

Regional STATE OF THE ENVIRONMENT REPORT

2017–2018



Local Land
Services
Central Tablelands



Local Land
Services
Central West

For the Councils of the
Greater Central West Region of NSW:
Bathurst Regional, Blayney, Bogan, Bourke,
Cabonne, Coonamble, Cowra, Dubbo
Regional, Gilgandra, Lachlan, Mid-Western
Regional, Narromine, Oberon, Orange, Warren,
Warrumbungle



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Abbreviations

AHIMS	Aboriginal Heritage Information Management System
BCT	Biodiversity Conservation Trust
BOM	Bureau of Meteorology
BPEM	Best Practice Environmental Management
CBD	Central Business District
CMA	Catchment Management Authority
CRS	Community Recycling Station
DA	Development Application
DCP	Development Control Plan
EC	Electrical Conductivity
EECs	Endangered Ecological Communities
EPA	Environmental Protection Authority
GJ	Gigajoule
GL	Gigalitre
GPT	Gross Pollutant Trap
ha	Hectare
IP&R	Integrated Planning and Reporting
kL	Kilolitre
km ²	Square kilometres
LBL	Load Based Licensing
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
mg	milligram
MGB	Mobile Garbage Bins
ML	Megalitre
MRF	Materials Recycling Facility
NSW	New South Wales
NTU	Nephelometric Turbidity Units
PM10	Particulate Matter (10 microns or less)
RID	Report Illegal Dumping
RSoE	Regional State of the Environment
SLM	Sustainable Land Management
SoE	State of the Environment
WTP	Water Treatment



Introduction

A State of the Environment (SoE)

Report is an important management tool which aims to provide the community and Council with information on the condition of the environment in the local area to assist in decision-making.

Why a Regional SoE Report?

Environmental issues are not restricted to Council boundaries. Regional State of the Environment (RSoE) Reports are recommended by the NSW Government and used by some groups of Councils in NSW to enable a better understanding of the state of the environment in a regional context and to identify future collaborative pathways. More specifically, a regional approach to reporting:

- facilitates a better understanding of the state of the environment across the region
- encourages collaboration in regards to partnering on projects and sharing ideas and resources
- assists in the management of shared environmental resources
- forges stronger regional links across participating Councils.

Who is involved?

The participating Councils in the region are:

- Bathurst Regional Council
- Blayney Shire Council
- Bogan Shire Council

- Bourke Shire Council
- Cabonne Council
- Coonamble Shire Council
- Cowra Shire Council
- Dubbo Regional Council
- Gilgandra Shire Council
- Lachlan Shire Council
- Mid-Western Regional Council
- Narromine Shire Council
- Oberon Council
- Orange City Council
- Warren Shire Council
- Warrumbungle Shire Council

Regional SoE reporting has been supported and coordinated by Central Tablelands Local Land Services (LLS) and formerly the Central West Catchment Management Authority (CMA) since the first regional report was prepared in 2008. As shown in Figure 1, the participating Councils are located across three LLS regions – Western, Central West and Central Tablelands.

All participating Councils have provided data to be included in this report, with additional regional information sourced by Central Tablelands LLS and Central West LLS and other government agencies (see the Appendix for details of data sources).

Reporting for 2017-18

Prior to 2009, as a requirement of the *Local Government Act 1993*, all local Councils in NSW produced an annual SoE Report on major environmental impacts, related activities and management plans. In 2007-08 and 2008-09, Councils in the region, along with the Central West CMA, collaborated to produce a regional SoE Report based on the requirements of the Act.

In 2009, the *Local Government Act 1993* was amended. The amendments required the use of an Integrated Planning and Reporting (IP&R) Framework to guide a Council's future strategic planning and reporting. As part of the IP&R Framework, Councils were required to develop environmental goals and objectives with their communities in relation to identified priority local environmental issues. These environmental goals and objectives form part of each Council's overarching Community Strategic Plan.

Whilst Community Strategic Plans were being developed by the participating Councils, RSoE Reports were produced under the requirements of the 1993 Act for the 2009-10, 2010-11 and 2011-12 years.

The IP&R Framework requires that Councils prepare annual reports which include reporting on environmental objectives in their Community Strategic Plans. In the year in which a Council election is held, the annual report must also include a SoE Report.



In 2012, the participating Councils and the Central West CMA decided to continue collecting data and reporting on an annual basis so that they could produce a comprehensive RSoE Report in 2016 (the year of the Council elections) that covered the intervening years.

The participating Councils decided to continue the regional reporting for 2016-17 and 2017-18 awaiting a decision regarding a possible amendment to the Act that will remove the requirement for a separate SoE Report in the year of a Council election.

