by 31 March 2017 and may be submitted via email or post:**

- **email:** [lachlan.gw.wrp@dpi.nsw.gov.au](mailto:lachlan.gw.wrp@dpi.nsw.gov.au)
- **post:** PO Box 829 Albury NSW 2640

DPI Water will acknowledge all submissions in writing.

Documents and supporting material will be available on the DPI Water website at [www.water.nsw.gov.au](http://www.water.nsw.gov.au)

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## 1 Water resource plans

### 1.1 Principles

Principles set down in the Murray-Darling Basin Plan 2012 (the Basin Plan), together with principles set by NSW Government, will guide the development of WRPs.

Principles guiding the Basin Plan are:

- there will be no adverse impacts on water available to a water access licence holder
- there will be no net reduction in the protection of planned environmental water
- the Commonwealth is responsible for funding bridging the gap between existing limits and SDL water.
- the WRP must meet the requirements set out in the Basin Plan

Additionally, NSW requires that WRPs:

- balance social, cultural, economic and environmental needs of the community and catchments
- are cost neutral for NSW licence holders
- minimise change for water sharing plans (WSPs) within their initial ten-year period

### 1.2 Objectives of the water resource plan

The aim of the Basin Plan is to provide for a healthy, working Basin into the future. WRPs are a key part of implementing the Basin Plan. They will address the objectives of the Basin Plan at a regional level.

Objectives include environmental, economic, social and cultural aspects.

For more information regarding the objectives of WRPs, refer to the DPI Water factsheet [Water resource plans – overview](#).

### 1.3 What the final water resource plan will look like

A WRP will be made up of at least one WSP, a water quality management plan (WQMP), a risk assessment and other supporting documents. DPI Water will adjust the WSP where necessary to meet the requirements of the Basin Plan, and to address areas for improvement identified through consultation and technical studies.

NSW WRPs will meet the minimum requirements of the Commonwealth *Water Act 2007* and Basin Plan. Each WRP must:

- describe all water rights in the plan area
- demonstrate how compliance with the SDL prescribed in the Basin Plan will be assessed and maintained
- include a WQMP
- provide for environmental water
- address risks to water resources identified in a risk assessment
- explain how essential human needs will be met in extreme events
- take account of Aboriginal peoples' water-dependent cultural values and uses

WSPs made under the NSW *Water Management Act 2000* will remain the mechanism for articulating water sharing in NSW. WSPs will be a key component of each WRP.

For more information regarding what WRPs will look like, refer to the DPI Water factsheet [Water resource plans – developing a water resource plan](#).

## 1.4 How water resource plans work with other water plans and projects

At the same time as DPI Water is developing the WRP, there are other important initiatives occurring in parallel. These include: SDL adjustments, the Northern Basin Review, NSW Management of Extreme Events, review of Trading Rules and the development of Regional Strategies.

For more information regarding these initiatives and how they relate to WRPs, refer to the DPI Water factsheet [Water resource plans – overview](#).

## 1.5 The water resource plan development process

DPI Water is developing the WRP according to a robust process which follows the National Water Initiative Policy Guidelines and includes community engagement.

This Status and Issues phase will be followed by a Strategy and Rule Development phase. A draft Lachlan Alluvium WRP will be published and subject to public exhibition. A final Lachlan Alluvium WRP will then be submitted for approval by the NSW Minister for Regional Water and the NSW Minister for the Environment, and finally for accreditation by the Commonwealth Minister for Agriculture and Water Resources.

For more information regarding the development process, refer to the DPI Water factsheet [Water resource plans – developing a water resource plan](#) and the [NSW Water Resource Plan Roadmap 2016–2019](#).

## 1.6 Consultation and stakeholder input

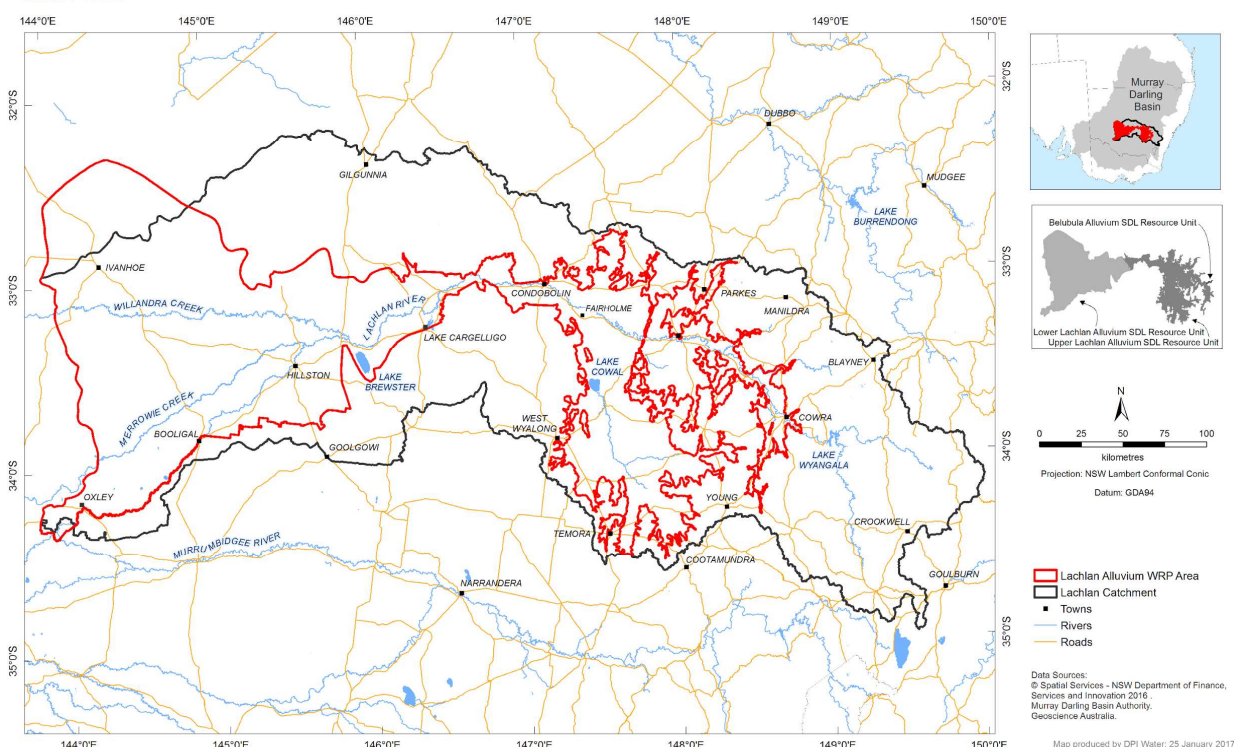
DPI Water will consult in accordance with National Water Initiative Policy Guidelines and the *MDBA Handbook for Practitioners – Water resource plan requirements*.

There will be a number of opportunities for stakeholders through public submissions and targeted consultation. Consultation will aim to give stakeholders information and provide for informed input on issues and options for improved water resource management.

DPI Water will:

- seek public submissions on issues to be considered
- provide information to stakeholders to help them participate in the planning process
- undertake targeted consultation with stakeholders prior to drafting the WRP
- seek public submissions on the draft WRP
- undertake further targeted consultation of the draft WRP after public exhibition, if required
- support Aboriginal communities via the DPI Water Aboriginal Water Initiative (AWI) Program to make submissions on the draft WRP and through ongoing community consultation, as required, after public exhibition





The climate is generally characterised by hot summer temperatures with moderate winter rainfall that can vary between years. There is a significant range in temperatures and rainfall, between Cowra in the east to Hillston and Oxley/Ivanhoe in the west. Average annual rainfall decreases westward and varies from approximately 600 mm at Cowra at the eastern end of the area to approximately 300 mm at Ivanhoe in the far west.

There are approximately 106,000 people in the Lachlan Valley (Green et al. 2011), with the urban centres the population hubs. Aboriginal Australians comprise 4.9% of this population (CMA 2011), compared to 2% of the total NSW population (AHRC 2006).

Approximately 30% of the total population live within the major rural centres of Cowra, Parkes, Forbes and Young, which have populations ranging from 7,000 to 10,000 people (ABS 2011). These larger towns in the valley service the rural and industry population.

The dominant land uses in the Lachlan Valley are livestock grazing and dryland cropping, which together cover approximately 90% of the valley (Green et al. 2011). Irrigated cropping covers approximately 1,100 km<sup>2</sup> and occurs mainly along the Lachlan and Belubula rivers and their tributaries.

## 2.2 Beneficial uses of the water resources

### Aboriginal values and uses

The Lachlan Alluvial WRP area is within the traditional lands of the Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita traditional owners. There is a significant relationship between groundwater and the traditional owners of these lands. Water and specifically groundwater is written into their Lore, their traditional stories and their dreaming. Creation beings live in these stories with cultural knowledge being passed down through these stories. Song and dance demonstrate the significance of this connection to water, and the people's relationship to land.

Groundwater has provided the life support for generations of traditional owners. Water provided for the trees, the medicinal plants and the animals that sustained the lives of the local communities. Aboriginal people place a high level of value on water as the uses are significant and many, in relation to the survival of Aboriginal people and their culture.

The AWI supports involvement of Aboriginal people in the water resource planning process supports Aboriginal people to document and share their social, spiritual and cultural information, including identifying specific values and uses associated with water. It is important to better understand Aboriginal values and uses in order to manage risks to them.

Communities welcome the engagement and are interested in further discussions to improve opportunities to provide for Aboriginal values and uses.

*'Groundwater is in our stories, dances and art, it links out songlines and Dreaming stories, it holds great significance to both Lore Men and Women, it has allowed our people to survive in a dry landscape for thousands of generations. So we need to be a part of its use and protection.'*

Table 1 provides a description of asset types and beneficial value and use by Aboriginal people across NSW. These assets may be dependent on groundwater on a permanent or intermittent basis to meet all or some of their water requirements.

The asset types and descriptions have been identified through consultation with Aboriginal communities through the AWI. As consultation progresses in each WRP area more specific assets for that area will be identified and risks to their values and uses will be considered.

Throughout the development of water resource plans, DPI Water will continue to work with Aboriginal communities to identify opportunities to better address the needs and aspirations of the Aboriginal Communities in terms of equitable access to water for social, cultural, spiritual and economic use of water.

**Table 1: Water-dependent Aboriginal cultural asset types and their values and uses.**

Water-dependent asset type	Description
Waterholes/soaks/billabongs	There are specific waterholes that are a refuge for iconic species for Aboriginal people. Waterholes have a customary value and traditional use and often represent a connection between groundwater and surface water. Other uses include resource-gathering. These resources have an economic value for Aboriginal peoples.

