NSW GOVERNMENT | Department of Primary Industries

Lachlan Water Resource Plan

Surface water

Status and Issues paper

Published by the NSW Department of Primary Industries

Lachlan water resource plan (surface water), status and issues paper

First published November 2016

More information

www.dpi.nsw.gov.au

Acknowledgments

Australian Government
Department of Agriculture and Water Resources

This project is funded by the Australian Government's Sustainable Rural Water Use and Infrastructure Program, as part of the implementation of the Murray-Darling Basin Plan in NSW.

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 Water Resource Plan (surface water)* covers all surface water 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 that NSW must deliver by 2019. The Department of Primary Industries (DPI) Water will issue monthly progress reports showing how the Department is tracking against the key timelines in the Roadmap.

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 states' existing water planning and management. They will include documents that set out the interrelated water management arrangements for each water resource plan area.

The requirements of water resource plans are consistent with existing arrangements whenever possible. As a result, water users' business planning and water management should continue as usual.

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 NSW Department of Primary Industries Water (DPI Water) will consider when developing the Lachlan Water Resource Plan (surface water). Additional issues raised during submission and consultation periods will be considered during the development process.

As the Lachlan water resource plan 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 plan.

DPI Water invites Lachlan stakeholders, particularly surface water users, to comment on issues listed in this *Status and Issues Paper* and raise any additional issues.

A second round of submissions on the draft *Lachlan Water Resource Plan (surface water)* will be invited later in the planning process. That submission period will be advertised in The Land, local papers and on the DPI Water website.

Documents and supporting material will be available on the DPI Water website at www.water.nsw.gov.au

Stakeholders may submit feedback via email or post:

- lachlan.sw.wrp@dpi.nsw.gov.au
- Locked Bag 5123 Parramatta NSW 2124

DPI Water will acknowledge all submissions in writing.

Contents

List of Figures

List of Tables

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 water resource plans.

Basin Plan principles state:

- There will be no adverse impacts on water available to a water access license holder.
- There will be no net reduction in the protection of planned environmental water.
- The Commonwealth is responsible for bridging the gap between existing limits and Sustainable Diversion Limits (SDL).
- The water resource plan will meet the requirements set out in the Basin Plan.

Additionally, NSW requires that water resource plans:

- Balance social, cultural, economic and environment needs of the community and catchments.
- Are cost neutral for NSW license holders.
- Minimise change for water sharing plans 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. Water resource plans 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 water resource plans, refer to the DPI Water factsheet *Water resource plans – overview*.

1.3 What the final water resource plan will look like

Water resource plans will be made up of water sharing plans, a water quality management plan, a risk assessment and other supporting documents. The water sharing plans will be adjusted where necessary to meet the requirements of the Basin Plan, and to address areas for improvement identified through consultation and technical studies.

NSW water resource plans will meet the minimum requirements of the Commonwealth *Water Act 2007* and Basin Plan. Each water resource plan must:

- describe all water rights in the plan area
- demonstrate how compliance with the sustainable diversion limit (SDL) prescribed in the Basin Plan will be assessed and maintained
- include a Water Quality Management Plan
- provide for environmental watering
- address risks to water resources identified in a risk assessment
- explain how essential human needs will be met in extreme events
- identify and take account of Aboriginal objectives and outcomes with regard to values and uses including views on cultural flows.

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

For more information regarding what water resource plans 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 water resource plan, there are other important initiatives occurring in parallel. These include, Long-Term Watering Plans, Sustainable Diversion Limit adjustments, the Northern Basin Review, the Healthy Floodplains Project, NSW Prerequisite Policy Measures, NSW Planning Assumptions for surface water resources, NSW Management of Extreme Events, review of Trading Rules and the identification of Regional Strategies.

For more information regarding these initiatives and how they relate to water resource plans, refer to the DPI Water factsheet *Water resource plans – overview*.

1.5 The water resource plan development process

DPI Water is developing the water resource plan according to a robust process which follows National Water Initiative Guidelines and includes community engagement and the objective of having the decision making process as transparent as possible.

This Status and Issues phase will be followed by a Strategy and Rule Development phase. A draft *Lachlan Water Resource Plan (surface water)* will be published and subject to public exhibition. A final *Lachlan Water Resource Plan (surface water)* will then be submitted for approval by NSW Minister for the Environment and the NSW Minister for Water, 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 Guidelines and the MDBA *Handbook for Practitioners – Water resource plan requirements* to inform consultation and stakeholder input.

There will be a number of opportunities for public submissions and targeted consultation with stakeholders. Consultation will aim to give stakeholders information and to obtain 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, including Aboriginal communities prior to drafting the water resource plan
- seek public submissions on the draft water resource plan
- undertake further targeted consultation after public exhibition if required
- support Aboriginal communities via the DPI Water Aboriginal Water Initiative (AWI team) to make submissions on the draft water resource plan and through ongoing community consultation as required after public exhibition

In addition to this consultation, a Stakeholder Advisory Panel (SAP) will be established for each surface water resource plan to provide early input on regulated river issues and options. Members include local licence holder representatives drawn from WaterNSW's Customer Service Committee, environmental representatives drawn from the local Environmental Water Advisory Group and various agency representatives. The SAP is an advisory panel that will complement other consultation, particularly prior to drafting a water resource plan.

2 Status of the Lachlan surface water resources

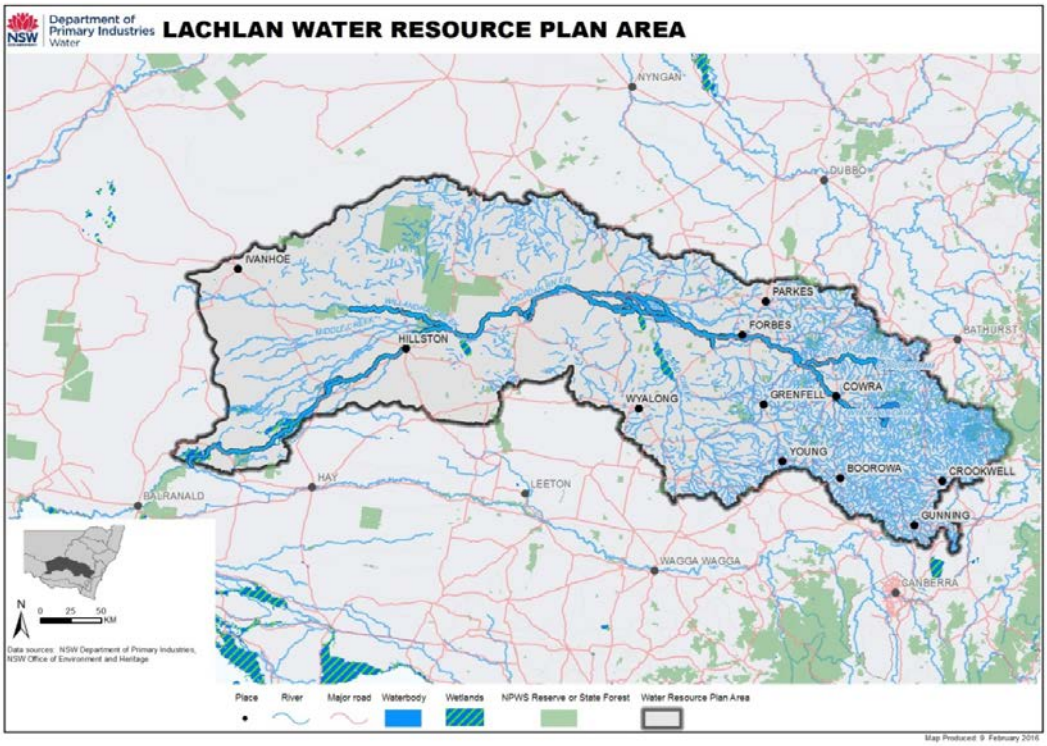
This section provides a brief overview of the status of the Lachlan surface water resources.

For more detailed information about the Lachlan surface water resources, please refer to the *Lachlan water resource description report* on the DPI Water website.

2.1 The Lachlan Water Resource Plan Area

The Lachlan Water Resource Plan will cover all the surface water resources of the Lachlan Valley (Figure 1). It will include the regulated river systems; unregulated rivers flowing into the regulated river systems; unregulated effluent creeks flowing out of the regulated river system on the plains; and water captured through farm dams. Groundwater in the area is not included, and is covered by separate water resource plans.

Figure 1: Lachlan Water Resource Plan Area



The Lachlan Valley covers an area of over 84,700 km² and represents about 8 per cent of the Murray-Darling Basin. The catchment is characterised by hot summer temperatures with moderate rainfall which is highly variable between years. There is a significant range in temperatures and rainfall, between the central tablelands ranges to the east, and the riverine plains in the west. Average annual rainfall in the valley ranges from around 900 mm in the headwaters to the east, to around 300 mm in the west. Rainfall generally higher in the summer months in the north, tending towards winter dominant rainfall in the south (CSIRO 2008). Temperatures range from 32–35°C in the summer months and 14–16°C in the winter months for Forbes, Ivanhoe and Wyalong.