FIGURE 1 Map showing participating Council areas and Local Land Services regional boundaries

This report

Touring, Dubbo LGA

The themes covered in this report were guided by those in the then Central West Catchment Action Plan. The themes are:

- Land
- Biodiversity
- Water and Waterways
- People and Communities
- Towards Sustainability

Use of Indicators

Indicators are important management tools used in environmental reporting. They summarise and communicate information about the condition of key aspects of complex environments so that our decision making can be better informed.

In this report, a suite of indicators has been identified that help report on the environmental themes listed above.

Where indicator data for previous years is available, it is provided along with data for 2017-18 in a summary table at the commencement of each theme chapter.

There is a description for each indicator trend within the chapter and an explanation of possible reasons for it occurring. There are also case studies highlighting responses to environmental issues across the region.

The trend arrows in the summary tables are based on comparing the average of data from the past three years with the data for 2017–18, where direct comparison can be made.

The trend arrows used in the summary table are:

- ↑ improvement
- no or little change
- ↓ worsening trend

Council Snapshot Reports

In 2012, the participating Councils decided to produce additional brief snapshot reports for each of their Local Government Areas (LGAs). These Council Snapshot Reports were produced annually from 2013 to 2018. They report on the indicator trends for each LGA.

It should be noted that two Councils were amalgamated prior to the end of June 2016. Dubbo City Council and Wellington Council were amalgamated to form Dubbo Regional Council. In this report, the data of the former Dubbo City and Wellington LGAs has been amalgamated and compared with Dubbo Regional Council data for 2017-18.







Weather Events in the Region 2017-18

Weather conditions have impacts on several of the indicators in this report, particularly those in the Water and Waterways chapter.

In 2017-18, drought conditions across the region worsened culminating in extensive drought declarations as summarised in the Towards Sustainability chapter. The drought was exacerbated by above average temperatures that increased evaporation rates.

A coverage of seasonal weather conditions across the region in 2017-18 follows.

Winter 2017

In winter 2017 there was below-average rainfall across most of NSW. The winter days were relatively warm with above average maximum temperatures across most of NSW. A number of sites in the study area such as Mudgee, Dubbo and Orange recorded their highest mean daily maximum winter temperature (BOM, 2017c).

However, Oberon received its first snow event in early August 2017. This was due to a low pressure system which moved across NSW, dropping the temperatures in Oberon to below 0°C.

Spring 2017

The NSW weather for 2017 was the warmest on record with two spells of very hot weather in September and December (BOM, 2018a). The Bureau of Meteorology released

a special climate statement in October 2017 highlighting the record-breaking spring heat.

NSW experienced an exceptionally warm September with two separate days of record-breaking temperatures between 23 and 27 September (BOM, 2017b). Many sites in the study area broke their maximum day temperature records for September. Bathurst, Condobolin, and Nyngan broke their previous September daily maximum temperature records with temperatures of 31.2°C, 37.0°C and 37.5°C, respectively. Bourke and Dubbo broke their previous September record on more than one day with Bourke exceeding temperatures of 40.0°C. Record large diurnal ranges were also observed in September with Bathurst experiencing its greatest September diurnal range on record of 27.4°C (BOM, 2017b).

NSW experienced an exceptionally warm September with two separate days of record-breaking temperatures between 23 and 27 September (BOM, 2017b). Rainfall was below average for the State and the lowest rainfall on record for the month was recorded for the study area.

Summer 2017

December 2017 was a very warm month for NSW, being the seventh-warmest December on record. However, above-average rainfall

Snow storm,
Oberon LGA
(Oberon Council)



was recorded in October and December for much of the study area (BOM, 2018a). The above average hot weather persisted through the summer and early autumn of 2018. There were above-average temperatures in January through to March in 2018 and multiple heatwaves were recorded in January. Mudgee recorded its warmest January night (highest daily minimum temperature) on record.

It was the State's fourth-warmest summer on record as NSW reached a mean maximum that was 2.46°C warmer than average (BOM, 2018c).

Autumn 2018

The Bureau of Meteorology issued another special statement due to persistent summer-like heat in April 2018 and record-breaking maximum temperatures as a nationwide heatwave ensued. The heat was particularly persistent and intense in the study area. Notably, Dubbo more than doubled its previous record of six days for the number of consecutive days above 30°C in April (BOM, 2018b).

In 2018, the state also experienced its second warmest autumn on record (BOM, 2018d).

Long-term trends

The observed increase in maximum temperatures throughout inland NSW over the past year is consistent with projected temperature



Drought landscape,
Dubbo LGA
(Scott Gregory
Willoughby Imagery)

changes for the region for the coming decades. It is expected that the maximum temperatures within the region will increase over the next twenty years by 0.4 – 1.0°C (NSW Office of Environment & Heritage, 2018). It is projected that the study area will experience the greatest increases in temperature during the summer months (NSW Office of Environment & Heritage, 2018).