Wetlands	Wetland systems have traditional and customary uses as well as spiritual values. The existence of many scarred trees and a range of traditional resources – vegetation, bird and fish, are indicative of Aboriginal occupation and use. Some of these wetland systems may be reliant on groundwater for its maintenance and use. After flood the wetlands would often be associated with customary/ceremonial use and have a cultural-economic outcome through trade. Such areas are used now for cultural renewal practices.
Lagoons/Wetland bowls	Some valleys have a number of flood-dependent lagoons and wetland areas that are sites of annual traditional resource-gathering and use. Some of these systems may be reliant on groundwater for its maintenance and use. The areas have traditional connection and spiritual connection and are also used now for cultural renewal practices.
Transit stops – ephemeral flows	<p>These areas were subject to natural flows to maintain water levels and water quality. Dependent on time of year fish and other water-dependent resources may be present in the deeper water holes. These deeper holes traditionally provided a refuge to iconic species. A level of connectivity exists between the rivers and creeks and the alluvial groundwater sources.</p> <p>The use of these areas has traditional and historic value, as well as contemporary knowledge-sharing. The areas also supported tool creation and occupation for periods of time as evidenced through grinding grooves and provided transit stop opportunities in times of flow and resource abundance.</p> <p>Specific location and times for use of these types of areas are part of the traditional songlines for the traditional owners and are an integral part of Aboriginal culture.</p>
Occupation sites and camp grounds	Many occupation sites exist across the catchment landscape and waterscapes that have a direct reliance on both surface and groundwater. These sites are evidenced by hearth sites, tool-making sites, grinding grooves and resource-gathering sites. A number of these particular sites and camp grounds include the traditional use of water for childbirth and continue to have significance to Aboriginal women.
Spiritual sites, areas	There is a great deal of spiritual connection to water across the landscape of the Murray-Darling Basin. This connection is present in many dreaming and creation stories, artwork and cultural practices including dance and song. The detail of this relationship mostly remains guarded by Lore with Aboriginal people, however the connection to water is prevalent and evidenced in the cultural practices of the Aboriginal communities across the basin states.

An additional point raised by communities was the recognition that some values and uses had linkages to environmental assets. It is important to recognise that protecting these assets for environmental purposes may not be sufficient to protect them for cultural purposes and that Aboriginal Communities are best positioned to describe the requirements to protect these assets.

### **Irrigated agriculture**

Irrigated crops include pasture, cereals, oilseeds and cotton grown on the alluvial soils of the riverine plain, and vegetables, wine grapes and stone fruit grown on the riverine plains and in the tablelands region. Irrigated crops in the Lachlan Valley cover 1.4% of the catchment area (Green et al. 2011).

Irrigation water is sourced from the Belubula and Lachlan regulated rivers and the alluvial groundwater resources. Irrigation is concentrated mainly along the Belubula and Lachlan Rivers within the Belubula and Upper Lachlan Alluvium and in the area surrounding Hillston in the Lower Lachlan Alluvium.

### Water for towns and essential human needs

Groundwater is relied upon within the area for town water supply, stock and domestic purposes as well as to support local commerce.

Town water supply and stock and domestic users have a higher priority for access than other groundwater licences. WSPs recognise this priority by ensuring that a full share of water is allocated for annual town water supplies except where exceptional drought conditions prevent this. The annual water available is specified on the town's licence.

Across the WRP area, town water supply (local water utility) access licences have a total share component of 10,770ML/year, with:

- 2,922 ML/year in the Lower Lachlan Alluvium
- 7,848 ML/year in the Upper Lachlan Alluvium

The *Water Management Act 2000* also requires WSPs protect water for basic landholder rights, which are made up of domestic and stock rights, harvestable rights and native title rights. Water taken under a domestic and stock right may be used for normal household purposes around the house and garden and/or for drinking water for stock. Requirements for basic landholder rights for domestic and stock were estimated to be 36 ML/year from the Belubula Alluvium, 4,000 ML/year from the Lower Lachlan Alluvium and 6,280 ML/year from the Upper Lachlan Alluvium.

### Other water uses

Mining is another key land use in the catchment with three major mines relying on groundwater for their water supply. A total share component of 11,514 ML/year is held by the mining companies in the Upper Lachlan Alluvium. These mines are relatively large producers and provide a significant socio-economic contribution to the region.

## 2.3 Hydrogeology

The Lachlan Alluvium consists of the Cenozoic sediments of the Belubula, Upper Lachlan and Lower Lachlan Alluvium. The Belubula and Upper Lachlan Alluvium are made up of valley-fill alluvial sediments whereas the Lower Lachlan Alluvium forms an extensive alluvial fan deposited by the Lachlan River. These sediments consist of clay, silt, sand and gravel. Recharge to the Lachlan Alluvium occurs through leakage from the Lachlan River and its various tributaries and anabranches, infiltration from rainfall and irrigation activity.

The water-bearing sands and gravels of the Belubula Alluvium are a single aquifer system which is up to 39 m deep and 2.5km wide. Yields are generally between 1-15 L/s but have been reported up to 25 L/s.

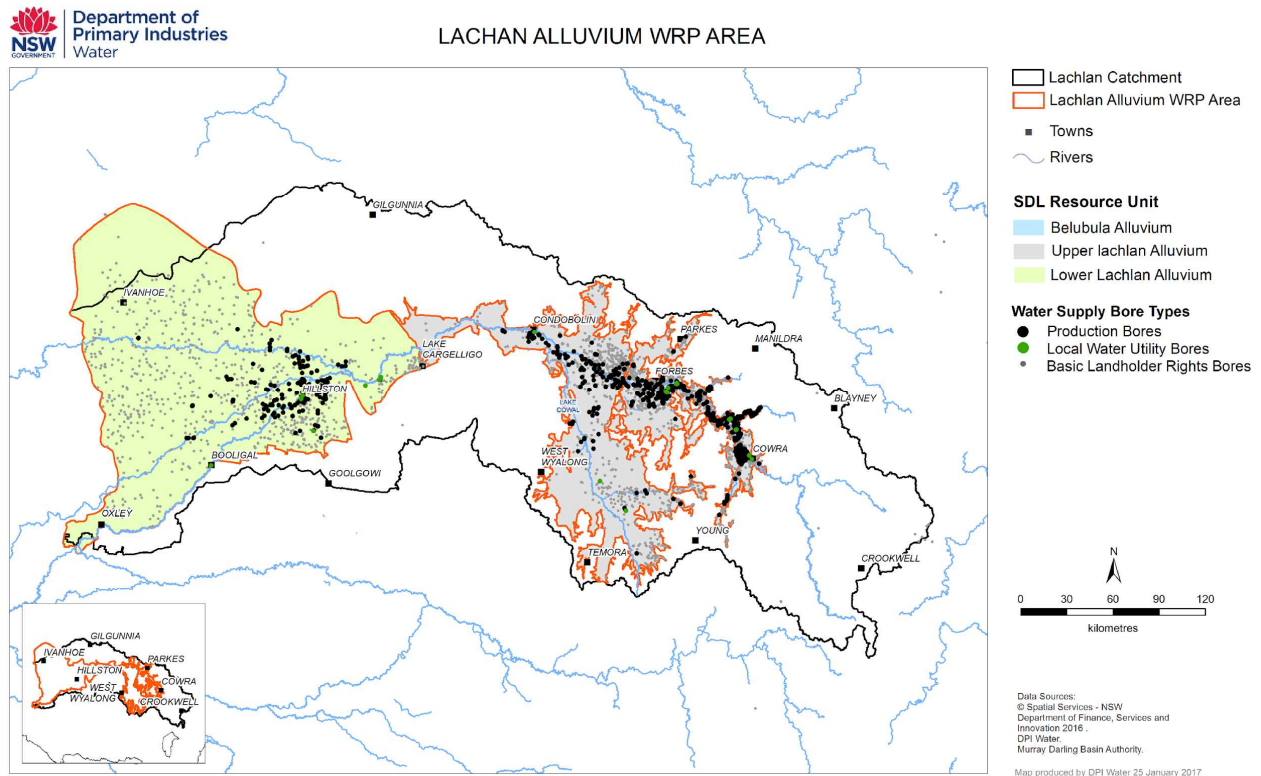
The water bearing sands and gravels of the Upper Lachlan Alluvium are divided into two main aquifer systems; a shallow system up to approximately 65 m deep and a deep aquifer system up to approximately 90 m deep. Yields from the shallow and deep system have in general been reported as high as 40 and 150 L/s, respectively.

The water-bearing sands and gravels of the Lower Lachlan Alluvium are generally divided into two main aquifer systems: a shallow aquifer system up to approximately 70 m deep, and a deep aquifer system up to a maximum of approximately 300 m deep. Yields from the shallow and deep system vary with reported yield as high as 250 L/s.



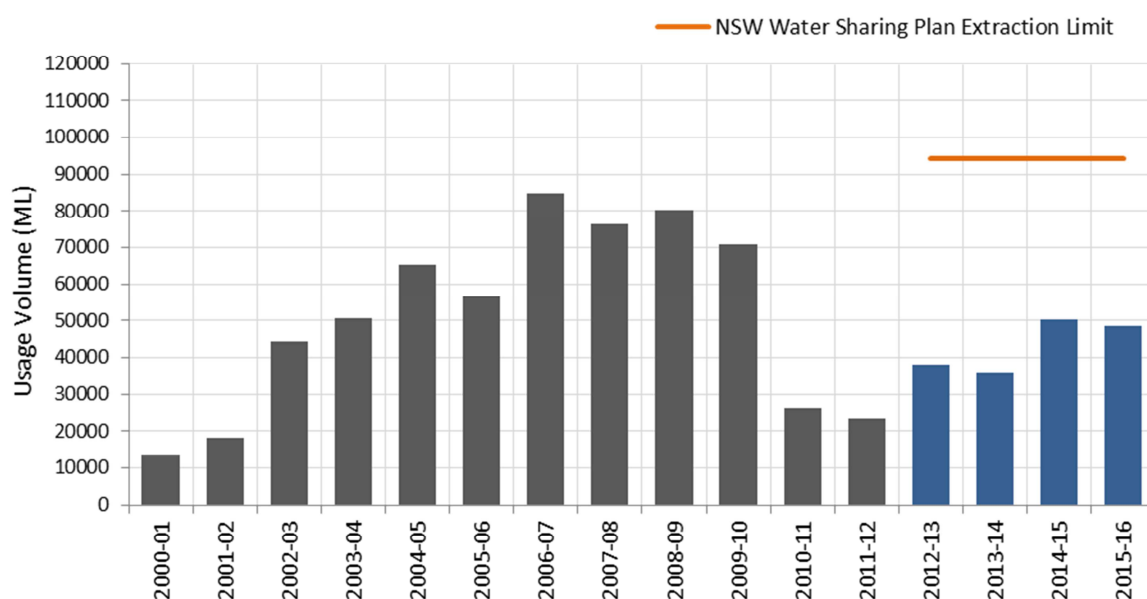
## 2.4 Groundwater extraction

Groundwater is used for productive purposes such as irrigation and industry as well as for water supply for local water utilities and stock and domestic use. Figure 2 shows the distribution of water supply bores.