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 per cent of this population (CMA 2011) compared to 2 per cent of the total NSW population (AHRC 2006). Around 30 per cent of the total population live within the major rural centres of Cowra, Parkes, Forbes and Young which all have populations of 7,000 -10,000 people (ABS 2011). These larger towns in the valley service the rural and industry population. However, residents often travel to

larger centres in neighbouring catchments for higher level health, education and business services (MDBA 2016).

The dominant land use in the Lachlan Valley is livestock grazing and dryland cropping which together covers approximately 90 per cent of the valley (Green et al. 2011). Irrigated cropping covers 1,100 $km^{2.}$. Irrigation agriculture is located along the length of the Belubula and Lachlan rivers and primarily supports horticulture, rice, fodder crops, cereal grains, dairy, grapes and beef (MDBA 2016). There are a number of mines within the Lachlan Valley which use regulated river water from the Lachlan and Belubula rivers for production.

2.2 Beneficial uses of the water resources

Aboriginal values and uses

The DPI Water's AWI team has engaged with the Aboriginal communities in the Lachlan water resource plan area. The community's objectives and outcomes for the management of the water resources are founded in a number of traditional owner group's obligations to the whole river system and associated river communities as an indivisible group. These groups include the Nari Nari, Ngiyampaa, Wiradjuri and Yita Yita. Achieving their objectives requires consideration of values and uses that may extend across multiple water resource plan areas.

The AWI consultation and engagement process provides opportunities for Aboriginal people's involvement within the planning process through the collection of social, spiritual and cultural data, including the identification of specific values and uses.

Consultation to date has shown that these Aboriginal communities have a multi-faceted relationship with access to and use of water. This relationship ranges from a spiritual and cultural association, to an economic focus, to location of special places. Communities welcome the engagement and are interested in further discussions to improve opportunities to provide for Aboriginal values and uses.

Historically, the inclusion of issues and information relating to cultural values and uses of water by Aboriginal communities had proven difficult for DPI Water due to a lack of data and an inability to adequately address cultural water requirements. It has been highlighted through AWI community engagement that this lack of cultural data has been one of the major risks to the long-term sustainability of cultural values, with significant consequences and threats to Aboriginal cultural heritage values and uses. These risks and associated management approaches are included in the DPI Water Risk Assessment Report.

Aboriginal knowledge of the environment can contribute to water management plans. The water resource plan process will continue 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, including the views of Aboriginal peoples with regard to cultural flows.

While consultation makes clear that Aboriginal values and uses across the landscape should be considered in a holistic, connected sense, some important values and uses at specific locations have been identified. Table 1 provides a description of asset types.

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

Water-dependent asset type	Description
Waterholes	There are specific waterholes that are a refuge for iconic species for Aboriginal people. Waterholes have a customary value and traditional

Water-dependent asset type	Description
	use and connection. Other uses include resource gathering. These resources have an economic value for Aboriginal peoples.
Wetlands	Wetlands along the Lachlan River have traditional and customary uses as well as spiritual values. The existence of many scarred trees and a range of traditional resources – vegetation, birds and fish, are indicative of Aboriginal occupation 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	The Lachlan Valley has a number of flood dependent lagoons and wetland areas that are sites of annual traditional resource gathering and use. The areas have traditional connection and spiritual connection and are also used now for cultural renewal practices.
Transit stops – ephemeral flows	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. 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. Specific location and times for use of these types of areas are part of the traditional songlines for the Wiradjuri people and are an integral part of Aboriginal culture.
Occupation sites and camp grounds	Many occupation sites exist across the Lachlan Valley landscape and waterscapes that have a direct reliance on water. 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 child birth 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 practice 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.

Irrigated agriculture

Although irrigated crops in the Lachlan Valley are economically important to the region, they only cover 1.4 per cent of the catchment area (Green et al. 2011). Irrigated crops include pasture, cereals and oilseeds 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.

Pasture (summer and winter) and lucerne are the predominant irrigated crops followed by cereals. Smaller irrigation areas of cherries and other stone fruit are grown around Young with wine grapes grown around Cowra and Canowindra. Cotton is grown mainly in the western part of the valley where production levels closely match water availability.

The primary water supply for irrigation in the Lachlan Valley is the Lachlan regulated river, followed by the alluvial groundwater sources. The level of irrigation associated with the unregulated rivers and tributaries is significantly less with the key irrigation areas being the cherries and stone fruit around Young and potatoes around Crookwell (Green et al. 2011).

Water for towns and essential human needs

Towns and riparian landholders depend on access to water for essential human needs and to support local commerce.

Towns have a higher priority access to water than general irrigation licences. Water sharing plans recognise this priority by ensuring that a full share of water is allocated for annual town water supplies, except when exceptional drought conditions prevent this.

Town water supply licences in the Lachlan Valley have a total share component of 21,162 megalitres (ML)/year (15,545 ML/year in the Lachlan regulated system and 5,617 ML/year in the Lachlan unregulated rivers).

The *Water Management Act 2000* also requires water sharing plans to 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 stock drinking water.

In the Lachlan and Belubula regulated systems, requirements for basic landholder rights for domestic and stock rights are estimated to be 12,765 ML/year and 222 ML/year respectively. Additionally, share components of domestic and stock access licences total 12,502 ML/year in the Lachlan regulated system and 233 ML/year in the Belubula regulated system.

In the Lachlan unregulated rivers, basic landholder rights for domestic and stock use are estimated at 10,564 ML/year. Additionally, share components of domestic and stock access licences in the Lachlan unregulated rivers total 2,040 ML/year.

Recreational water uses

The Lachlan Water Resource Plan Area supports an important recreational fishing industry. It is estimated that the Lachlan Valley has a recreational fishing value of over $37 M per year (Deloitte 2012).

Gum Bend Lake and Lake Cargelligo provide significant recreational opportunities for the community in the form of boating, canoeing, water skiing, swimming, and bird watching, often associated with nearby camping and other outdoor activities such as bushwalking. Fishing is another popular recreational activity in Lake Cargelligo, Wyangala Dam and on the nearby Lachlan River, with Murray Cod, Golden Perch, Silver Perch, Brown Trout, Rainbow Trout, Macquarie Perch, Carp, Catfish and Redfin Perch caught all year round. The Belubula River, Carcoar Dam and Mandagery Creek provide similar recreational opportunities.

2.3 Key environmental assets and ecosystem functions

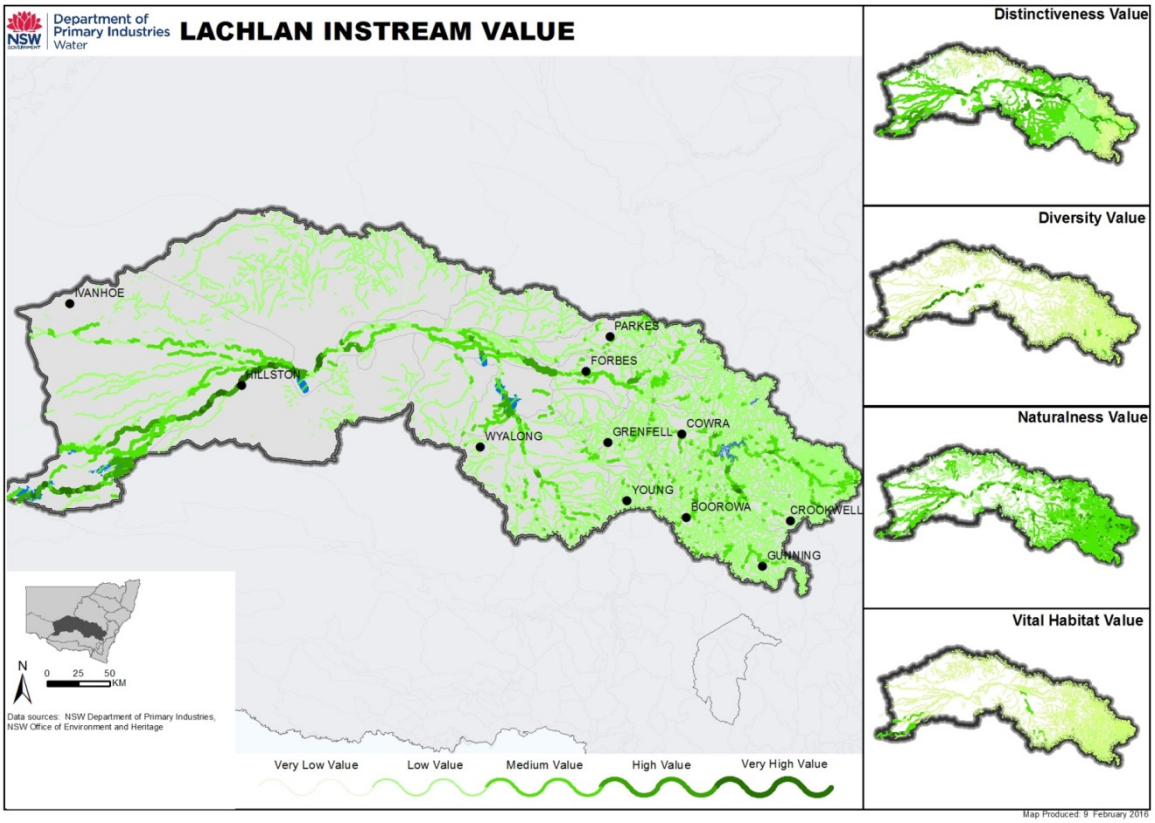
The Lachlan water resources support significant aquatic ecological values (Figure 2) including:

- 471,011 ha of wetlands in the lower floodplain
- nine wetlands with values for water bird and migratory bird habitat, listed in the Directory of Important Wetlands in Australia

- native and threatened fish species including the Australian Smelt, Eel-tailed Catfish, Silver Perch, Macquarie Perch, Golden Perch, Big-headed Gudgeon, Olive Perchlet, Southern Pygmy Perch, Murray Cod, and Western Carp Gudgeon
- habitat for threatened frog species such as Sloane's Froglet, Booroolong Frog, Yellow-Spotted Tree Frog, Southern Bell Frog and Stuttering Frog
- habitat for threatened bird species including Magpie Goose, Australasian Bittern, Brolga, Black-necked Stork, Australian Painted Snipe, Black-tailed Godwit, Blue-billed Duck, Eastern Osprey, Freckled Duck and Curlew Sandpiper
- habitat for two threatened bat species including the Southern Myotis and the Greater Broad-nosed Bat
- provides habitat for threatened plant species including spike rush, dense cord rush, Austral Pillwort, Klaphake's Sedge, Winged Peppercress and Menindee Nightshade
- areas of River Red Gum Woodland, Black Box Woodland and Lignum.

The nine nationally important wetlands include the Booligal Wetlands, Murrumbidgil Swamp/Lake Merrimajeel, Cuba Dam, Merrowie Creek, Great Cumbung Swamp, Lachlan Swamp, Lake Brewster, Lower Mirrool Creek Floodplain and Lake Cowal/Wibertroy wetlands.

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

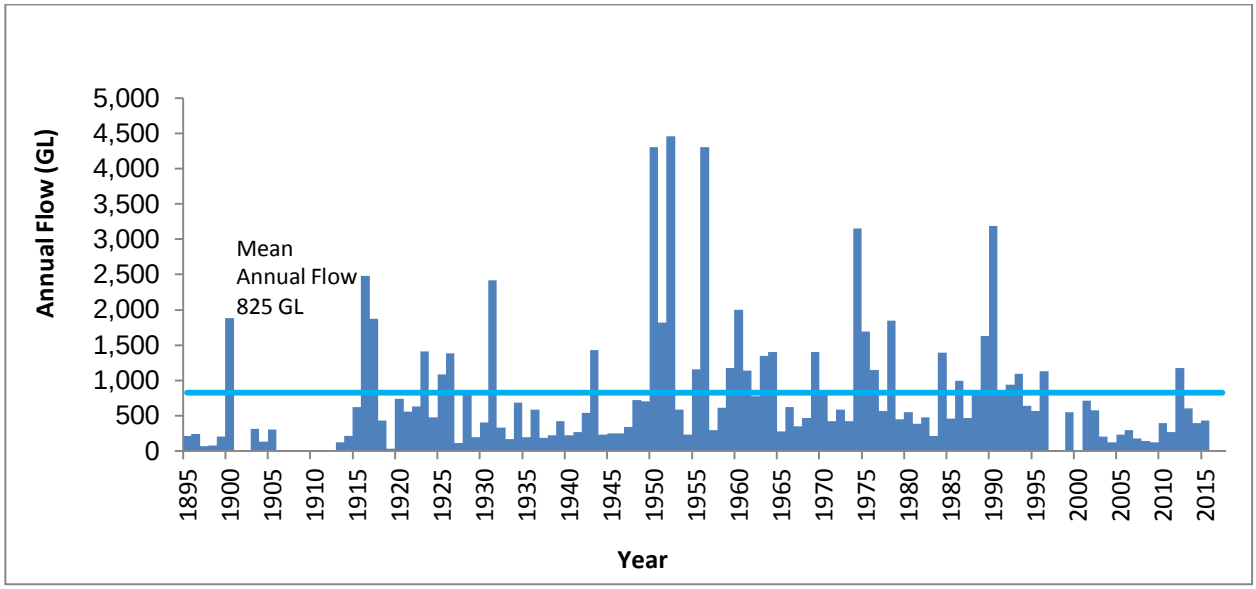


2.4 Stream flows

The Lachlan River system has highly variable flows with periodic extended droughts. Long-term flow records are available for the Lachlan River at Cowra, Condobolin and Booligal. Recording commenced in the late 1800s, and captured the natural streamflow pattern prior to regulation of the river in 1935. Mean annual flows at these gauging stations are 825 GL/year at Cowra, 599 GL/year at Condobolin and 259 GL/year at Booligal (DPI Water 2016).

Figure 3 shows that periods of very low flows occur on average once a decade, the most recent being the millennium drought. Since 2000, river flows have been lower than average (Green et al. 2011). The driest year was in 1919 with a total annual flow of 34,300 ML. The wettest year was in 1952 with 4,455,551 ML for the year.

Figure 3: Annual flows in the Lachlan River at Cowra



The surface water resources of the Lachlan Valley have been divided into 'water sources' for the purpose of planning and management.

The Lachlan Regulated River Water Source comprises water between the banks of the Lachlan River and some of its anabranches, from Wyangala Dam water storage downstream to the Great Cumbung Swamp (Figure 4). Wyangala Dam was built in 1935 in the upper reaches of the Lachlan River about 50 kilometres south-east of Cowra.

The Belubula Regulated River Water Source comprises water between the banks of the Belubula River, from Carcoar Dam water storage downstream to the junction of the Belubula River with the Lachlan River (Figure 5). Carcoar Dam was built in 1970 in the upper reaches of the Belubula River located about 55 kilometres south-west of Bathurst and 6 kilometres east of Carcoar.

Figure 4: Lachlan Regulated River

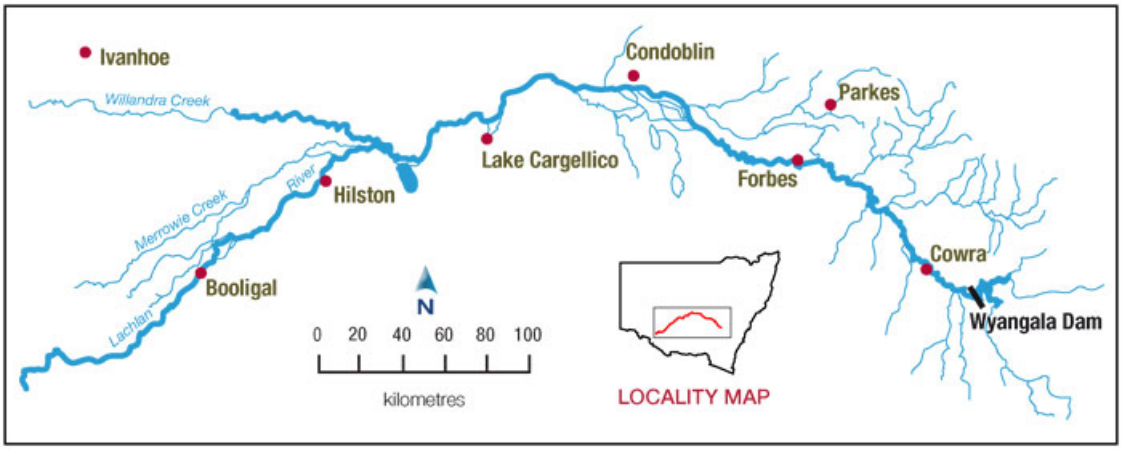
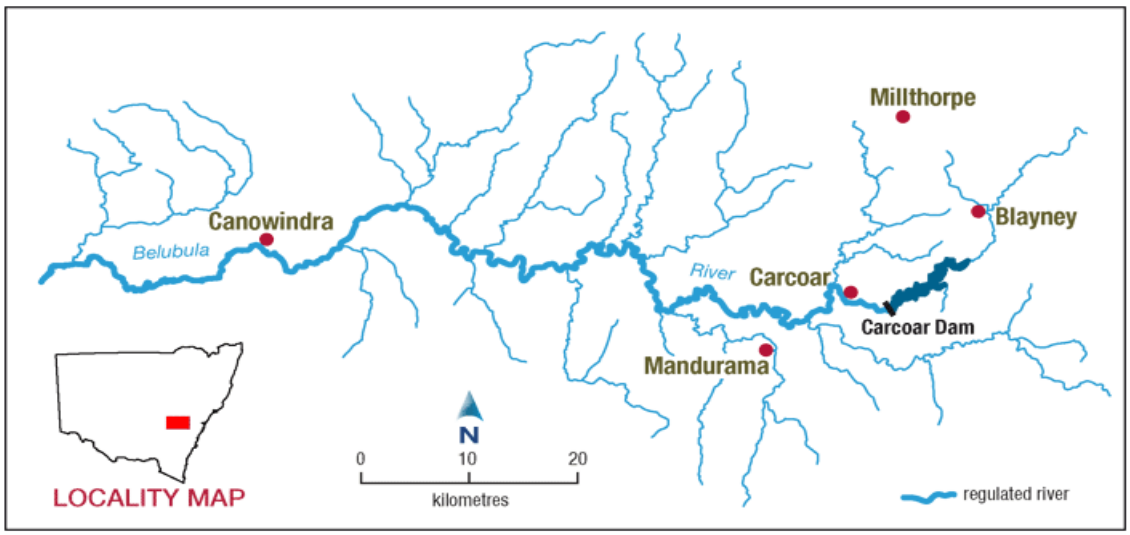


Figure 5: Belubula Regulated River



As with the climate, water available for take under water access licences varies substantially from year to year. Figure 6 shows the water taken since 2004 from the Lachlan Regulated River. The low levels of take from 2004 to 2011 are an effect of the millennial drought where general security licences had very low allocations. Figures 7 and 8 show the water taken since the start of the Belubula Water Sharing Plan including water taken from uncontrolled flows by general security, high security and supplementary licences.