Climate data also shows that the frequency of annual maximum temperature anomalies of 0.7°C or higher are increasing for the State (BOM, 2018e). Climate change projections for the study area indicate very high confidence for average temperature increases

through all seasons, with a greater number of hot days and warm spells and fewer frosts, and increased intensity of extreme rainfall events (Climate Change in Australia, 2018).

Rainfall is expected to be quite variable in the coming years and across the State; however, it is projected that spring rainfall will decrease for inland regions in the near and far future (NSW Office of Environment & Heritage, 2018). Shifts in seasonal rainfall are important to understand as they can impact reproductive cycles of native fauna, influence crop productivity, and contribute to extreme weather events such as floods and droughts.

Land

This chapter focuses on aspects of sustainable land management in the region. There are a number of challenges to the sustainable use and management of our soil and land

Canola crop,
Warrumbungle LGA
(David Kirkland)

resources, such as wind and water erosion, soil contamination, soil acidity, soil salinity, soil degradation and loss of land to development.

These challenges can be caused by clearing, overgrazing and pollution from a range of sources including disused operations such as petrol stations. The sustainable use of soil and land in agricultural areas of the region is of increasing significance, particularly in the face of a changing climate.

“The key to sustainable land management is to understand the processes that lead to

land degradation at any particular place and then manage the land within its inherent capability” (NSW EPA, 2015).

Sustainable land management is crucial to minimising land degradation, rehabilitating degraded areas and ensuring the optimal use of land resources for the benefit of present and future generations.



Table 2: Summary Table of Indicator Trends - Land

Issue	Indicator	2014-15	2015-16	2016-17	2017-18	Trend
Contamination	Contaminated land sites - Contaminated Land Register (number)	7	7	8	8	↓
	Contaminated land sites - potentially contaminated sites (number)	1,098	1,486	1,751	1,930	↓
	Contaminated sites rehabilitated (number)	5	9	13	6	↓
Erosion	Erosion affected land rehabilitated (ha)	3	822	2,267	1,821	↑
Land use planning and management	Number of development consents and building approvals	3,458	3,289	3,537	3,552	↓
	Landuse conflict complaints (number)	93	114	114	104	↑
	Loss of primary agricultural land through rezoning (ha)	2,235	80	124	40	↑
Minerals & Petroleum	Number of mining and exploration titles	800	786	820	995	↓
	Area covered by mining and exploration titles (ha)		4.26M	5.67M	5.64M	↓

- ↑ improvement
- no or little change
- ↓ worsening trend

Note – the above trends are for data in 2014-15, 2015-16, 2016-17 and 2017-18 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2017-18. They should be read in terms of the limitations for indicators discussed throughout this chapter. Refer to the Appendix for a list of Councils included in the trend data.