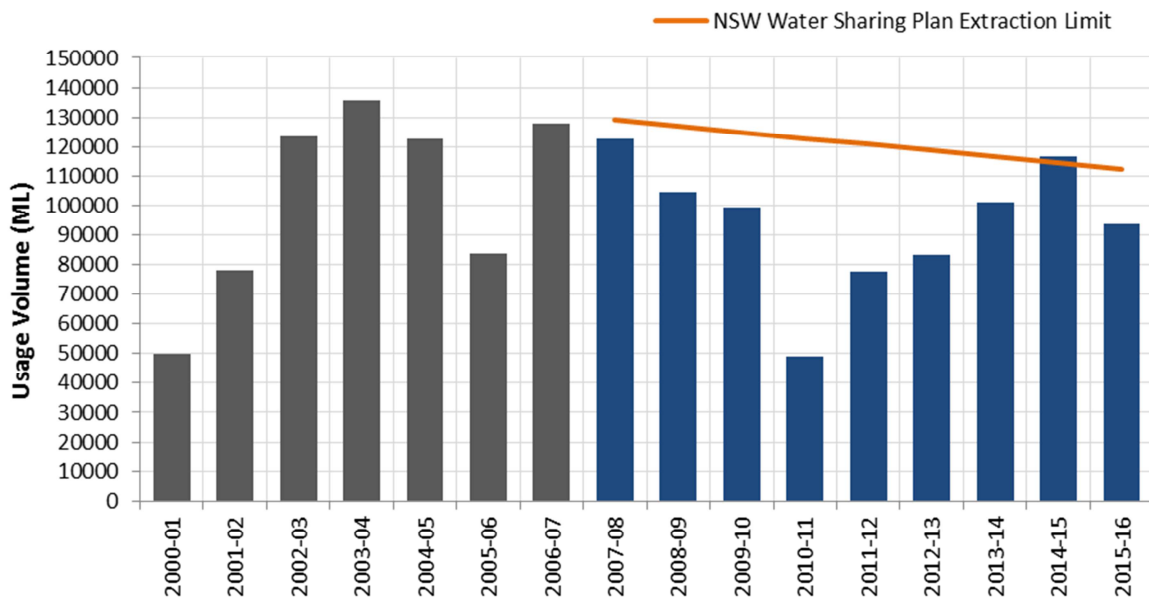


**Figure 2: Location of registered water supply bores within the Lachlan Alluvial WRP area.**

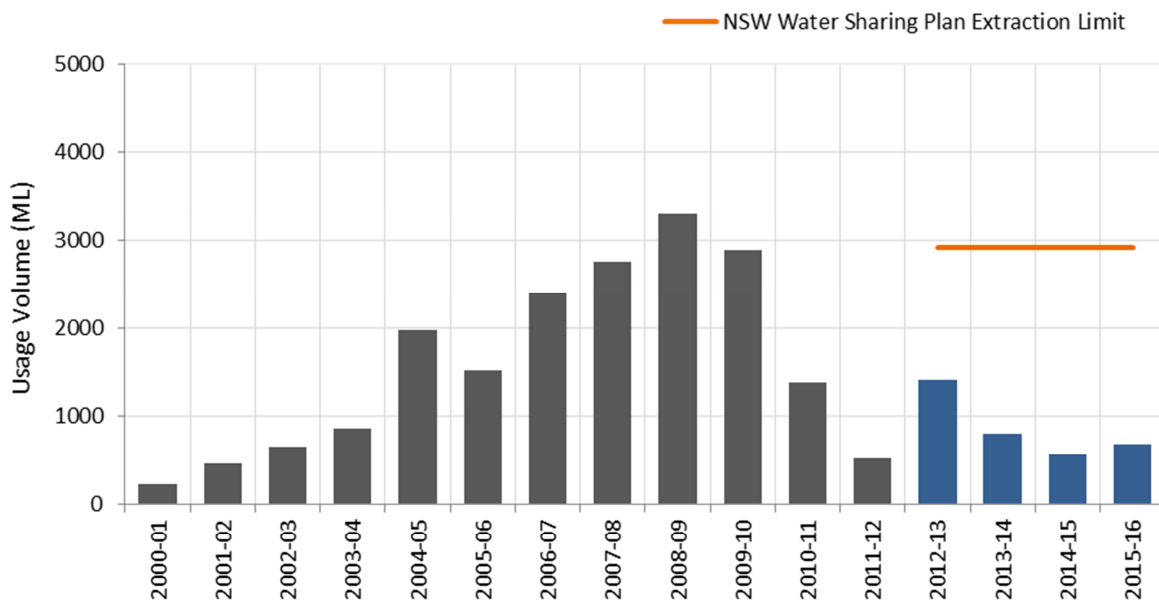
In the Lachlan Alluvium the production bores are metered and usage is recorded by Water NSW. Annual groundwater extractions and the WSP extraction limits for the Upper Lachlan, Lower Lachlan and Belubula Alluvium since 2000 are provided in Figure 3, Figure 4 and Figure 5.



**Figure 3: Groundwater extraction under access licences from the Upper Lachlan Alluvium.**



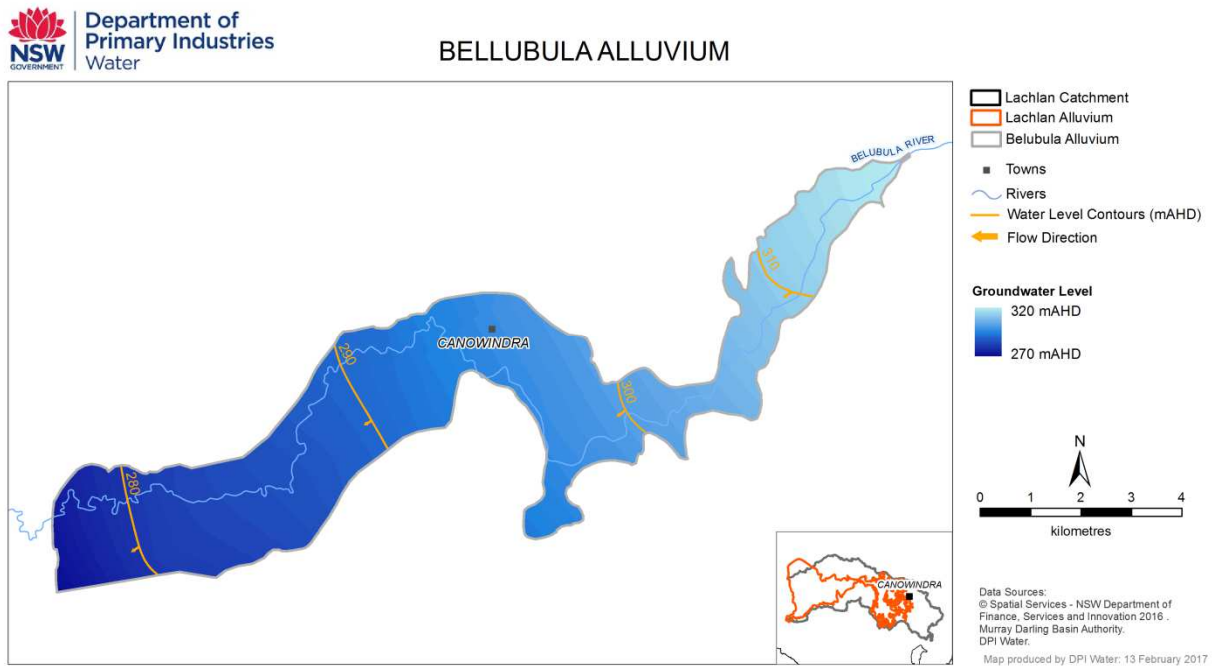
**Figure 4: Groundwater extraction under access licences from the Lower Lachlan Alluvium.**



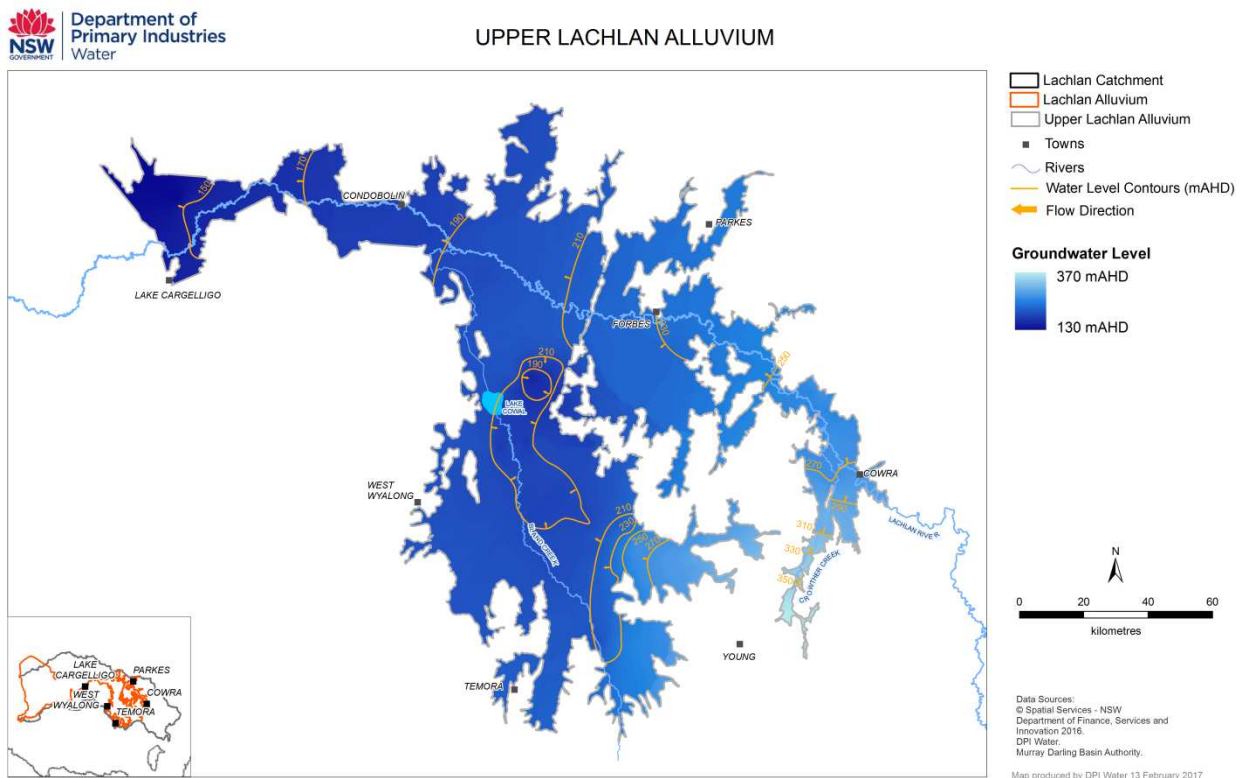
**Figure 5: Groundwater extraction under access licences from the Belubula Alluvium.**