Figure 6: Water taken under Lachlan Regulated River water access licences

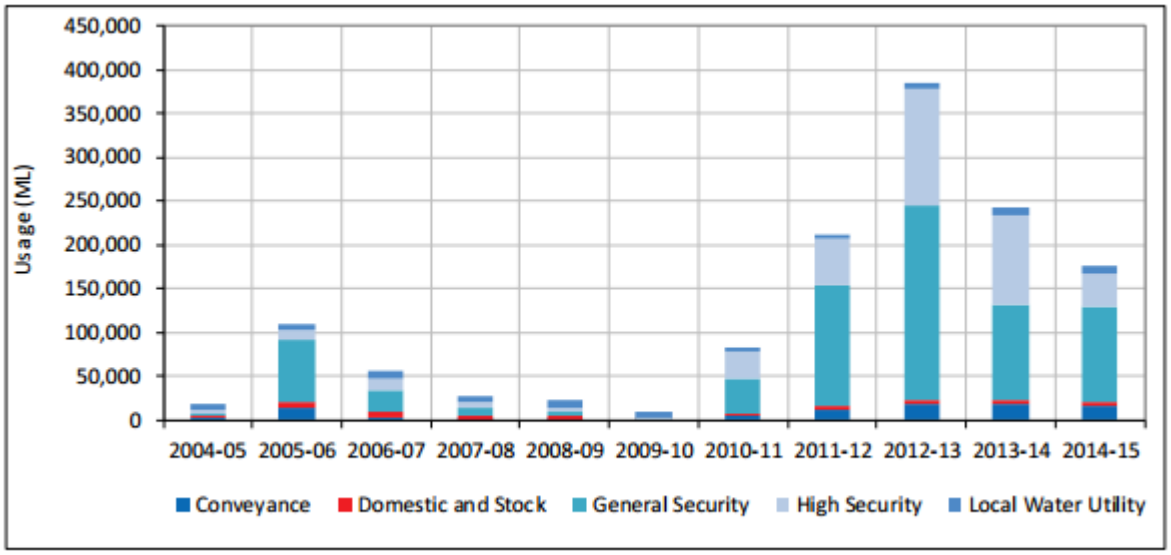


Figure 7: Water taken under Belubula Regulated River water access licences

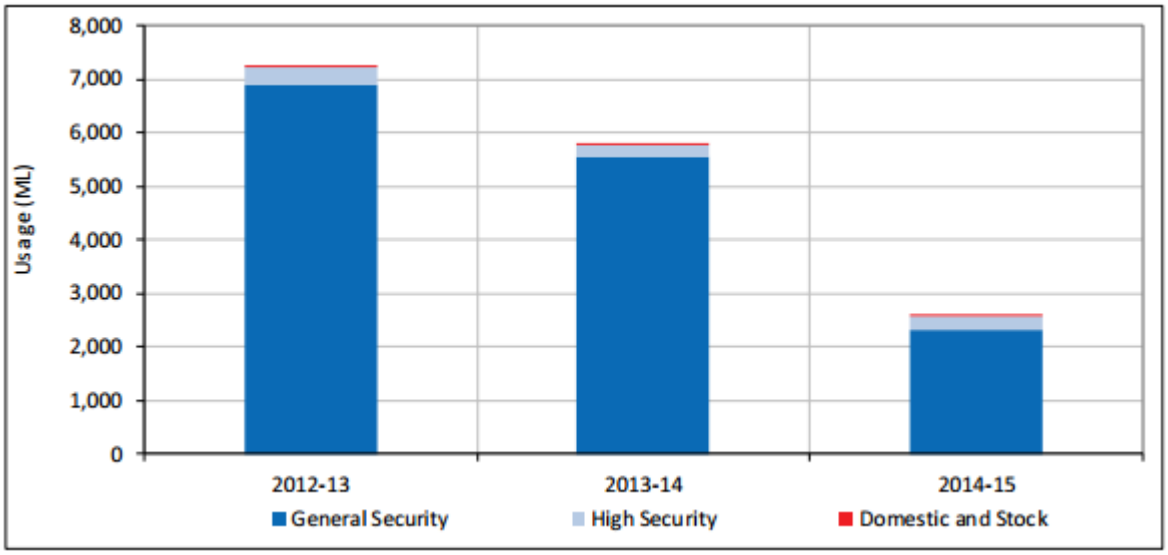
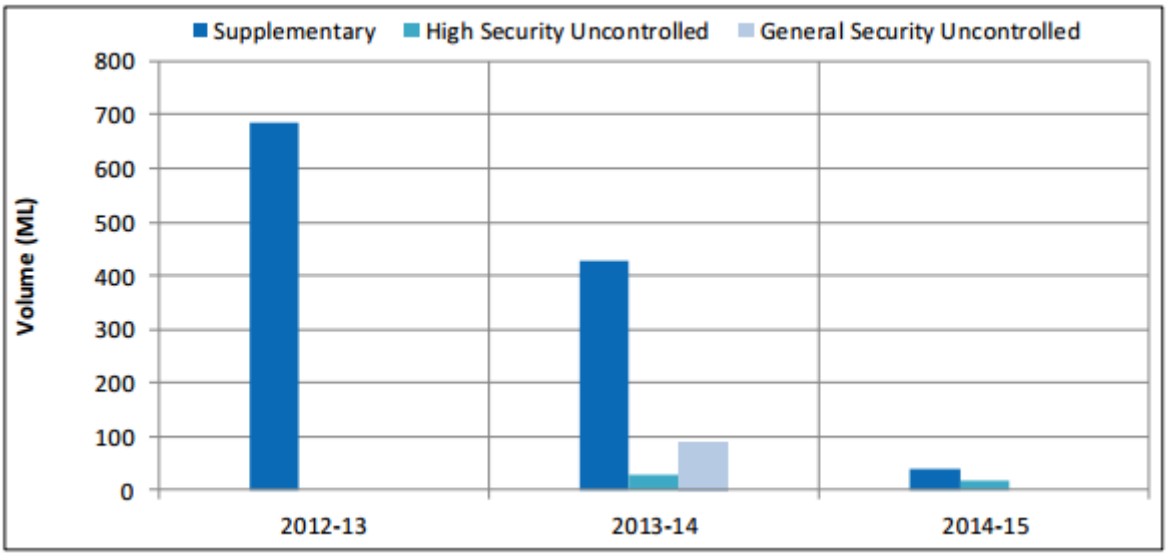


Figure 8: Water taken from uncontrolled flows in the Belubula Regulated River



The water sources of the Lachlan unregulated rivers cover all other surface water sources in the Lachlan catchment excluding the regulated Lachlan and Belubula rivers. Generally, unregulated rivers are those where flows are not controlled by releases from storages. There are a total of 23 unregulated water sources within the Lachlan Valley.

2.5 Water quality

The condition of water quality in the Lachlan Water Resource Plan Area varies from poor to excellent. Degraded water quality can put stress on a range of aquatic organisms, impact on Aboriginal cultural and spiritual uses of water, increase the cost of drinking water treatment, contribute to public health risks, and decrease the suitability of water for irrigation.

The following water quality parameters are considered: dissolved oxygen (DO), pH, salinity, nutrients, sediments and turbidity, algae, temperature, organic carbon and toxicants.

The water quality status map (Figure 9) provides an overview of water quality condition within the Lachlan Water Resource Plan Area. It shows and assesses monitoring locations in the plan

area using a water quality condition index (WaQI). The WaQI is a combined index for nutrients, pH, turbidity and dissolved oxygen. It scores water quality data collected by DPI Water against targets listed in the Basin Plan. Thermal pollution, harmful algal blooms, and salinity for irrigation water are also assessed and described in Table 2.