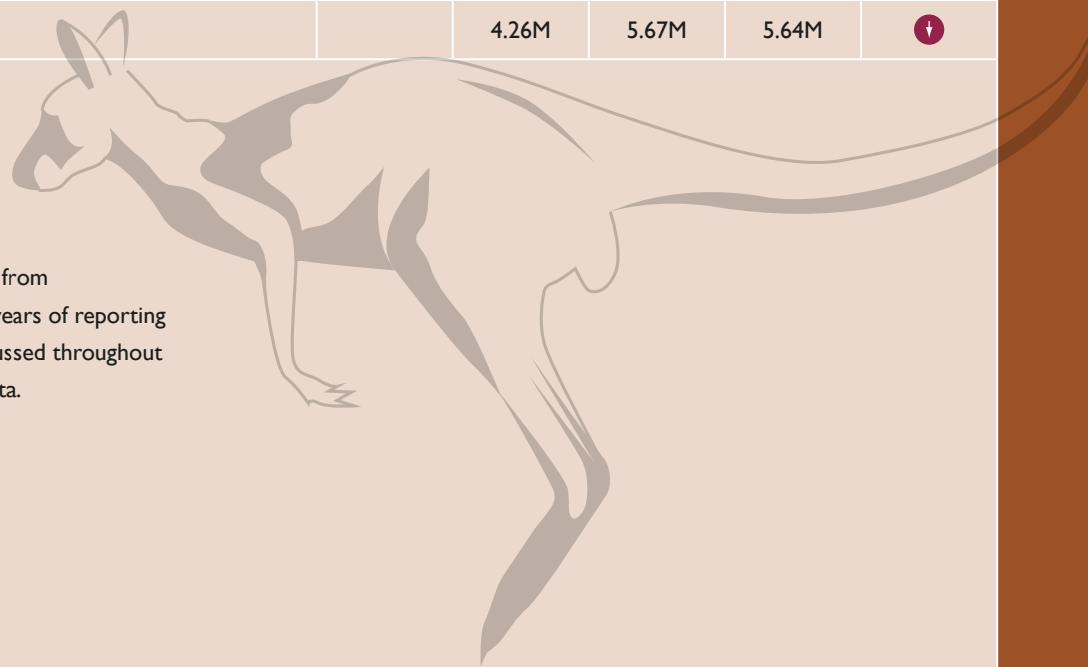


FIGURE 2: Number of potentially contaminated sites across the region

Condition

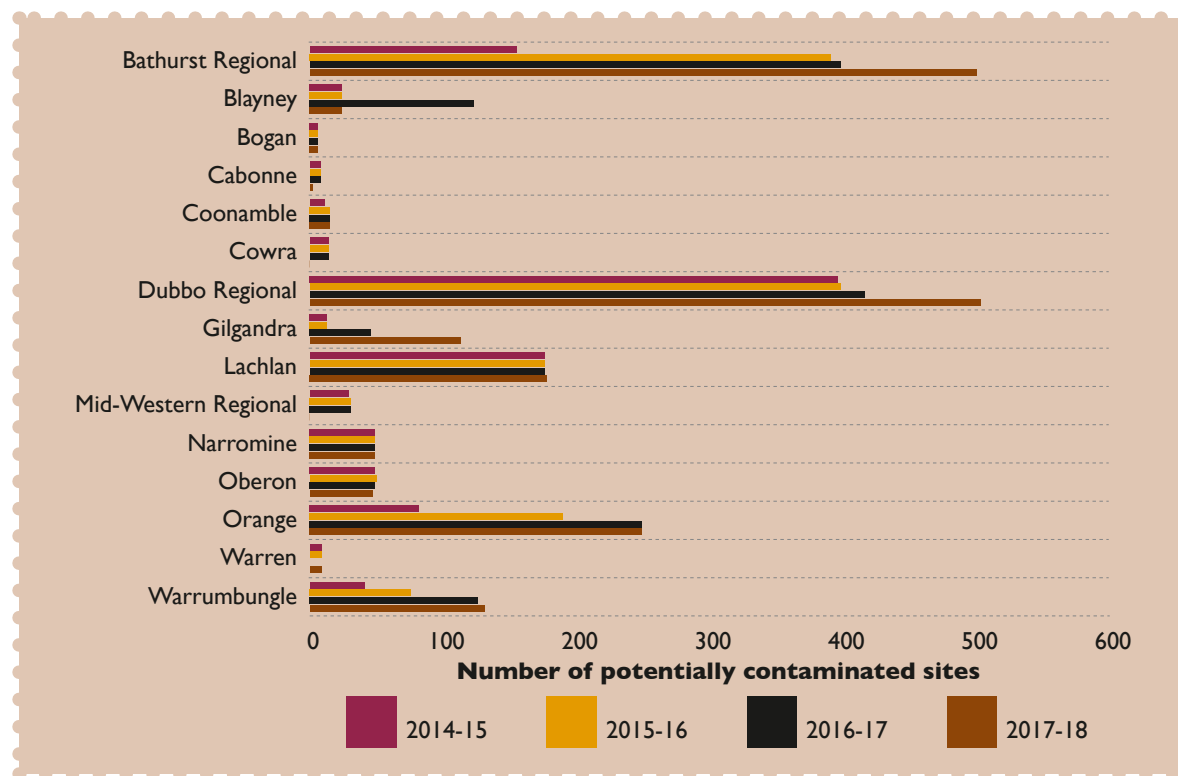
Contamination

Contaminated land has the potential for immediate or long-term adverse effects on human health and the environment. Land contamination is usually the impact of past land uses such as service stations, fuel depots, horticultural facilities, orchards, sheep dips, agri-chemical dumps, pistol ranges, mines, landfills and gasworks. A site is classified as contaminated when hazardous substances occur at concentrations that are above normal background levels, posing a potential risk to human health or the environment.

The NSW Office of Environment and Heritage maintains a register of Contaminated Sites (www.environment.nsw.gov.au/whowere/registers.htm). All participating Councils also have or are collating a list of potentially contaminated sites based on past land use.

Indicator – Contaminated land sites (Contaminated Land Register)

There are eight sites across the region on the Contaminated Land Register at 30 June 2018. No sites were added or removed from the register during the current reporting year.



Indicator – Contaminated land sites (potentially contaminated sites)

As shown in Figure 2, the number of potentially contaminated sites reported across the region increased again in 2017-18 following a large increase last year. This year's increases largely came from updates to the contaminated land registers in the Bathurst, Gilgandra and Dubbo Regional LGAs. The sites in Gilgandra LGA have increased from 13 two years ago to 113, resulting from a

desktop and visual survey of contaminated and potentially contaminated sites across the Shire.

Threats

Development and land use

Development in and around urban areas can impact significantly on the natural environment including clearing for building

CASE STUDY: Naturally Occurring Asbestos in Unexpected Places (Oberon LGA)

Oberon Council staff were undertaking further improvement work at the Oberon Common with the use of heavy earthmoving equipment to cover the last of the rocky outcrops. Unexpectedly, during the course of this work chrysotile asbestos was found.