## 2.5 Groundwater levels

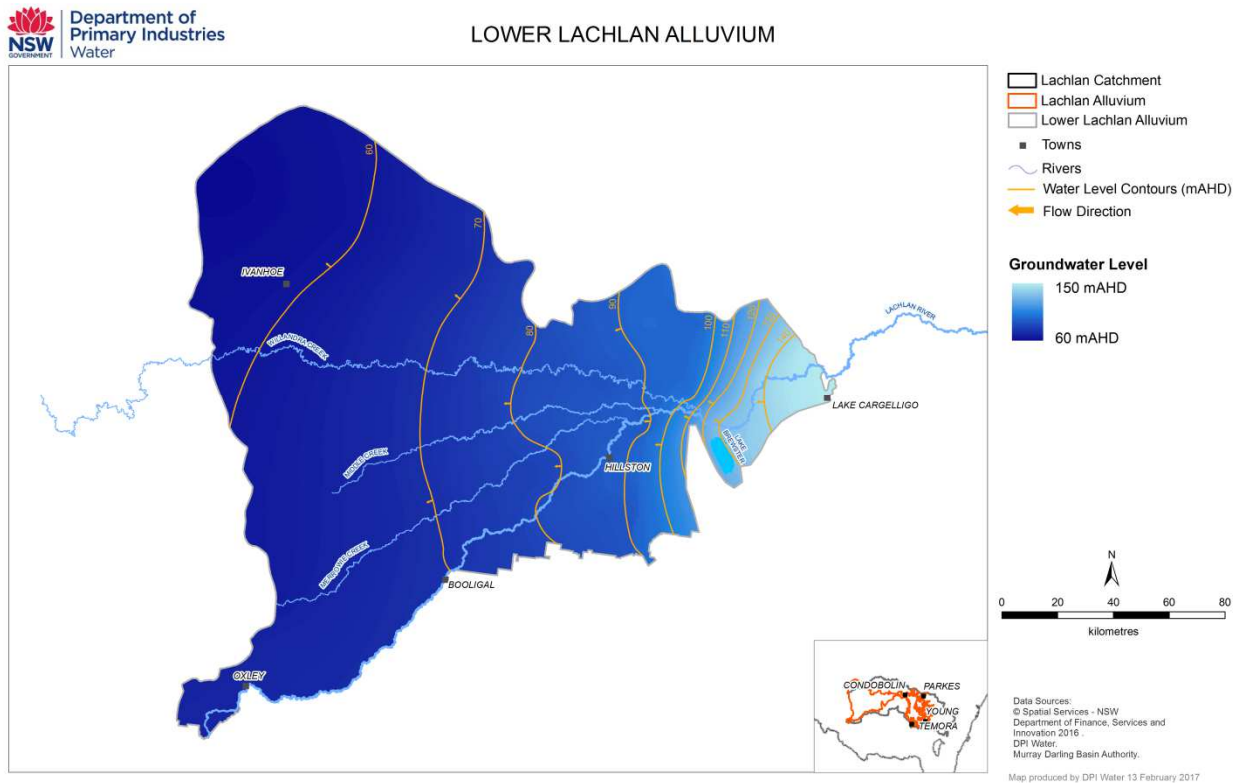
There are 498 monitoring bores at 250 sites across the Lachlan Alluvium. Groundwater level contours derived from current monitoring data within the productive aquifers of Belubula, Upper Lachlan and Lower Lachlan Alluvium are shown in Figure 6, Figure 7 and Figure 8 respectively.



**Figure 6: Groundwater flow direction in the Belubula Alluvium based on the non-pumping period (winter) groundwater levels monitored during the 2015 – 2016 year.**



**Figure 7: Groundwater flow direction in the Upper Lachlan Alluvium based on the non-pumping period (winter) groundwater level monitored during the 2015 – 2016 year**

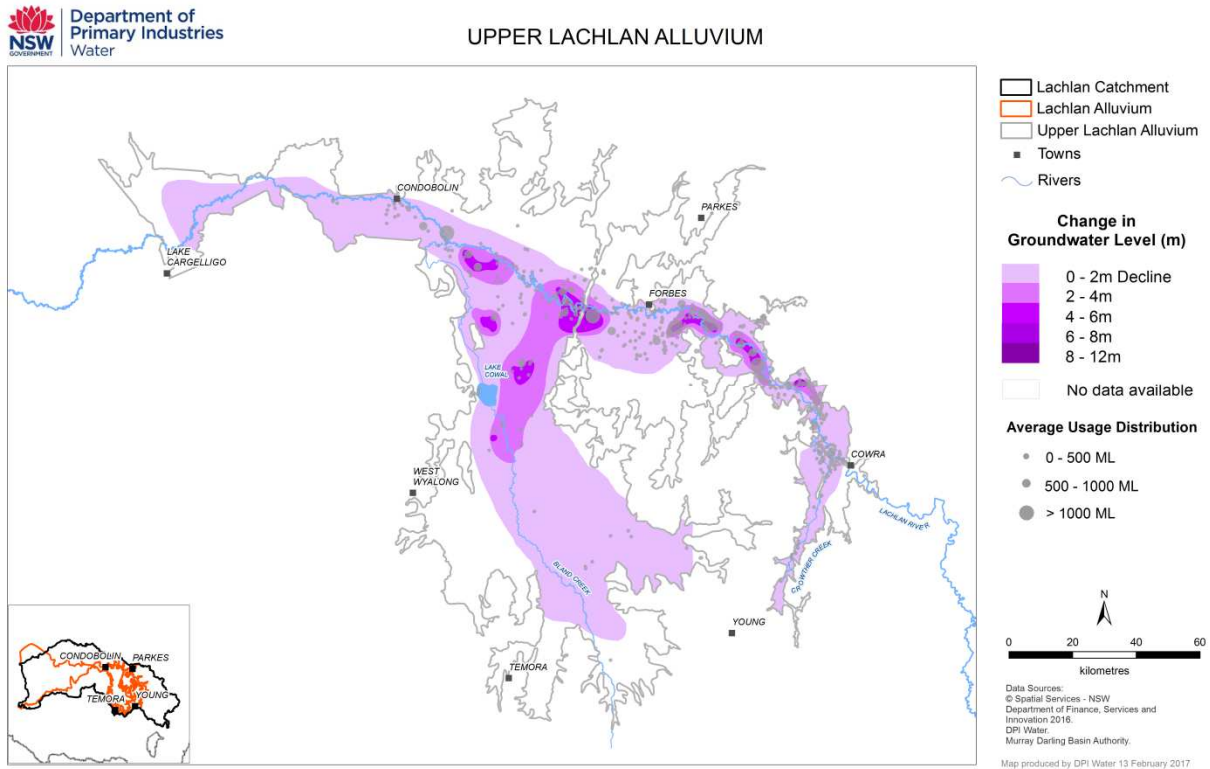


**Figure 8: Groundwater flow direction in the Lower Lachlan Alluvium based on the non-pumping period (winter) groundwater level monitored during the 2015 – 2016 year.**

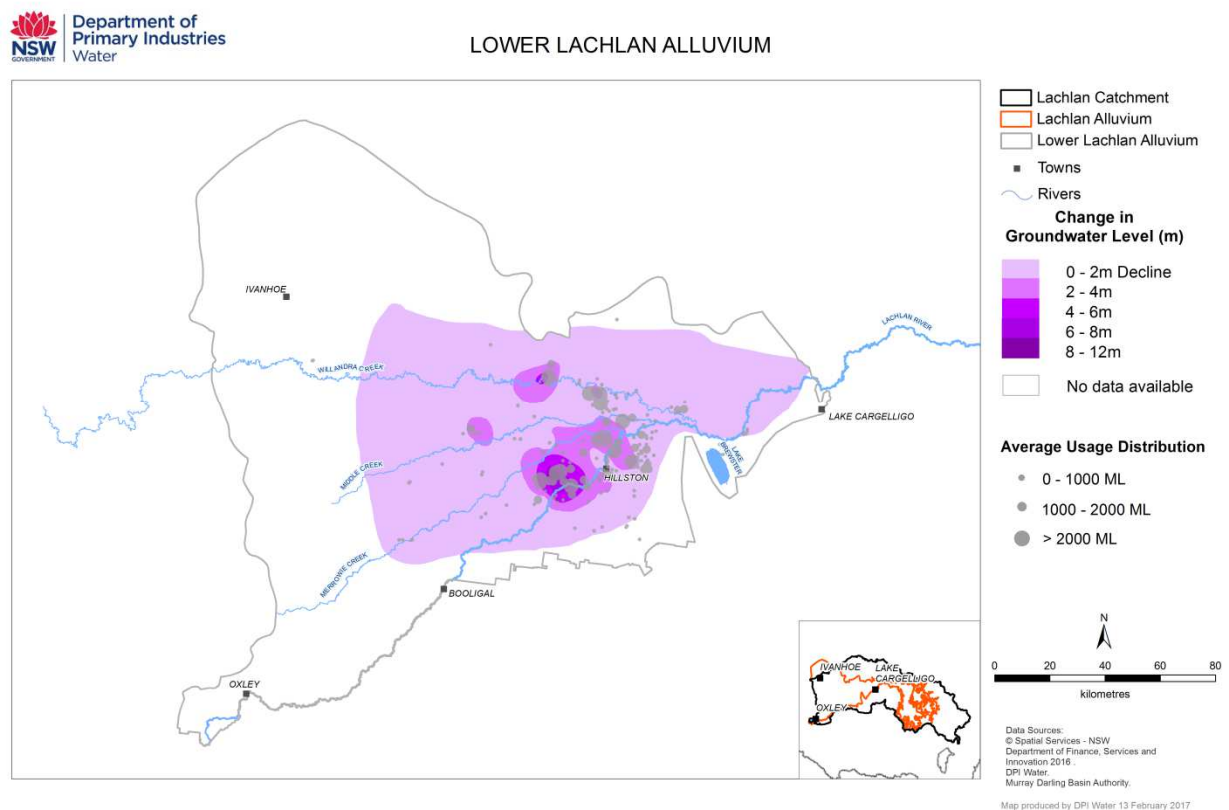
Seasonal drawdowns in groundwater levels from groundwater pumping reflect the pumping stresses and climatic conditions from year to year. Seasonal drawdowns are greatest in the deep aquifers of the Upper and Lower Lachlan Alluvium because it is from this portion of the resource from which most groundwater is extracted.

The seasonal pumping drawdowns in the productive aquifers of the Upper Lachlan and Lower Lachlan Alluvium for 2015 -2016 year are shown in Figure 9 and 10, respectively. This shows the magnitude of change between the pumping and non-pumping periods for that year.