Changes to land use and natural river flows are the main causes of water quality problems within the catchment. Table 2 provides a summary of the status of water quality in the different regions of the plan area. The water quality management plan will describe water quality issues in the Lachlan Water Resource Planning Area including possible management strategies.

Figure 9: Water quality condition of the Lachlan Water Resource Plan Area

WaQI Scores: Blue = Excellent (100-95), Green = Good (94-80), Orange = Fair (79-60), Red = Poor (59-1)

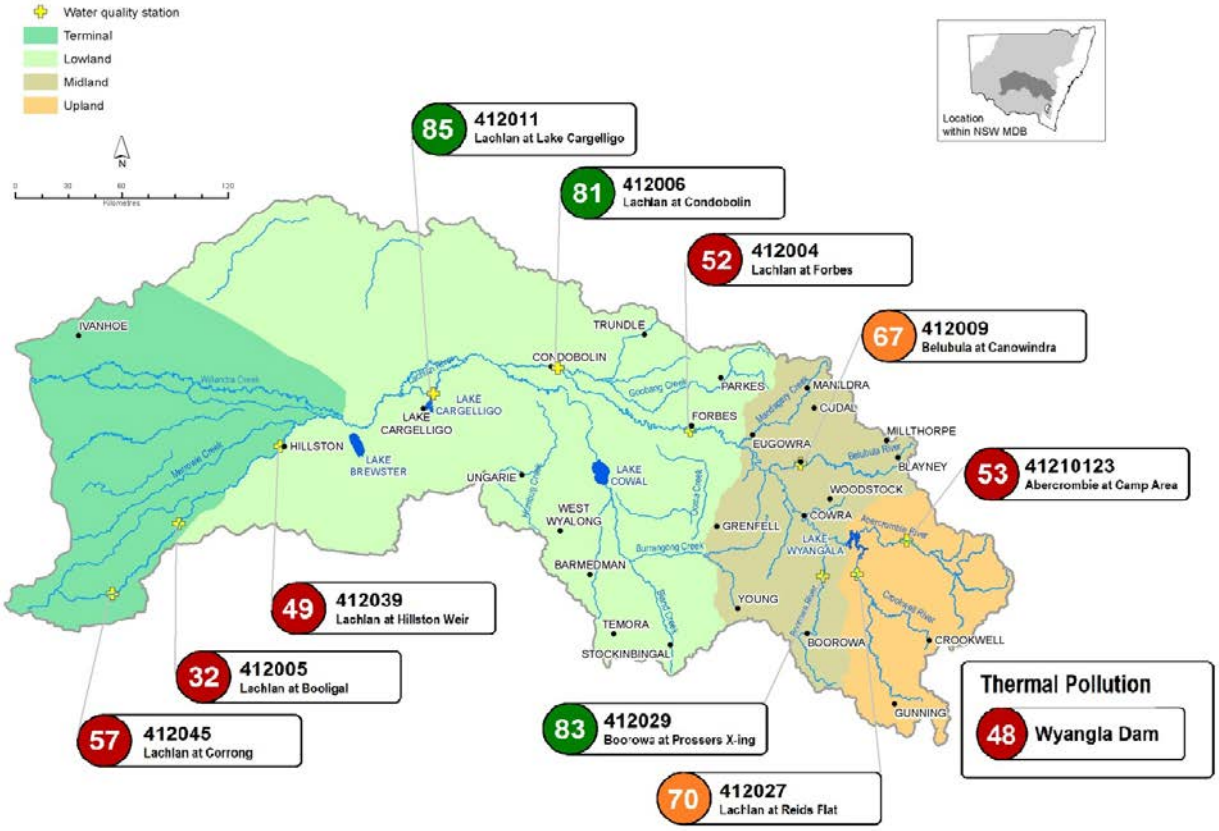


Table 2: Summary of water quality assessment in the Lachlan Water Resource Plan Area

	Upland	Midland	Lowland	Terminal
Dissolved oxygen	Mostly within targeted range	Mostly within target range	Frequently outside of target range	Frequently outside of target range
			Caused by organic carbon, nutrients and temperature are high resulting in increased microbial respiration.	
pH	Mostly within target range	Mostly within target range Occasionally elevated at Belubula River	Mostly within target range	Mostly within target range
Salinity	Generally low	Low to medium with high salinity recorded in Boorowa River, Belubula River and Mandagery Creek	Generally low	Generally low
Nutrients (nitrogen and phosphorus)	Low to medium	Medium to High	High	High
Suspended sediments and turbidity	Medium to high	Medium to high	High	High
	Turbidity is elevated due to a number of factors including the widespread conversion of land for cropping, river bank and riparian condition, presence of carp, and grazing practices.			
Harmful algal blooms	Rare	Occur in some years at Wyangala and Carcoar Dams.	Occur regularly at Lake Cargelligo and in some years at Lake Brewster.	Occur occasionally at some sites on the lower section of the Lachlan river.
Thermal pollution	Unknown	Occurs in the Lachlan River up to 213 km below Wyangala Dam due to water only able to be released from the bottom of the dam. Summer: below natural Winter: above natural Potential for localised effects downstream of Carcoar Dam.	Unknown	Unknown

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 and which will be considered when developing the water resource plan. The Basin Plan requires water resource plans to address:

1. Complying with the SDL.
2. Identifying opportunities to strengthen protection of Aboriginal values and uses.
3. Providing for environmental watering.
4. Managing medium to high risks identified in a risk assessment.
5. Identifying measures to contribute to water quality objectives.
6. Specifying how critical human water needs will be met in extreme events.

Since 2013, DPI Water has been consulting with stakeholders in the Lachlan Water Resource Plan Area about concerns with the existing water sharing plans. While some of the issues have been resolved through the water sharing plan (WSP) replacement process and plan amendment processes, several issues remain to be addressed in the water resource plan (WRP). DPI Water is also consulting with the Aboriginal community regarding water-dependent cultural values, uses and issues.

In addition to this, DPI Water has identified issues through the following technical assessments:

- A risk assessment for the Lachlan surface water resources. Several medium to high risks were identified that need to be considered in developing the water resource plan.
- The evaluation of the Lachlan Regulated River Water Sharing Plan.
- An assessment of long-term average take of water under baseline conditions on the regulated rivers using an updated river system model.
- An assessment of the status and causes of water quality degradation.

Reports on these technical assessments are available separately.

3.2 Supporting Aboriginal values and uses

DPI Water's AWI team has engaged with the Traditional Owners and broader Aboriginal community within the Lachlan Water Resource Plan Area and have captured a range of issues identified through this process (table below). This work will be ongoing and further opportunities to inform plan development will be provided at the time of public exhibition and targeted consultation, as well as throughout the life of the plan.

The water resource planning process will present further opportunities for Aboriginal communities throughout the area to explore water management issues and aspirations.

Water sharing plans 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 water resource plan development process.

Table 3 (Appendix), 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 Status and Issues paper.

Issues identified by Aboriginal communities

Issue	Status
The term **Cultural Flows** is identified by the Basins' Aboriginal Nations as an essential entitlement. Although cultural flows are often viewed as being similar to environmental flows, they provide social, spiritual cultural and economic benefits that can't be satisfied by environmental flows or specific purpose Aboriginal cultural water licences. Cultural and economic flows need to be considered as an entitlement within the WSP and the WRP.	No provisions for cultural flow entitlement in the WSP or WRP.
Aboriginal Community Development Licenses 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.	These licences can only be issued in coastal river systems, subject to the relevant WSP providing for applications to be made.
Constraints in the uptake of water licences Aboriginal people do not have the capacity to access 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 licenses and creating an Aboriginal Water Trust to support the uptake of water licensing.	Aboriginal Communities/individuals have no or limited capacity or the funding to enter into the water market.
Critical human water needs 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. The current state of water quality in many systems does not provide water of	Current water quality across the WRP area is not sufficient for human consumption direct from the surface water source

Issue	Status
reasonable health standard for a number of reasons including fertilizer and sediment run-off, various forms of pollution, bank erosion and riparian zone clearing.	
Water Quality issues are impacting on 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 Lachlan river system. How is DPI water going to address the water quality issues that impact on the general health of the Lachlan river system?	Limited data for the WRP processes to address water quality considerations regarding Aboriginal values and uses
Regulated systems - water licence delivery volumes and extraction timeframes have impacts on community access to water and use of water. Large licences result in large delivery volumes. Then the extraction capacity of pumps often results in the volume disappearing the following day. This inconsistency in flows adds to the difficulty for general enjoyment and social benefit of the system. What data is there to demonstrate impacts to or benefit of ecological services – fish, birds and vegetation which are also used by Aboriginal people.	Potential for WRP risk assessment to consider
Instream works are impacting on the general and natural flow of water within the Lachlan system. The Lachlan has a number of weirs that have been created over time to aid with water extraction, which are limiting flow and recharge of ground water bores held downstream.	Potential for WRP risk assessment to consider
Water quality in the unregulated reaches of the system is an issue in low flow times and generates significant weed growth. This hampers with fishing activities and cultural renewal activities that look to utilise the water source.	Potential for WRP risk assessment to consider.
Availability of access to water for cultural practice and renewal activities is an issue that impacts the Aboriginal communities' ability to plan and carry out cultural renewal events. There is a reliance on natural flows, however planning around these events is problematic.	Provision for specific purpose licence however no 'cultural flows'.