As the operators had previously experienced such an event on a rural road some 20 km away, the site was quickly secured and the ground moistened with continuous watering to suppress dust emissions emanating from the site. The issue was quite serious, given the close proximity to residential dwellings, making the need to ensure the correct safety measures were in place immediately.

A hygienist was engaged to provide immediate advice and to also bring air monitoring devices to site to measure the presence of any airborne fibres. The immediate testing proved negative to any fibres in the air, which was a good result.

Immediate capping of the site with clay materials was required. These materials were imported to encapsulate the affected area to a depth of 500 mm, during which time all safety measures were employed.

It cost nearly \$40,000 to properly and compliantly deal with the unexpectedly found chrysotile asbestos. Oberon Council now undertakes additional due diligence prior to excavation of unknown areas, in an attempt to identify any potential problems prior to breaking ground.



Investigating to determine the presence of Natural Occurring Asbestos in the Common, Oberon (Oberon Council).

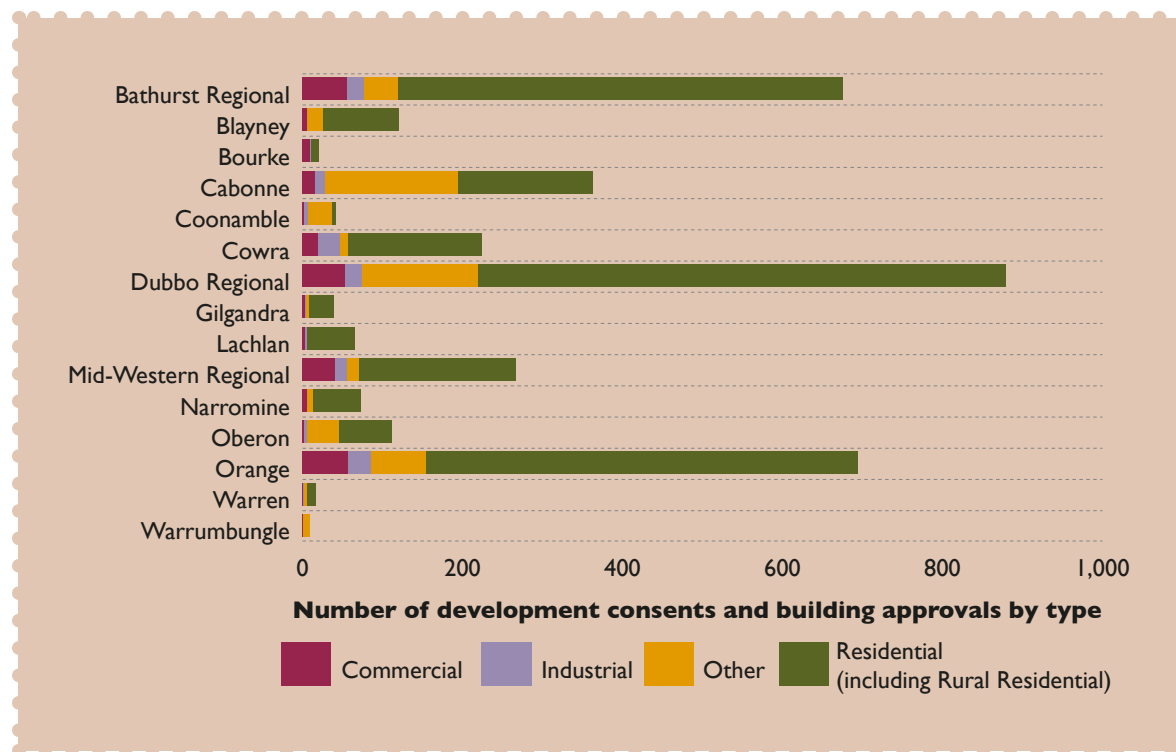


FIGURE 3: Number of development consents and building approvals by type 2017-18

blocks. On the other hand, there can be economic and social benefits to a community from increased development activity.

Indicator – Number of development consents and building approvals

Development activity in the region increased by 1.8% in the current reporting year, following a 40% increase in 2016-17 which was largely due to the inclusion last year of two new categories of development in the report: Sub-division and Urban-Zoning. However, with these two categories removed,

the current trend in development activity over the past four years has been a very gradual increase.

A breakdown of development approvals for each LGA is provided in Figure 3.

Indicator – Landuse conflict complaints

The number of landuse conflict complaints across the reporting region this year was just over 10% lower compared to 2016-17, with a reduction in the number of complaints reported by the Mid-Western LGA and Blayney LGA which together reported no

complaints this year compared with ten in 2016-17.