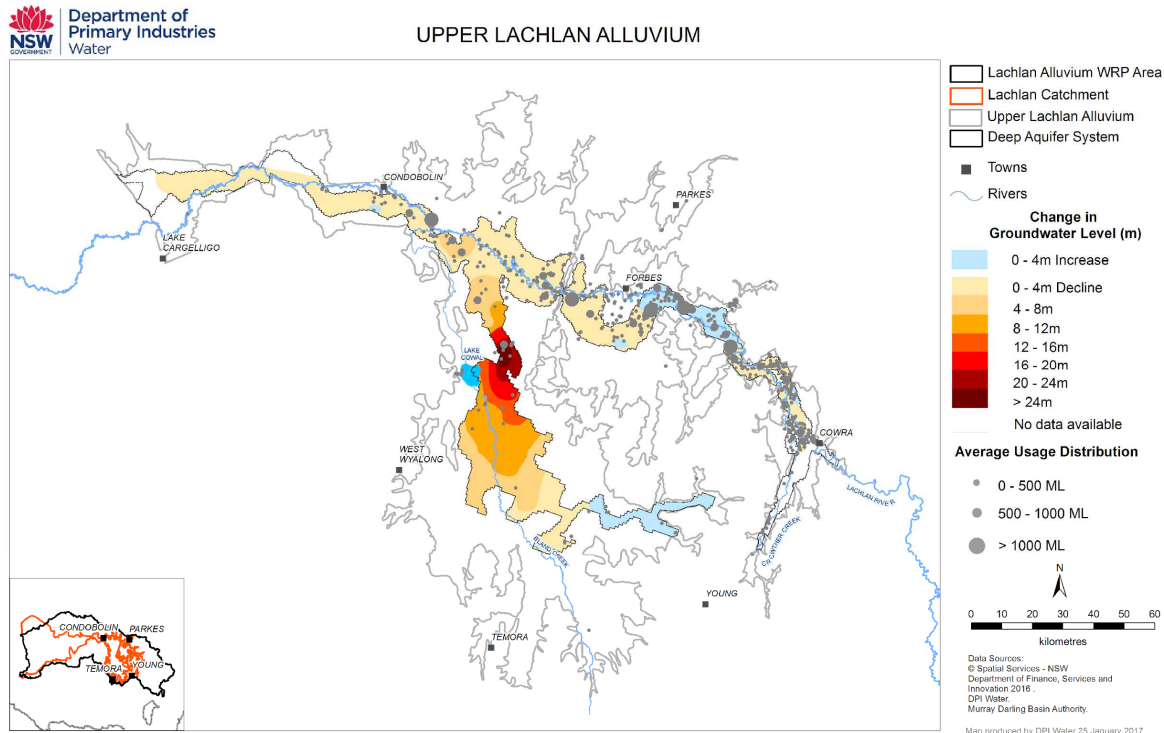


**Figure 9: Seasonal pumping drawdown in the Upper Lachlan Alluvium during the 2015 – 2016 water year. This illustrates the magnitude of drawdown between the pumping and non-pumping periods in that year.**

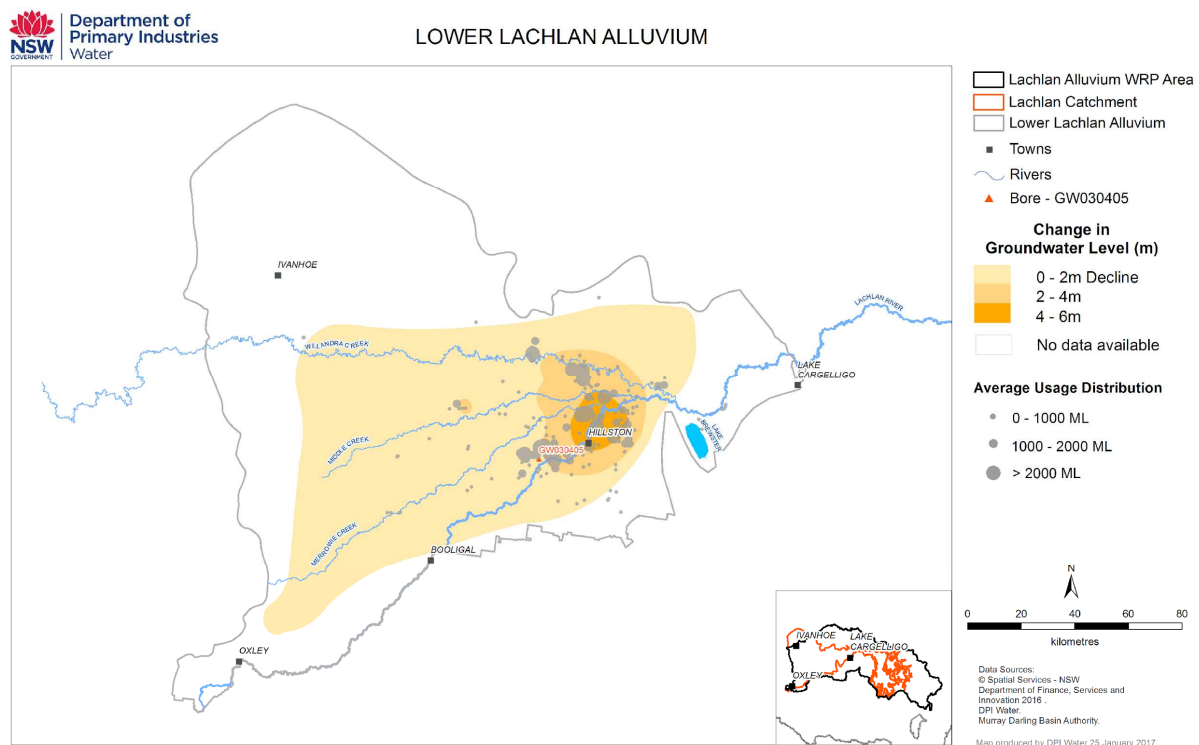


**Figure 10: Seasonal pumping drawdown in the Lower Lachlan Alluvium during the 2015 – 2016 water year. This illustrates the magnitude of drawdown between the pumping and non-pumping periods in that year.**

The cumulative change in groundwater levels in the deep aquifers of the Upper and Lower Lachlan Alluvium are shown in Figure 11 and Figure 12, respectively. These maps illustrates the change in groundwater levels from the non-pumping period from 2005 - 2006 compared to the groundwater levels during the non-pumping period of 2015 – 2016.

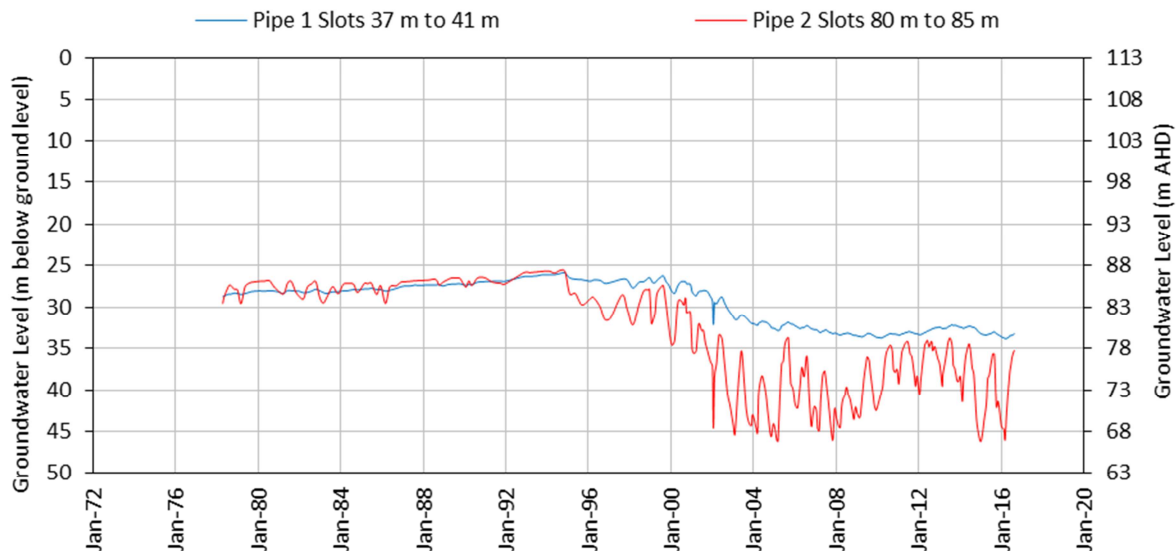


**Figure 11: The change in groundwater levels during the non-pumping periods in the deep aquifer system of the Upper Lachlan from 2005-2006 compared to those of the 2015-2016 water years.**



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

Long-term change in groundwater levels reflects climatic variations as well as the impacts of pumping. The hydrograph shown in Figure 13 illustrates the seasonal pumping cycles in the deeper aquifer as well as the seasonal recovery of the groundwater levels. Whilst over the longer term the groundwater recovery levels have declined from pre-development levels, the hydrograph at Figure 13 also illustrates how groundwater levels can stabilise at a lower level under a new pumping equilibrium. Monitoring of the groundwater levels across the system is important to ensure groundwater levels at a local scale continue to be sustainable.



**Figure 13: Long term groundwater data monitored at two depth intervals at bore site GW030405. The location of this bore is shown on Figure 12.**

## 2.6 Groundwater-dependent environmental assets and ecosystem functions

### A new approach to identify groundwater-dependent ecosystems

DPI Water defines groundwater dependent ecosystems (GDEs) as ‘*ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services.*’ (Kuginis et al. 2016).

When the first groundwater WSPs were developed, no systematic mapping of GDE had occurred in NSW. DPI Water has since put in place a program to identify and monitor GDEs, so they can be considered in water planning decisions.

The identification of GDEs in NSW is separated into two key projects. The first project was to identify the probability of an ecological community being groundwater-dependent. DPI Water has since completed a comprehensive program of mapping high probability GDEs [see – [http://www.water.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0011/691868/High-Probability-GDE-method-report.pdf](http://www.water.nsw.gov.au/__data/assets/pdf_file/0011/691868/High-Probability-GDE-method-report.pdf)].

The second project prioritised GDEs for management purposes. A method to assign an ecological value to the high probability GDEs has been developed based on the High Ecological Value Aquatic Ecosystem (HEVAE) framework (Aquatic Ecosystems Task Group 2012).