3.3 Improving water sharing

Reviewing environmental water

Issue - Lachlan Regulated	Status
Review translucent flow rules. A range of issues have been raised to tighten and loosen the translucent flow rules and make the delivery of the translucent flows water more flexible.	A range of options have been discussed with the SAP members. These are being modelled and feedback sought from SAP.
Review trigger for the Environmental Water Allowance (EWA). Changes have been proposed to the EWA trigger to improve availability of the EWA during drier times.	A range of options have been discussed with SAP members. These are being modelled and feedback sought from the SAP.
Protection and management of all environmental flows in the Lachlan system. Issue relates to protecting and managing all planned and licenced environmental water through the Lachlan system to maximise environmental outcomes.	Options to be considered.
Release rules for EWA and WQA should be established. Original Lachlan WSP stated that volume and timing of releases shall be specified in procedures established by the Minister. This was not undertaken during the life of the WSP.	This provision has been removed from the WSP and replaced with a provision that states the Minister should seek advice from an Environmental Watering Advisory Group (EWAG); this change was supported by stakeholders.
Limit the available water determination (AWD) to 0.65 ML/share to address poor river condition. This is a proposal to use a reduction in the AWD to provide more water for the environment.	The AWD is used to distribute allocations not to provide water for the environment. Environmental water is provided through the planned environmental water rules and licenced environmental water. Issue not to be investigated further.
Review structure of the Environmental Water Advisory Groups (EWAGs). The Minister's report on the replacement WSPs recommended that this issue is dealt with at a statewide level during water resource planning.	An independent review of EWAGs was undertaken in 2014. The outcome of this review has been assessed by OEH who are responsible for administering and supporting the EWAGs. Clauses in WSP to be reviewed to ensure statewide consistency.
Issue – Belubula Regulated	**Status**
Review the rules for accessing uncontrolled flows. The trigger used to permit access to uncontrolled flows is not working as originally	A range of options have been discussed with SAP members. These are being modelled and feedback sought from the SAP.

intended when the WSP was developed in 2012. Options have been proposed to improve the trigger so it operates more closely to the original intent.	
Review the end of system flow target. The implementation of the end of system flow rule is not matching the original intent as proposed during rule development. During the recent period when dam levels have been extremely low this flow has not been provided due to issues of water availability. In light of the original intent of the rule, a review is to be undertaken.	Options to be discussed with the SAP.

Issue – Mandagery Creek	**Status**
Review of the cease to pump rules. This rule was subject to review as part of the replacement process for the Mandagery Creek WSP. The review was not completed within the timeframe of the replacement process and subsequently was rolled over into the water resource plan process.	To date several options have been considered and discussed with stakeholders.

Review of trade rules

Issue – Lachlan Regulated	**Status**
Review impact of permanent removal of mid Lachlan trade barrier. The original WSP provided for a review of this trade rule. A partial review was undertaken resulting in an increase in the volume of temporary water to be traded across the barrier. A rule review is also required in light of the Basin Plan trading guidelines.	A range of options have been discussed with the SAP members. These are being modelled and feedback sought from SAP.
Review trading into Wallumundry/Wallaroi system. Limited channel capacity constraints within some reaches of these systems hinder water delivery. Transmission losses are relatively high for the volume of water being delivered. Future increase in extractions from these systems may further impact deliverability of water orders.	Options to be discussed with the SAP.

Granting of access licences

Issue – Lachlan Regulated	Status
Review the continued granting of Domestic and Stock (stock) access licences. The Lachlan WSP is the only inland plan that allows the granting of stock and domestic (stock) licences. There is concern that granting of these licences could contribute to growth in use. However, if granting is prohibited water for stock use can only be obtained through trading.	Options to be discussed with the SAP.

Expanding the regulated system

Issue – Lachlan Regulated	Status
Consider providing access to regulated water for licence holders along Booberoi Creek. Unregulated river licence holders on Booberoi Creek have requested access to regulated water to improve reliability of access to water.	DPI developed a consultation paper presenting a number of options. Consultation was undertaken with relevant stakeholders. DPI Water to now assess feedback.

Improving accounting rules

Issue – Lachlan Regulated	Status
Debit individual general security accounts with evaporation losses associated with volume of allocation held in accounts. Currently evaporation losses associated with holding and delivering water are socialised across all licence holders. This proposal would involve debiting these losses against individual accounts. The volume to be debited against an account would be based on the volume of allocations held in the account.	Discussed with the SAP. Rules for inclusion in the WSP to be drafted and comments sought at public exhibition.
Review the account reset rule in WSP. All general security accounts are spilled and reset whenever storages are full or are highly likely to fill, including when airspace releases from Wyangala are made. Issues have been raised in relation to the frequency of subsequent resets and the information used for determining AWDs when airspace releases are made.	Options around these issues to be discussed with the SAP.
Reduction in the account limit.	A range of options have been discussed with the SAP members. These are being modelled

The limit for general security accounts is 200%. A reduction in the account limit is proposed to improve security for active GS licence holders.	and feedback sought from the SAP.
Allow high security licence holders to nominate from which subaccount water orders are debited.	Clause added to replacement WSP to address this issue. Issue resolved.
Review carryover limits.	General security accounts are managed through continuous accounting, there is therefore no carryover. Issue not to be investigated further as agreed by stakeholders.
Issue – Belubula Regulated	**Status**
Reduction in the account limit The limit for general security accounts is 130%. A reduction in the account limit is proposed to improve security for active GS licence holders.	A range of options have been discussed with the SAP members. These are being modelled and feedback sought from the SAP.

Improving river operations

Issue – Lachlan Regulated	**Status**
Reduce the frequency of replenishment flow delivery.	This issue has been withdrawn. Issue not to be investigated further.
Re-credit return flows from replenishment flows exiting Booberoi Creek.	Replacement WSP has addressed this issue. Issue not to be investigated further.
Review end of system flow rule.	Agreed by stakeholders that this was not a high priority issue and should not be investigated further.
Priority of extractions during periods of channel capacity constraint.	Clauses in WSP to be reviewed to ensure statewide consistency.

Changing resource assessment assumptions

Issue - Lachlan Regulated	**Status**
Change the minimum inflow sequence (MIS) to a less conservative percentile ($99^{th}$to 98^{th}). This proposal is aimed at improving water availability for general security water users. The Lachlan hydrological model uses the MIS to ensure that the storage doesn't run dry for the period of record. The result of using a less conservative MIS may be an increase in water	A range of options have been discussed with the SAP members. These are being modelled and feedback sought from the SAP.

availability but in very dry times the storage may run out of water earlier.	
Review assumptions underlying resource assessment. These assumptions include the reserves set aside in the resource assessment for essential requirements, the environmental water allowance and the water quality allowance.	There are ongoing negotiations between DPI Water and the Lachlan CSC regarding these assumptions. Issue not to be investigated further as part of the WRP.

Issue - Belubula Regulated	**Status**
Review assumptions underlying resource assessment. Recent analysis indicates that the standard resource assessment techniques do not apply well to the Belubula Regulated River	DPI Water is currently reviewing the resource assessment for the Belubula to improve its accuracy.

Ensuring water supply for Lake Cargelligo

Issue - Lachlan Regulated	**Status**
Proposal to provide allocations to Lake Cargelligo, including diverting river water through the lake and keep the lake at a specific level.	Initial consultation with stakeholders has been undertaken. Options are being investigated.

Improving the trigger for growth in use

Issue - Lachlan Regulated	**Status**
Review growth in use trigger to reduce its sensitivity. It is proposed that the criteria used to assess if extractions are exceeding the long-term average annual extraction limit are too sensitive. It is suggested that these criteria could result in the implementation of a growth in use strategy in response to small fluctuations which are not representative of a true growth in use.	The growth in use rules in the WSP are based on departmental policy. These rules are being reviewed at a statewide level by DPI Water as part of the development of the WRP and in light of the requirements of the Basin Plan.

Confirming the baseline diversion limit (BDL)

Issue – Belubula Regulated	**Status**
The accuracy of the Baseline Diversion Limit (BDL) as used by the Murray Darling Basin Authority (MDBA) for the Belubula Regulated River has been questioned.	DPI Water has commenced reviewing the Belubula component of the Lachlan WRP BDL. Any changes proposed to the BDL needs to be approved by the MDBA.

Water users are concerned that the Belubula component of the Lachlan BDL calculated by the MDBA is incorrect.	

Improving water security

Issue - Belubula Regulated	Status
Support from water users for construction of a dam on the Belubula River.	This matter is out of scope for the water resource plan process.

Improving plan objectives and performance indicators

Issue	Status
The current objectives and performance indicators in the water sharing plans are not fit for purpose.	DPI Water is developing improved plan objectives and performance indicators. The Appendix includes a draft set of objectives for the Lachlan Water Resource Plan. Once they are finalised, a subset of these objectives with performance indicators will replace those in the current water sharing plans.