Indicator – Loss of primary agricultural land through rezoning

The loss of agricultural land through rezoning can have deleterious environmental impacts. Not only may the agricultural land have economic value, it could contain remnant native vegetation which may be lost as a result of development following rezoning.

Forty hectares were reported as being rezoned from rural to other categories in 2017-18 across the region: 30 hectares by Cabonne Council and 10 hectares by Orange City Council. This area is considerably less than that in each of the past three years.

Mining

The boom in global demand for Australian resources has continued to have a significant impact on the economy of the Central West of NSW.

In many areas, mining is a major employer and exploration for new commercial deposits is widespread across the region. The resources industry provides job opportunities for many people who in other times would have been forced to leave the region to find work and it also brings new people into the region. This diversity can provide social benefits in terms of employment and wealth creation,

but may also negatively impact on the social structure of some smaller regional centres. In addition, the number and scale of active mines and exploration projects can threaten the local environment through vegetation clearance, possible contamination of groundwater, and subsidence which may affect surface water.

Indicator – Number and type of mining exploration titles

Indicator – Area covered by mining and petroleum exploration projects

In 2017-18 there was a significant increase in the number of mining and exploration titles compared with previous years. As shown in Figure 4, Mid-Western LGA dominated the number of mining titles in comparison to other LGAs in the region. It also had substantial coal exploration activity.

However, there was a small decrease in the area covered by exploration and mining for minerals, coal and petroleum across the region in 2017-18 compared to the previous year.

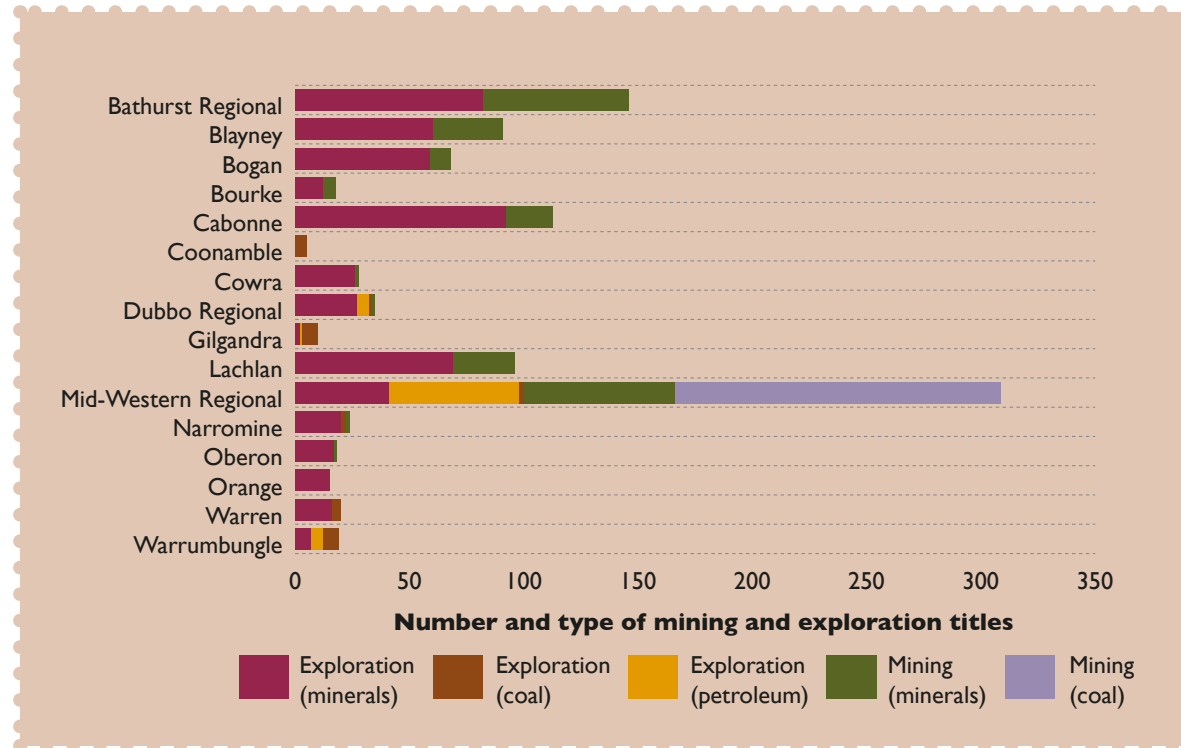


FIGURE 4: Number and type of mining and exploration titles in the reporting region 2017-18

Response

Contamination

Indicator – Contaminated sites rehabilitated

Six contaminated sites were reported as rehabilitated across the region in 2017-18: two industrial sites and a landfill site in the Bathurst LGA, a former abattoir site in the Lachlan LGA and two sites in the Oberon LGA.

The number of contaminated sites rehabilitated across the region has declined over the past three years.