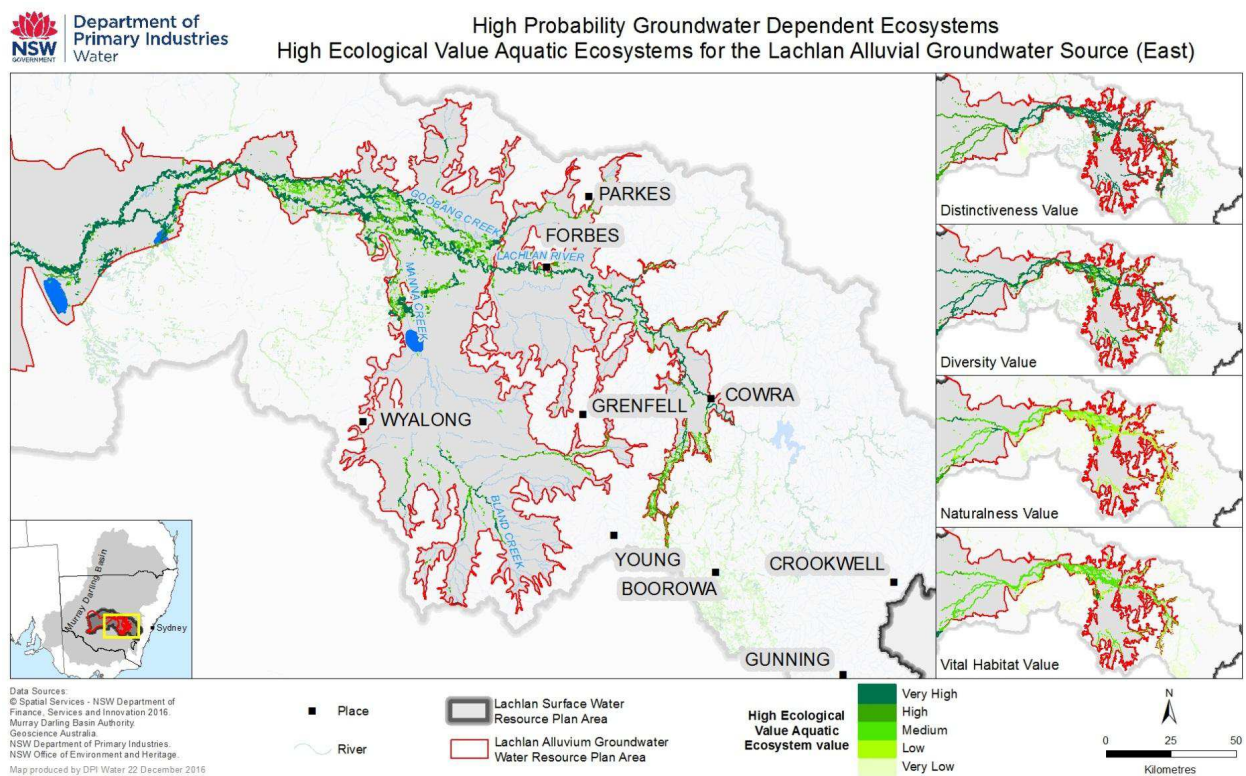
After applying the two approaches to existing data, a subset of high probability and high value groundwater-dependent ecosystems is identified. The risks to these GDEs from extraction will be further considered to determine if any controls are required to manage the risks and what monitoring or further information may be required.

### High probability Groundwater GDEs in the Lachlan

The Lachlan alluvial groundwater resource supports significant GDEs of ecological value including endangered ecological communities (EECs), threatened species, vegetation, and base flow ecosystems.

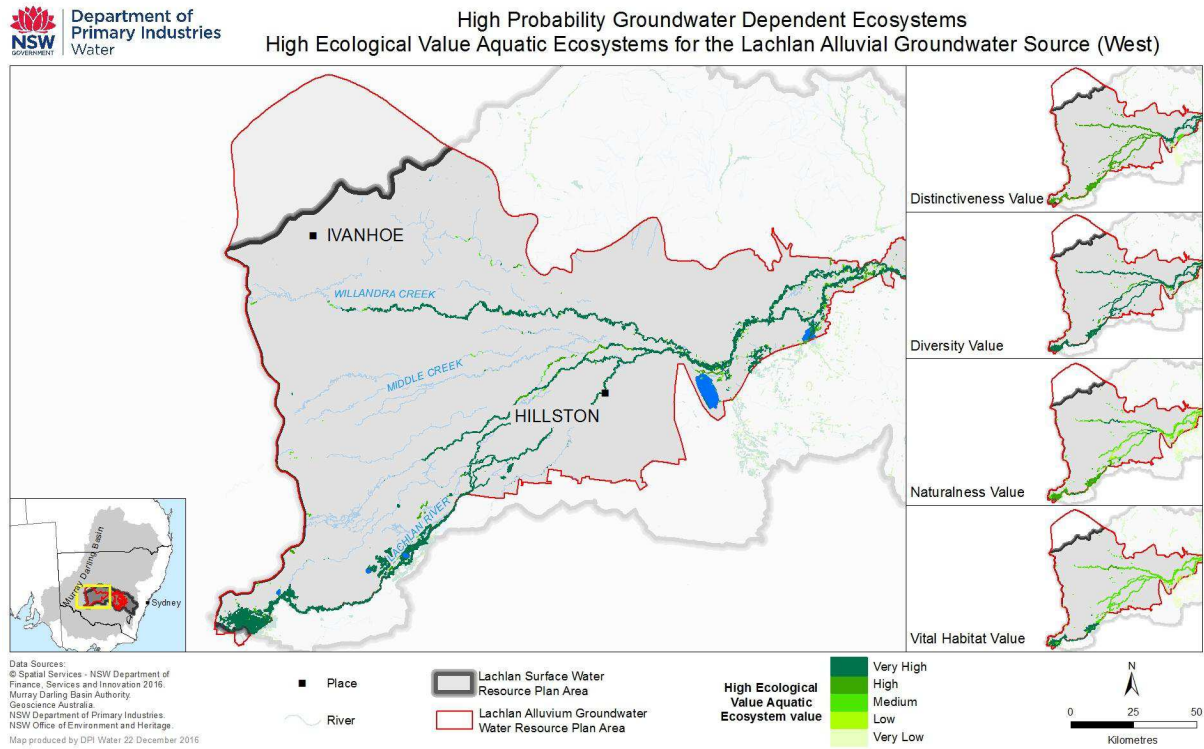
GDE ecological value in the Lachlan Alluvium WRP area (Figures 1 and 2) has very high to high values across the Upper and Lower Lachlan alluvial groundwater sources.

River Red Gum – Lignum and River Red Gum – Black Box communities dominate both alluvial groundwater sources in the riparian and floodplain (Figures 14 and 15). There is a high number of recorded threatened bird and flora species. The Lachlan River EEC, Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC and basin target species are also located these groundwater sources. Habitat diversity is also very high in this area providing extensive riparian corridors as vital habitat for important bird and mammal species. Vital habitat and naturalness is higher in the lower Lachlan with very high and high values, whilst in the upper Lachlan there are medium to low values.



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





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

## 2.7 Water quality

Groundwater salinity in both the shallow and deep aquifers of the Lower Lachlan Alluvium is low and generally less than 2,500 microsiemens per centimetre ( $\mu\text{S}/\text{cm}$ ) east of the Cobb Highway. The lowest salinity groundwater occurs closest to Lachlan River near Hillston. To the west salinity increases exceeding 40,000  $\mu\text{S}/\text{cm}$ . In 2009 the former NSW Office of Water commissioned Parsons Brinckerhoff to characterise the hydrochemistry and investigate the risks posed by groundwater pumping on groundwater quality in six alluvial systems including the Lower Lachlan Alluvium. Thirty-three monitoring bores were sampled during 2009 and 2011. The study focussed on an area approximately within 50 km around Hillston. The main finding of this study relating to salinity is that groundwater in both aquifer systems is fresh (271 - 1,795  $\mu\text{S}/\text{cm}$  in the shallow aquifer and 456 - 1,350  $\mu\text{S}/\text{cm}$  in the deep aquifer), and is suitable for multiple beneficial uses including drinking water supply, irrigation and stock water supply. No significant long-term increasing trends in salinity were identified.

Across the Upper Lachlan Alluvium, salinity in groundwater samples from groundwater monitoring bores at the time of construction ranged from 40  $\mu\text{S}/\text{cm}$  close to the rivers to > 40,000  $\mu\text{S}/\text{cm}$  on the outer limits of the alluvium. The quality in the shallow and deep aquifers is quite variable but is generally < 2,500  $\mu\text{S}/\text{cm}$  upstream from the village of Fairholme. Downstream and to the south from Fairholme the salinity in the Shallow Aquifer is variable and generally > 2,500  $\mu\text{S}/\text{cm}$ .

Groundwater quality in the Belubula Alluvium based groundwater samples from monitoring bores at the time of construction is very fresh (< 1,500  $\mu\text{S}/\text{cm}$ ) similar to quality in the Belubula River.

## 3 Issues to be addressed in water resource plan development

### 3.1 How issues were identified

This section of the paper describes the water sharing issues that have been identified which will be considered in developing the WRP.

The Basin Plan requires WRPs:

1. comply with the SDL
2. identify opportunities to strengthen protection of Aboriginal values and uses
3. provide environmental water
4. manage medium to high risks identified in a risk assessment
5. identify measures to contribute to water quality objectives
6. specify how critical human water needs will be met in extreme events

In June 2015, DPI Water and the National Resources Commission sought submissions on the review of *the Water Sharing Plan for the Lower Lachlan Groundwater Source*. Four submissions were received specific to the Lower Lachlan Groundwater Source and 6 submissions were received for all 6 major inland alluvial groundwater sources under review. In addition, five meetings have been held with water users between July 2015 and May 2016.

Issues raised by stakeholders related to the process of developing or reviewing a plan as well as the specific rules in the plans.

There were some messages from stakeholders across inland NSW regarding groundwater modelling, recharge studies, consultation and information sharing, Aboriginal engagement, use of best available information, research needs, governance and monitoring and reporting on the implementation and effectiveness of plan rules. These comments have been used to inform the process of developing WRPs.

Concerns with the existing WSPs raised by stakeholders during this process will be considered in the development of the WRP. DPI Water is also consulting with the Aboriginal community on their values, uses and issues.

DPI Water has also identified issues through:

- WSP preliminary audits to determine whether the provisions of the plans are being implemented.
- the National Water Planning Report Card 2013, that provides consolidated summary of the status of water planning based on the key elements of National Water Initiative and its associated Water Planning Guidelines.
- the Natural Resource Commission's 2015 water sharing plan review report

### 3.2 Supporting Aboriginal values and uses

Aboriginal communities across NSW have worked with DPI Water to identify some key issues for groundwater WSPs. These are included in Table 2. DPI Water will continue to consult with Aboriginal communities within the Lachlan Alluvial WRP area to confirm the local community's values and uses and concerns. Further opportunities for input will be provided at the time of public exhibition and during targeted consultation before the plan is finalised.

*'My people hold groundwater as key to our survival, especially in spring country where it can be the only source of water. Our ancestral beings from our stories and Dreaming created these water sources, our stories state this.'*

WSPs currently provide various forms of protection and benefit for Aboriginal peoples' values and uses including specific purpose Aboriginal cultural access licences. However, additional consideration around providing water for Aboriginal economic purposes and cultural flows is required as part of the WRP development process.

Table 4 (Appendix 1) provides a summary of objectives identified through AWI Aboriginal community engagement. This list of objectives will be further assessed post-public exhibition and targeted consultation of the Lachlan Alluvium *Status and Issues Paper*. The issues that can most likely be dealt with during the WRP development process are listed below, with additional issues listed in Appendix 2.

**Table 2. Aboriginal identified issues and current status.**

Issue - all	Status
Availability of access to water for cultural practice and renewal activities is an issue that impacts Aboriginal communities' ability to plan and carry out cultural renewal events.	Potential for WRP risk assessment to consider.
Identifying and protecting Aboriginal values and uses of water that depend on or are connected to groundwater. This includes protecting the water at specific locations of cultural significance.	DPI Water will identify and assess options to achieve this during WRP development and consider this in the WRP risk assessment.

### 3.3 Improving water sharing

DPI Water will be developing plan rules using the best available information and will engage with stakeholders to ensure that water sharing rules are improved and unintended consequences are minimised. The issues below have been raised by stakeholders in relation to the WSPs.