3.4 Complying with the SDL

The Basin Plan sets a single SDL for all the surface water of Lachlan Water Resource Plan Area – covering the regulated and unregulated water sources. The SDL is a long-term average diversion of water that allows changes from year to year, so long as the long-term average is not exceeded. It is divided into a baseline diversion limit (BDL) which equates to the long-term average amount of water that would have been taken during the historical climate condition (1/07/1895 – 30/06/2009) under State water management law as at 30 June 2009, and a 'reduction' to achieve a sustainable level of take. The Commonwealth is responsible for achieving the reduction through investment involving willing participants. Hence, complying with the SDL can be achieved without impacting on the reliability of water allocations for licence holders under the rules in the current water sharing plans.

Rather than being a simple number, the SDL is the amount of water that could be taken under the water rights, rules and level of development pre Basin Plan, minus environmental water recovery. Under the Basin Plan, NSW is required to determine annual permitted take for all forms of take in the Lachlan Water Resource Plan Area. This volume is to be determined each year using models or other methods. Hence it can, where appropriate, vary from year to year depending on climate and water availability. This is a similar approach to that which has been used for Murray-Darling Basin Cap management, but different to the NSW long-term extraction limit compliance methodology as specified in existing water sharing plans.

Issue	Status
Under the Basin Plan, compliance with the SDL is determined each year by summing a running balance of 'unders' and 'overs' from previous years. If the balance exceeds 20% of the SDL this may be a breach. WSPs	These two issues will be addressed as part of the development of a NSW approach to addressing planning assumptions for surface

have different arrangements for assessing compliance with extraction limits, which may not synchronise with the Basin Plan. The Basin Plan also provides for States to put forward reasonable excuses for SDL non-compliance. Long-Term Diversion Limit Equivalent (LTDLE) factors need to be established for each licence category in order to determine what percentage of each megalitre of water recovered for the environment contributes to bridging the gap between existing limits and the SDL.	water resources.

3.5 Environmental watering

The Lachlan Regulated River Water Sharing Plan established an environmental contingency allowance (ECA). This water is held in storage and can be released for specified environmental purposes. Additionally, since 2009, the NSW and Commonwealth Governments have invested to obtain water access licences that can be used for environmental watering ('held' environmental water). The long-term watering plan currently being prepared by NSW Office of Environment and Heritage (OEH), will guide management of both planned and held environmental water in future.

The Basin Plan requires the water resource plan to provide for environmental watering to occur consistent with the long-term watering plan. However, the way the environmental water is used, and any changes to management to facilitate its use, can affect water availability for other water users. For example, it could result in changes to water conveyance losses that impact on water available to licence holders.

Issue	Status
Changes to the way environmental water will be managed and used can affect water availability for licence holders. How environmental water can be used is constrained by the current legislative and policy framework in NSW.	OEH will be proposing management objectives and rules. DPI Water will assess the impact of these using the river system model. DPI Water is also investigating and developing new tools to increase transparency and availability of environmental water use. A state-wide approach, the NSW Policy Pre-requisite Implementation Plan, is in the process of being finalised. This implementation plan will provide direction for any policy and legislative changes that NSW will make to improve environmental watering.

3.6 Managing risks

DPI Water has prepared a risk assessment, as required by the Basin Plan. The water resource plan must describe strategies to address medium to high risks where this can be done. These strategies will be appropriate for the nature of the risk and the confidence in the information used to assess the risks. Water availability risks are described in this subsection. Risks relating to water quality are included in section 3.7, Improving water quality.

Risk of insufficient water damaging ecological values

This assessment considered the risk to ecological values arising from the take of water and regulation of flows.

For the unregulated rivers in the Lachlan Water Resource Plan Area, there is significant uncertainty in the information used for this assessment. DPI Water has made assumptions about the use of water by licence holders because of the current lack of actual water take information on these rivers. It is likely that actual water take is less than the assumed amount/volume.

Issue	Status
There are medium to high risks to ecological values on the regulated river system arising from the take of water and regulation of flows. These risks have been identified across a broad range of flow conditions.	Risk mitigation strategies have been proposed that seek to improve the variability and naturalness of low to medium flows through the current review of translucent environmental water allocations and the ways in which irrigation water is delivered. The mitigation of risks associated with higher or less frequent flows will be addressed through the LTWP developed by OEH.
There are possible medium to high risks to ecological values on a number of unregulated river water sources arising from the take of water. More information on water usage in unregulated water sources is needed to confirm whether this is the case.	Trade rules prevent risks being made worse by limiting trade into these areas. The current unregulated river water sharing plan is due for review in 2022. During this period, relationships between water flow and aquatic biota will be assessed in several plan areas and a review of the adequacy of current access rules will be undertaken. Better information on unregulated water source water usage will be available by that time.

Risks to water availability caused by increase in number of farm dams

There is some capacity for increases in farm dams in the catchment under the harvestable right. The risk assessment considered the best available estimate of likely growth rate in farm dams, and estimated the likely impact of this on water availability for ecological values and water for consumptive use.

The assessment showed there is no significant risk at the valley scale, but a medium risk to ecological values at a local scale in Flyers Creek, Crookwell River at Narrawa North and the Lachlan River at Gunning. There is significant uncertainty in the information used for this assessment. While the assumed growth rate for farm dams is likely to be a reasonable estimate at a large scale, it may not be so at a local scale.

Issue	Status
There are possible medium risks to ecological values in three areas arising from future growth in farm dams.	Subject to funding, DPI Water will monitor to determine if increases in farm dams actually occur in these areas.

Risks to water availability arising from climate change

The risk assessment considered risks associated with changes to water availability under dry, median, and wet climate change scenarios. The assessment considered impacts on environmental assets (Booligal Wetlands and Great Cumbung Swamp), general security and high security licence holders.

Issue	Status
Climate change poses low risk to high security entitlement in the Lachlan and Belubula regulated water sources irrespective of the scenario modelled. The rainfall and runoff reductions under the median and dry climate change scenarios produce a medium risk to general security entitlement as well as the Booligal Wetlands and the Great Cumbung Swamp.	Current WSPs already provide water trading and carryover of water allocations to help water licence holders cope with changing climate. Given the long-term nature of climate change trends and the uncertainty about which scenario will actually occur, the situation should be monitored and reassessed when the WRP is next reviewed. Risk to the Booligal Wetlands and Great Cumbung Swamp will be addressed in the LTWP prepared by OEH.

3.7 Improving water quality

The Basin Plan requires the water resource plan to specify measures to contribute to the achievement of water quality objectives. It also requires the plan to describe strategies to manage risks arising from water quality degradation, or explain why a risk cannot be addressed by the water resource plan.

Section 2.5 describes the status of water quality in the Lachlan Water Resource Plan Area Changes to land use and natural river flows are the main causes of water quality problems within the valley. The risk assessment has identified where water quality degradation is a risk to values and uses of water.

Issue	Status
There are locations where turbidity, nutrients, pH and dissolved oxygen results are outside of target ranges (see section 2.5). Of these, there are medium to high risks to ecological values from: • Elevated turbidity and nutrients across the catchment except at Abercrombie River • pH and low concentrations of dissolved oxygen across the catchment except at Abercrombie River and Lachlan River at Forbes. Poor water quality at these locations also impacts on Aboriginal people's health and wellbeing and their cultural and spiritual values as described in Section 3.2	Co-operative natural resource management between community and government can mitigate some of these risks and reduce water quality degradation. DPI Water will work with partner agencies to identify those actions and suggest priority actions. Flow management can be of benefit in reducing some water quality risks. DPI Water will identify and assess improvements and changes to flow management as part of development of the water resource plan.

Cold water from Wyangala dam is a high risk to ecological values. The impact of thermal pollution on Lachlan River has the potential to extend up to 213 km downstream of the dam. Cold water from Carcoar Dam is medium risk to ecological values. The impact of thermal pollution on Belubula River has the potential to extend up to 50 km downstream of the dam.	Wyangala Dam is a high priority dam for investigation (feasibility, design and cost of mitigation) in Stage 2 of the NSW Cold Water Pollution Strategy.
There are elevated levels of salinity in the Lachlan River from time to time, which are a medium risk to ecological values. There is a risk of irrigated crop damage arising from the salinity of water taken from Boorowa River (high), Mandagery Creek (high) and Belubula River (medium). However, there is uncertainty in the assessment, as it did not address the timing of higher salinity levels compared to the timing of the take of water for irrigation.	NSW is party to the Basin Salinity Management Strategy 2030. Under this Strategy the government is monitoring salinity and where needed identifying and implementing measures for salinity management.
Harmful algal blooms occur regularly at Lake Cargelligo and in some years at Carcoar, Wyangala and Lake Brewster and at some sites on the lower part of the Lachlan River during warmer months. Harmful algal blooms are caused by still, clear, warm water and high level of nutrients.	NSW currently manages the risk of human exposure to blue-green algal blooms through a coordinated regional approach with the Regional Algal Coordination Committees. Land and flow management may be of benefit in reducing harmful algal bloom risks. DPI Water will identify and assess possibilities as part of development of the water quality management plan

3.8 Managing in extreme events

The Basin Plan requires the water resource plan to 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	Status
The current Lachlan Regulated River WSP requires the system to be managed so that a full allocation of water can be made available to towns through a repeat of the worst period of	Councils responsible for town water supply commonly have drought management plans that include how water will be supplied in extreme events. These include measures such as backup supplies from groundwater, and plans for

low inflows on record, at the commencement of the 2004 WSP. However, more severe droughts are possible, and unanticipated water quality events or system failures could occur. The current regulated river water sharing plans are unlikely to meet the requirements of the Basin Plan during extreme events.	emergency infrastructure if needed. DPI Water will assess whether further measures are warranted as part of developing the Regional Water Strategy. A state-wide approach for the management of extreme events is being developed by DPI Water for consultation.
Review water sharing arrangements during extreme drought. The Lachlan CSC has developed a drought management protocol and proposes that this is included in the Lachlan WSP.	A WRP is required to provide detail on how the water resources will be managed during an extreme dry period. DPI Water is currently developing a policy which will inform the water resource plans on this matter. The CSC protocol will be considered in light of the policy.