Erosion

Indicator – Erosion affected land rehabilitated

The Central West LLS reported that a total of 1,791 hectares was rehabilitated in 2017-18 with a further 30.5 hectares rehabilitated by the Cowra, Dubbo Regional, Lachlan, Orange and Warrumbungle Councils. Whilst this is a decline from last year, this year's total is still more than double the area rehabilitated across the region in 2015-16.





Cattle feedlot,
Dubbo LGA.

Sustainable agricultural practices

Sustainable agricultural practices benefit the environment by minimising wind and water erosion, soil structure decline, organic carbon loss and salinity. These practices include understanding land and soil capability, non-tillage farming systems and crop and stock rotation.

Indicator – Farm entities demonstrably practicing sustainable agricultural

The Central West LLS reported that the land area where farms demonstrate sustainable agricultural practice is a total of 147,560 hectares. Just over three quarters of this came from Landcare delivery. The two other LLS initiatives contributing the balance of the total area reported were:

- delivering training and advice to land holders in the interpretation of Hydrogeological Landscapes mapping and the application of this information in the management of their land and water resources
- increasing awareness, knowledge and skills and the capacity for Central West landholders to adopt innovation and technology in agriculture and apply it to their enterprises.

CASE STUDY: Community-driven Asbestos Removal (Bourke LGA)

Bourke Shire Council, together with WasteAid, led a community-driven effort to remove asbestos and other dangerous waste from communities within Bourke Shire during the period July to December 2017. The project resulted in 36 cubic metres of asbestos and contaminated waste being removed from West Bourke. The project focussed on local training for Class B Asbestos Removal and the use of local contractors, so that local capacity in asbestos remediation could be supported and strengthened.

The asbestos removal project developed community engagement with Nulla Nulla Local Aboriginal Land Council for asbestos awareness and safety. Asbestos risks were identified by Nulla Nulla LALC and WasteAid, where building materials from old houses have been removed, broken-down and disposed or left scattered. The weathering and further degradation of these materials causes asbestos fibres to become friable and airborne, leading to potential exposure and health risks. A community engagement campaign was built on local consultation and education to raise awareness and help identify areas contaminated with asbestos.

A total of seven blocks of land in West Bourke, approximately 130,000 square metres, were surveyed for materials suspected of containing asbestos. Fifteen of the 18 samples confirmed asbestos and a remediation plan was targeted at one block – selected to mitigate the most risk, and selected based on the available timeline and resources. Asbestos was successfully removed from this block, and another three blocks were partially remediated. Methods included scraping with machinery and hand-picking, with crews applying full safety protocols and controls and wearing full protective equipment. It is intended that this is the initial phase of total remediation of the area.

Guidelines from SafeWork NSW and the Australian Government Asbestos Safety and Eradication Agency were applied to the project, with funding provided by the Office of Local Government. Dwayne Willoughby, Council's Manager Environmental Services, led the working group which directed the project. The working group sought outcomes to benefit Bourke Shire, assisted in targeted asbestos remediation in Walgett Shire and Brewarrina Shire, and the establishment of a transferable, scalable and sustainable model for remediation of affected Aboriginal lands.

The project working group has produced a document outlining the Aboriginal Community-Based Asbestos Remediation model as well as an asbestos management guide for the Local Aboriginal Land Councils. It is now seeking to share its knowledge and data with heads of the Asbestos Coordination Authority in order to help reduce asbestos in other communities across NSW.

Removal of asbestos, west Bourke





Biodiversity

Biodiversity is the variety of all life on earth - the different plants, animals and micro-organisms and the ecosystems of which they are a part. Biodiversity is critical to maintaining functioning ecosystems which provide important services upon which all life depends.

Ecosystems that are rich in biodiversity are more resilient and healthy and are better able to recover from outside stresses such as drought, pests, bushfire and climate change.

Understanding biodiversity gives us the ability to more effectively address environmental challenges including:

- controlling pests and supporting species that pollinate crops
- maintaining groundwater tables
- absorbing carbon
- protecting water quality.

Local Councils may impact on biodiversity through a variety of activities including landuse planning and the management of Council reserves.

Condition

Loss of Biodiversity

Indicator – Total area in the National Parks Estate

Indicator – Addition to the National Park estate

The National Park estate includes national parks, nature reserves, state conservation areas and regional parks.

The total area of the National Park estate in the reporting region was unchanged since last year.

Indicator – Total Area of State Forests

Indicator – Change in Area of State Forests

The total area of State Forests in the reporting region is 240,969 hectares, which is a very small decrease of just two hectares from the 2016-17 area. This continues a trend of small reductions reported in most years since 2010.