## Improving plan objectives and performance indicators

Internal reviews and stakeholder feedback identified that improvements to objectives and performance indicators are required. The WSP will be part of the WRP, so its objectives must be consistent with those of the WRP. The water resource plan must address environmental and water quality objectives set out in the Basin Plan and identify the objectives of Aboriginal people.

Issue - all	Status
The current objectives and performance indicators in the WSPs should be reviewed as they are not fit for purpose. They are not consistent, nor are they well aligned to the plan rules or other natural resource plans. They do not adequately accommodate the local community, industry and economy or Aboriginal objectives.	DPI Water is developing improved plan objectives and performance indicators. Appendix 1 includes a draft set of objectives for the Lachlan Alluvium WRP. These will be further refined during development of the WRP.

## Long-term average annual extraction limit

The groundwater sharing plans establish long-term average annual extraction limits (LTAAELs). The plans also include rules for monitoring compliance of extraction against LTAAELs and can reduce allocations to return extraction back to the LTAAEL if the limit is exceeded.

Issue – Lower Lachlan	Status
Extraction limits should be reviewed in light of new information including analysis of additional monitoring data, new scientific information, improved understanding of environmental needs and any revised estimates of system inputs and outputs such as recharge.	The NSW Government has agreed to manage extractions to the Basin Plan's SDLs
The WSP has achieved a reduction in groundwater use.	NSW's existing LTAAELs largely reflect the Basin Plan SDLs, therefore extraction limits cannot be increased.
The extraction limit should be retained as it is working well.	NSW will need to develop rules to show how extractions will be managed within the SDLs.

Issue – all	Status
Extraction limits for each of the water sources should be retained.	This issue will be further considered.
Rules for determining compliance with the extraction limit should be made more flexible to better reflect variation in water demand due to changing climate conditions and surface water availability.	This issue will be considered further however Basin Plan requirements to manage compliance with SDLs and permitted take rules must be complied with.
Suggested options include increasing the compliance period from a 3 to 5 year period, or using the current carryover limit and annual usage limit to manage compliance with the extraction limit or modelling.	
WRPs must include rules for annual permitted take and compliance with SDLs. This may require change to WSP extraction limit compliance rules.	

## Environmental values and aquifer integrity

The groundwater sharing plans include a number of provisions to protect environmental values such as the dependent ecosystems and the health of connected surface or groundwater systems and the integrity of the aquifer. A range of mechanisms are used including establishing extraction limits and reserving remaining recharge and storage to manage risks to environmental values, prohibiting new bores within restricted distances of environmental values (such as groundwater dependent ecosystems (GDEs) and waterways),



and controlling daily access or available water determinations in groundwater sources with a high degree of connection to surface water sources.

Issue – all	Status
Planned environmental water should be better defined to explain its purpose.	This issue is to be considered further including the use of developing supporting documents to explain the purpose of planned environmental water provisions and other provisions which support environmental outcomes.
Recharge estimates should be reviewed.  There is no evidence that recharge estimates should be reduced.	This issue will be considered further.  Review of recharge will not enable increases in extraction limits as NSW must comply with the SDLs set in the Basin Plan.
Provisions for environmental water need to be reviewed to protect aquifer integrity and health of environmental assets. Stakeholders recommend that the review is based on the best available information.  It must identify GDEs and their water requirements, as well as considering connectivity to other groundwater and surface water sources, and changes to recharge estimates.  Impacts on social and economic values, including risks (dry times, climate change scenarios) must also be considered.	A risk assessment will be undertaken for all alluvial groundwater water sources based on best available information. The risk assessments will identify medium and high risks to groundwater sources and develop strategies to address those risks. See Section 3.5 'Managing Risks' for more detail.
GDEs should be clearly defined, identified, and protected in the plans.  The most effective means of meeting GDE water needs should be considered.	DPI Water has developed a new method to identify GDEs using available data. GDEs have been identified (refer further to Section 2.6). Uncertainty and risks to these GDEs are yet to be considered. DPI Water will consider risks to GDEs and the need for additional management strategies where medium or high risks are identified.  Reductions in extraction limits to manage risk to groundwater-dependent ecosystems are not proposed.

### Protecting cultural uses and values

Some groundwater plans include distance restrictions to protect cultural values. Information on cultural values however is limited. DPI Water is implementing the AWI to work with Aboriginal communities to define cultural values and uses associated with groundwater.

Issue - all	Status
Stakeholders have raised concern that information on Aboriginal cultural uses and values is limited, that there is an incorrect assumption that planned environmental water will protect cultural values and uses and that the current provisions are inadequate to protect cultural values and uses. Stakeholders seek specific provisions in plans to protect cultural and spiritual values and practices.	DPI Water is working with Aboriginal communities to identify groundwater-dependent values.  This issue will be considered further.

### Managing connected water sources

The Basin Plan requires the WRP consider risks to connected surface water and groundwater sources. This sentiment was mirrored by some stakeholders, requesting that DPI Water consider connectivity in reviewing groundwater sharing plans.

Issue - all	Status
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The plans should identify and include rules to manage connectivity with surface water sources and other groundwater sources.	Risks to connected surface water sources and connected groundwater sources will be considered in the risk assessment and any medium or high risks will be further considered.
The Basin Plan requires the WRP consider risks to connected surface water and groundwater sources.	

### Rules for granting access licences

The groundwater sharing plans specify the circumstances under which a new access licence can be granted. This is complemented by rules in the *Water Management Act 2000* and the *Water Management (General) Regulation 2011*.

Issue – all	Status
All plans should include an Aboriginal Water reserve to ensure water is available to provide for specific-purpose access licences and native title rights.	Applications for access licences for Aboriginal cultural purposes can be made at any time.  Water required for native title rights is a basic landholder right. Access licences are not required to take water for native title rights.  Works approvals are required for any bores or wells.

### Rules for granting water supply works

The groundwater sharing plans prescribe rules for the granting of new work approvals. The plans protect existing users and environmental assets by not allowing new bores within restricted distances of certain features (e.g. GDEs, cultural sites or existing bores).

Issue — all	Status
Distance restrictions for new works should be reviewed.  A number of plans do not include distance restrictions for new bores from contaminated sources, cultural significant sites and other bores.  Current distances restrictions between bores are inadequate in some areas of the Lower Lachlan aquifer particularly areas where there is a high concentration of bores.	Distance restrictions will be further considered first at a state-wide level and then at a local level.
New infrastructure approvals should be assessed to minimise impact on existing water users.	DPI Water currently assesses all applications for new works to determine their impact on existing users and the environment before approvals are given.
Rules protecting existing licence holders from adverse local impacts from new works should be retained.	This issue will be further considered.

### Account management rules

Account rules determine how much water can be taken in a given year by each licence holder, how much water can be carried over in accounts from one year to the next and when individual extraction limits can be imposed.

Issue – Lower Lachlan	Status
Establishing maximum annual extraction limits to better reflect the physical constraints of aquifers including spatial changes in extraction as a result of trading activities.	Refinements to carryover and take rules will be considered further in groundwater sources where specific issues have been identified to maximise business flexibility while minimising risks to the groundwater sources, licence holders, connected water

	sources or dependent ecosystems and values.
Account management rules and terminology in the WSP and supporting documents should be revised to improve clarity.	DPI Water will review the WSP and supporting documents and develop advisory material to explain account management rules.

### Local impact rules

Local impact rules are in place in a number of groundwater sources to manage declines in groundwater levels or excessive drawdowns in areas of high extraction pressure. In some cases these rules are included in the WSP and in other cases they are documented elsewhere, such as orders under Section 324 of the *Water Management Act 2000*. Zone 1 in the Upper Lachlan groundwater source is one area where local impacts are currently being implemented in cooperation with water users. Water users have also raised concerns regarding an area of high extraction pressure around Hillston.

Issue – Lower Lachlan	Status
Ongoing management of local impacts in Zone 1 of the Upper Lachlan groundwater source.	This issue will be considered further in consultation with water users – with intent to implement agreed local impact management arrangements.
Concern regarding high extraction pressure around Hillston.	This issue will be further considered in consultation with water users
Water level management clauses in the current plan should be retained to enable management if needed.	This issue will be further considered.
Options to prevent adverse impacts on water levels should be considered (e.g. trade restrictions) in preference to managing impacts once they occur.	This issues will be further considered.
Local impact management should not reduce the capacity of existing licence holders in favour of new entrants in areas under high extraction pressure.	This issue will be further considered.

### Access licence dealing rules

The access licence dealing rules define where water can be traded between and within groundwater sources. The rules in WSPs are complemented by rules in the *Minister's Access Licence Dealing Principles* and the *Water Management Act 2000*. Changes to these rules during WRP development will be constrained by the Basin Plan water trading rules.

Issue – all	Status
Current trading arrangements should be reviewed.	This issue will be further considered.
Rules managing the spatial distribution of bores and patterns of extractive use as a result of trading should be reviewed to manage the effects of extraction.	

### Available water determinations

DPI Water issues available water determinations (AWDs) on 1 July each year. Stakeholders in a number of valleys have expressed concern that the process for making AWDs is unclear.

Issue - all	Status
The process for making AWDs to be clarified.	DPI Water will develop supporting documentation to explain AWD processes.
Issue - Belubula	Status
The AWD for aquifer access licences in the Belubula Valley Alluvial is linked to the regulated river high security AWD (70%) and the groundwater AWD (30%).	This issue will be considered further.

If dam levels drop significantly groundwater users will be subject to reduced allocations.

### Amendments

A number of amendment clauses are included in the current plan. Some require analysis before they can be implemented. The Minister has discretion as to whether to enact many of the amendment provisions.

Issue – Lower Lachlan	Status
Stakeholders have questioned why some amendment provisions have not been enacted and suggested amendment provisions could be simplified.	This issue will be further considered.

### Monitoring

Issue - all	Status
Monitoring arrangements should be established to assess the effectiveness of the measures and report on outcomes. Monitoring arrangements should be described.	This issue will be further considered.

### Additional matters for consideration

Chapter 10 of the Basin Plan outlines the requirements for WRPs, including consideration of interception activities, connectivity to surface water or other groundwater sources, current and future risks to the condition and continued availability of water, salinity and water quality, and protection of assets dependent on groundwater.

Issue - all	Status
A number of stakeholders have indicated that WSPs do not adequately address these issues and seek further information on how these issues will be considered.	A risk assessment will be undertaken for all alluvial groundwater sources based on best available information and consider these matters. The risk assessments will identify medium and high risks to groundwater sources and develop strategies to address those risks. See Section 3.5 'Managing Risks' for more detail.

## 3.4 Complying with the Sustainable Diversion Limit

The Basin Plan sets a separate SDL for each of the groundwater resource unit within the Lachlan Alluvium WRP area. The volume of these SDLs are approximately the same volumes set as the LTAAEL in the NSW WSPs for these resource units.

Under the Basin Plan, NSW is required to set out the method for determining the annual permitted take for each groundwater resource unit. The method must demonstrate that if it was applied over the historic climate conditions then the SDL would not be exceeded. The level of complexity for setting the annual permitted take will be influenced by the availability of data.