References

ABS 2011 Census Community Profile. Australian Bureau of Statistics http://www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles?opendocument&navpos=230 accessed 11 Oct 2016.

Australian Human Rights Commission 2006 A statistical overview of Aboriginal and Torres Strait Islander peoples in Australia https://www.humanrights.gov.au/publications/statistical-overview-aboriginal-and-torres-strait-islander-peoples-australia accessed 7/11/2016.

CMA 2011 Lachlan Catchment Status Report http://archive.lls.nsw.gov.au/__data/assets/pdf_file/0004/495436/archive-lachlan-catchment-status-report.pdf accessed 26/10/2016.

CSIRO 2008. *Water availability in the Lachlan. A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*. CSIRO, Australia. https://publications.csiro.au/rpr/download?pid=legacy:561&dsid=DS1 accessed 26/10/2016.

Deloitte Access Economics 2012. Benefits of the Basin Plan for the fishing industries in the Murray-Darling Basin. Report to the Murray-Darling Basin Authority.

DPI Water 2016 Real Time Data – Rivers and Streams http://realtimedata.water.nsw.gov.au/water.stm?ppbm=SURFACE_WATER&rs&3&rskm_url accessed 26/10/2016

Green D., Petrovic J., Moss P., Burrell M. 2011 Water resources and management overview: Lachlan catchment, NSW Office of Water, Sydney http://www.water.nsw.gov.au/__data/assets/pdf_file/0009/547884/catchment_overview_lachlan.pdf accessed 8/11/2016.

MDBA 2016. Lachlan snapshot. Murray Darling Basin Authority http://www.mdba.gov.au/discover-basin/catchments/lachlan accessed 11/10/2016.

Appendices

Appendix 1: Draft objectives and strategies

Following from the evaluation of a number of water sharing plans, 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 help to properly frame the review of strategies and rules so that the impact on all objectives can be considered. It will also lead to the development of improved performance indicators, leading to more meaningful and efficient monitoring, reporting and evaluation of the plan after it is implemented.

Table 3 shows draft objectives with related strategies for the water resource plan. They will be refined as the plan is being developed, including harmonising with objectives being developed in parallel for the Lachlan Long-Term Water Management Plan. 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
ENVIRONMENTAL		
Maintain or enhance the ecological condition of this water source and its dependent ecosystems (instream, riparian and floodplain) over the long-term	Maintain or improve population structure of native fish in medium and high value unregulated water sources	• Protect low flows and/or pools • Maintain a diversion limit • Restrict trading into water sources
	Maintain or improve population structure of native fish in the regulated Lachlan River	• Protect a proportion of medium to high flows • Maintain an environmental water allowance and provision for held environmental water, and facilitate their effective use • Maintain an end of system flow • Maintain a diversion limit
	Maintain or improve population structure of native fish in the regulated Belubula River	• Maintain a diversion limit • Protect a portion of tributary inflows
	Maintain or improve the transport of carbon and other nutrients through the Lachlan and Belubula regulated river systems and into the wetlands of the mid and lower Lachlan	• Protect a proportion of medium to high flows (Lachlan) • Protect a portion of tributary inflows (Belubula) • Maintain an environmental water allowance and provision for held environmental water, and facilitate their effective use (Lachlan) • Maintain diversion limits (Lachlan and Belubula)
	Maintain or improve the connectivity and dispersal potential of fauna within unregulated water sources and between unregulated and regulated water sources	• Protect low flows and/or pools • Protect a proportion of medium to high flows (Lachlan) • Protect a portion of tributary inflows (Belubula) • Maintain diversion limits
	Maintain or improve the quantity,	• Protect low flows and/or pools

	diversity and water quality conditions of low flow refugia habitats	• Maintain the water quality allowance and facilitate its effective use
	For wetlands and other water-dependent ecosystems, maintain quality of water sufficient to protect and restore the ecosystems	• Identify and encourage cost-effective measures to address identified medium and high risks to ecosystems related to water quality degradation, and to contribute to achieving the defined targets where they are not being met • Consider effect on water quality in any proposed changes to water management for other purposes • Maintain the water quality allowance and facilitate its effective use
ECONOMIC		
Maximise the economic benefits derived from the use of irrigated water and from dependent industries supporting regional communities	Maintain or improve water access opportunities in low risk unregulated river systems so they meet enterprise requirements	• Provide clearly defined water sharing rules and arrangements • Provide flexible water trading rules • Provide flexible account management rules • Ensure changes to water management for other purposes do not have third party impacts on licence water rights that are not able to be negated or offset
	Maintain or improve water access opportunities in the regulated river systems	• Provide clearly defined water sharing rules and arrangements. • Provide flexible water trading rules • Provide flexible account management rules • Ensure changes to water management for other purposes do not have third party impacts on licence water rights that are not able to be negated or offset
	Maintain or improve water quality to minimise crop yield loss or soil degradation when used in accordance with best irrigation and crop management practices	• Implement the Basin Salinity Management Strategy 2030 • Maintain the water quality allowance and facilitate its effective use
Maximise the economic benefits derived from water-dependent commercial and industrial enterprises	Ensure sufficient water is available to local water utilities in the regulated river system	• Provide for growth in local water utility entitlement • Ensure sufficient water is set aside in storage to provide supply • Ensure priority is given to maintaining town water supply needs

SOCIAL and CULTURAL		
Ensure adequate water supply to support critical human needs and basic landholder rights	Ensure sufficient water available to local water utilities in the Lachlan regulated and unregulated river systems	• Provide for growth in local water utility licences where necessary • Ensure sufficient water is set aside in storages to provide supply • Ensure priority is given to maintaining town water supply needs
	Maintain access to water for domestic and stock rights	• Provide for growth in domestic and stock requirements where necessary • Ensure sufficient water is set aside in storages to provide supply in the Lachlan and Belubula regulated rivers and some unregulated water sources • Give priority to domestic and stock water right needs
	Minimise water quality risks from raw water taken for treatment for human consumption including the risk of the odour of drinking water being offensive to consumers, and maintain the palatability rating of the water	• Continue to implement Drinking Water Management Systems as required by water suppliers operating licences.
Maintain or improve Aboriginal values, uses and assets which support and strengthen community	Maintain access for Native Title Rights	• Provide for growth in Native Title Rights • Ensure sufficient water is set aside in storage to provide supply in the regulated rivers • Give priority to maintaining Native Title Rights water needs
	Improve opportunities for Aboriginal communities to access water	• Provide access licences for Aboriginal cultural use • Provide flexible water trading rules • Provide flexible account management rules
	Maintain or improve water quality for Aboriginal communities values and uses	• Explore options to manage when developing Water Quality Management Plan.
Maintain or improve fishing, swimming and other recreational uses of water	Minimise the risk to recreational water users from water quality issues caused by potentially toxic blue green algae	• Implement regional algal contingency plans • Identify and encourage cost-effective measures to minimise algal blooms • Maintain the water quality allowance and facilitate its effective use
	Maintain or improve population of fish in unregulated water sources	• Protect low and/or pools • Maintain a diversion limit
	Maintain or improve population of fish in the regulated Lachlan River	• Protect a proportion of medium to high flows

		• Maintain an environmental water allowance and provision for held environmental water, and facilitate their effective use • Maintain an end of system flow • Maintain a diversion limit
	Maintain or improve population of fish in the regulated Belubula River	• Maintain a diversion limit • Protect a portion of tributary inflows • Maintain a diversion limit

Table 4: Objectives identified by Aboriginal peoples through consultation

Objective1:	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 Lachlan 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.
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 fish, vegetation and birds, as well as the instream use of water for swimming, drinking and maternal use.
Objecting 6:	To address and identify the impacts on the spiritually significant cultural values of the Lachlan Aboriginal communities. Management of water quantity as well as water quality inform the protection of these values and uses.