The MDBA have proposed amendments to the Basin Plan on the method to assess compliance of groundwater take to the SDL (MDBA 2016). It is proposed for the period between 2019 and 2028, non-compliance to the SDL will occur if the cumulative sum of the annual groundwater take in each year from 1 July 2019 is greater than the cumulative sum of the annual permitted take for the same period plus 20% of the annual SDL. From 2028, non-compliance will occur if the average annual take over the 10-year period ending with that water year is greater than the average annual permitted take over the same period.

This is a different approach to the existing NSW WSPs which assess the average extraction over a set number of years against the compliance to the plan's extraction limit.

Issue – all	Status
The WRP must include a method for determining annual permitted take and compliance with the SDL.	DPI Water will consider options to address the Basin Plan requirements at a state-wide level including a method for determining permitted take and compliance with the SDL and seek peak stakeholder input.

### 3.5 Managing risks

DPI Water is preparing a risk assessment, as required by the Basin Plan. The risk assessment for the Lachlan Alluvial WRP is not complete.

The risk assessment will assess risk:

- to the structural integrity of an aquifer
- of insufficient water for the environment (GDEs and base flows)
- to the health of GDEs from poor water quality
- of water quality being unsuitable for other water users
- due to interception
- future risks to water availability

The WRP must describe strategies to address medium to high risks. These strategies will be appropriate for the nature of the risk and the confidence in the information used to assess the risks. If a risk cannot be addressed by the WRP and explanation must be given.

DPI Water has already made substantial progress in implementing strategies to manage risks to groundwater resources. One of the main strategies has been to establish long term extraction limits in all inland groundwater sources and manage extractions within these limits.

Groundwater entitlements were reduced to the long term extraction limit in the six major inland alluvial aquifers (including the Lower Lachlan). Groundwater allocations in these six major inland alluvial aquifers (which include the Lower Lachlan) were progressively reduced to the long-term extraction limit over the life of the plans, via the use of supplementary water access licences (SWALs). These SWALs were provided to assist the licence holders adjust to reduced entitlements. In July 2017 no water will be allocated to SWALs in the Lower Lachlan groundwater source and the SWALs will be subsequently cancelled.

Other current strategies included within WSPs are distance rules for granting new works, trade rules, and notification requirements and in some cases local management rules. External to the WSPs are trade and new work assessment processes and some local impact management arrangements.

Any proposed strategies to address medium to high risks will be discussed with stakeholders before strategies are refined for inclusion in draft WRPs. Some further work may be required to monitor risks, particularly if there is any uncertainty, rather than changing water sharing rules.

### 3.6 Managing in extreme events

The Basin Plan requires the WRP describe how critical water needs will be met in extreme events. Extreme events in this context include severe droughts and water quality events that could put at risk the supply of water for both human consumption requirements and non-human consumption requirements, for which a failure to provide for would cause prohibitively high social, economic and/or national water security costs.

Issue - all	Status
The WRP must describe how resources will be managed in extreme events.	DPI Water will review critical human needs dependent on groundwater and identify options for management in extreme events.

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The WSPs should consider new information on climate variability collected since their commencement, quantify and address risk to system health or entitlement security due to long-term climate change.

A risk assessment will be undertaken for all alluvial groundwater sources based on best available information. The risk assessments will identify medium and high risks to groundwater sources and develop strategies to address those risks. See Section 3.5 'Managing Risks' for more detail.

A state-wide approach for the management of extreme events will be considered by DPI Water.

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## Appendices

### Appendix 1: Draft objectives and strategies

DPI Water is in the process of improving the logic framework of water plans to make objectives more relevant, and to clarify the relationship between objectives, strategies and performance indicators. This will enable more appropriate monitoring programs to be developed. Table 3 shows draft objectives with related strategies for the WRP. They will be refined as the plan is being developed. They are presented here as a guide.

**Table 3: Draft objectives for the water resource plan with related strategies.**

Broad objectives	Targeted objectives	Proposed strategies
<b>ENVIRONMENTAL</b>		
Contribute to the protection and maintenance of environmental values and condition of the groundwater sources in the plan area	Ecological condition of high priority GDEs such as vegetation communities dependent on the presence of subsurface groundwater is protected and maintained over the long term	<ul style="list-style-type: none"> <li>• Manage potential extraction impacts on water levels at a local scale for areas where there is a higher demand and a higher level of risk</li> <li>• Minimise extraction impacts on water levels at a water source scale</li> <li>• Minimise extraction impacts on water levels over the longer term</li> <li>• Integrate the management of highly connected ground and surface water sources</li> </ul>
	Ecological condition of high priority GDEs such as wetlands and base flow in streams dependent on the presence of groundwater is protected and maintained over the long term	<ul style="list-style-type: none"> <li>• Manage potential extraction impacts on water levels at a local scale for areas where there is a higher demand and a higher level of risk</li> <li>• Minimise extraction impacts on water levels at a water source scale</li> <li>• Minimise extraction impacts on water levels over the longer term</li> <li>• Integrate the management of highly connected ground and surface water sources</li> </ul>
	Protect and maintain aquifer water quality from salinity increases and degradation of other water quality parameters	<ul style="list-style-type: none"> <li>• Manage potential aquifer contamination at a local scale where there is a high level of risk</li> <li>• Manage potential extraction impacts on water levels at a local scale for areas where there is a higher demand and a higher level of risk</li> <li>• Minimise extraction impacts on water levels at a water source scale</li> <li>• Minimise extraction impacts on water levels over the longer term</li> <li>• Integrate the management of highly connected ground and surface water sources</li> </ul>
	Protect and maintain the productive base of aquifers within the plan area	<ul style="list-style-type: none"> <li>• Minimise structural damage to the aquifer from extraction</li> <li>• Manage potential extraction impacts on water levels at a local scale for areas where there is a higher extractive demand and a higher level of risk</li> <li>• Minimise extraction impacts on water levels at a water source scale</li> <li>• Minimise extraction impacts on water levels over the longer term</li> <li>• Minimise loss of connectivity between aquifers and /or surface water sources occurring as a result of water level change by integrating the management of highly connected water sources</li> </ul>
<b>ECONOMIC</b>		
Maximise the economic benefits derived from water-dependent	Maintain defined access for groundwater-dependent business	<ul style="list-style-type: none"> <li>• Managing extraction at a water source scale</li> <li>• Defining level of security based on categories of licences</li> </ul>



commercial and industrial enterprises.	Maintain equitable access for groundwater-dependent business	<ul style="list-style-type: none"> <li>Managing extraction at a local scale</li> <li>Defining priority of access</li> </ul>
	Maintain or improve flexibility for groundwater-dependent business	<ul style="list-style-type: none"> <li>Provide opportunity to trade</li> <li>Provide flexible account management</li> <li>Managing extraction over the long term</li> </ul>
	<b>SOCIAL</b>	
Ensure adequate water supply to support critical human needs and basic landholder rights	Ensure sufficient water available to service local water utilities/major utilities	<ul style="list-style-type: none"> <li>Setting priority, security of access</li> <li>Managing extraction at a water source / local scale</li> </ul>
	Ensure sufficient water available to service Domestic and stock (domestic) licences and BLR	<ul style="list-style-type: none"> <li>Setting priority, security of access</li> </ul>
	Access to other categories of licensed entitlement is equitable and sustainable	<ul style="list-style-type: none"> <li>Managing extraction at a water source / local scale</li> <li>Assessment process for issue of SPALs considers potential Impact on existing licence holders</li> </ul>
<b>CULTURAL</b>		
Maintain or improve Aboriginal values, uses and assets which support and strengthen community	Facilitate access to water by Aboriginal people and community	<ul style="list-style-type: none"> <li>Provide access to water for Aboriginal cultural and community purposes</li> </ul>
	Protect groundwater-dependent cultural values	<ul style="list-style-type: none"> <li>Managing extraction at a water source / local scale</li> </ul>

Table 4 provides a summary of objectives identified through broader Aboriginal community engagement. This list of objectives will be further assessed based on submissions received for this Status and Issues Paper.

**Table 4: Objectives identified by Aboriginal peoples through consultation.**

Objective 1:	To identify opportunities to better address the needs and aspirations of Aboriginal Communities in terms of equitable access to water for social, cultural, spiritual and economic purposes.
Objective 2	To ensure that Aboriginal Communities' issues and concerns have been carefully considered with appropriate provisions that ensure the long-term sustainability of their cultural values and uses.
Objective 3	To support the removal of barriers that constrain and limit equitable access to water for Aboriginal Communities, by reviewing policy gaps and legislation.
Objective 4	To ensure Aboriginal Communities are appropriately consulted and informed of issues affecting their ability to participate in the decision-making process. This includes building partnerships and trust regarding the use and storage of culturally-sensitive information.
Objective 5:	To identify and address water quality issues that are impacting on the Aboriginal values and uses across the WRP area. These impacts include the cultural connections to iconic species (fish, vegetation and birds), as well as the instream use of water for swimming, drinking and maternal use.
Objective 6	To address and identify the impacts on the spiritually-significant cultural values from water extraction.

## Appendix 2: Additional issues identified by Aboriginal communities

Issue - all	Status
<p>Aboriginal Community Development Licences - The current Aboriginal Community Development water licence provisions are not equitable in general for Aboriginal people across NSW. There are no real opportunities for Aboriginal people to access water for economic use within the surface or groundwater sources within the Basin. There needs to be real opportunities that deliver real benefits for Aboriginal people that allow Aboriginal people to become involved in the water market, and create employment opportunities for Aboriginal people.</p>	<p>Currently these licences may only be issued in coastal river systems, subject to the relevant WSP providing for applications to be made.</p>
<p>Constraints in the uptake of water licences - Aboriginal people do not have the capacity to access the water in terms of water infrastructure and cost of water licensing. This has made it impossible for Aboriginal communities to take up water licensing opportunities. In terms of funding to purchase water licenses and water infrastructure, mostly all Aboriginal land councils and individuals have land that they wish to develop but find it impossible to purchase water licences due to lack of funds. The creation of the water market has added to these difficulties. Aboriginal Communities are seeking support in terms of waiving the cost of water licences and looking at additional opportunities for 'excess' water.</p>	<p>Aboriginal Communities/individuals have no or limited capacity or the funding to enter into the water market.</p>
<p>Critical human water needs - remote Aboriginal remote Communities have no access to basic drinking water. Many communities in the Basin have issues with accessing water for basic human needs to maintain health, hygiene and wellbeing. In some alluvial groundwater systems water quality is too saline to be used for human water needs.</p>	<p>Current water quality across the WRP area is not sufficient for human consumption direct from the ground water source.</p>
<p>Water quality issues are impacting the general health of the river and connected groundwater systems. This includes the health and reproduction of cultural food resources (e.g. fish are covered in sore spots). Water quality is also significantly important to spiritual and ceremonial sites and the general health of the river and aquifer systems.</p>	<p>Limited data for the WRP processes to address water quality considerations regarding Aboriginal values and uses.</p>