Duckling, Pacific Black
Duck, Orange LGA

Table 3: Summary Table of Indicator Trends – Biodiversity

Issue	Indicator	2014-15	2015-16	2016-17	2017-18	Trend
Habitat Loss	Total Area in the National Parks Estate (ha)	804K	804K	804K	804K	➡
	Total Area of State Forests (ha)	241K	241K	241K	241K	➡
	Total Area Protected in Wildlife Refuges (ha)	202,000	215,000	215,000	294,000	⬆
	Total Area protected in conservation reserves (ha)	12,023	12,090	13,326	41,816	⬆
	Extent of Traveling Stock Reserves (ha)			291K	291K	➡
	Proportion of Council reserves that is bushland/remnant vegetation	35%	47%	47%	48%	⬆
	Habitat areas revegetated (ha)	68	69	174	68	⬇
	Vegetation protected and rehabilitated through CMA incentive funding (ha)	5,302	95,645	38,339	20,222	⬇
	Voluntary Conservation Agreements, Property Vegetation Plans & biobanking (number)	75	63	28	24	⬇
	Roadside vegetation management plan (number)	9	15	15	14	⬆
	Roadside vegetation rehabilitated (ha)	75	14	28	29	⬇
Threatened Species	State Threatened species listed in LGA (number)	284	288	290		
	Threatened species actions implemented (e.g. PAS, recovery plans) (number)	16	14	13	19	⬆
	Fish restocking activities: native species (number)	505,000	905,000	571,000	213,000	⬇
Noxious weeds and feral animals	Fish restocking activities: non-native species (number)	293,000	340,000	316,000	172,000	⬆
	Number of declared noxious weeds	139	139	102	102	⬆
	Invasive species (listed noxious or WONS) under active management (number)	178	193	212	196	⬆

 improvement
  no or little change
  worsening trend

Note – the above trends are for data in 2014-15, 2015-16, 2016-17 and 2017-18 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2017-18. They should be read in terms of the limitations for indicators discussed throughout this chapter. Refer to the Appendix for a list of Councils included in the trend data.

FIGURE 5: Total Area under Voluntary Conservation Agreements by LGA in 2017-18

Indicator – Total Area protected in Wildlife Refuges

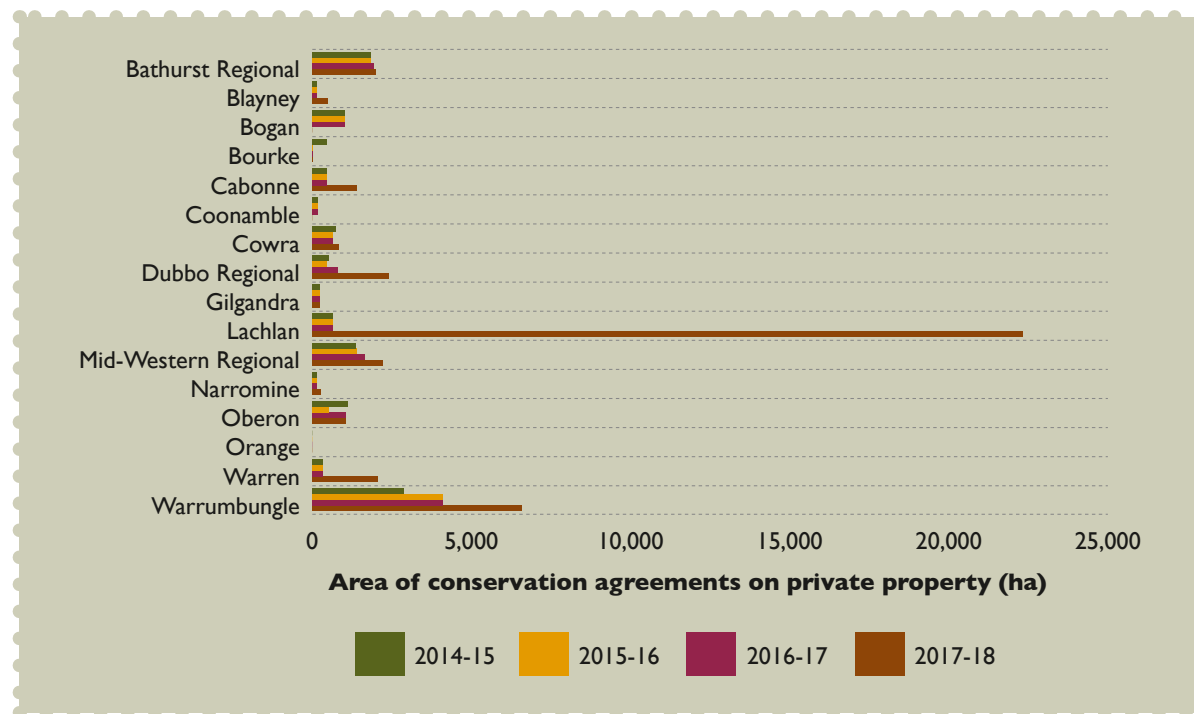
The Wildlife Refuges scheme has existed since 1948 and is one of the longest-running schemes in Australia that supports conservation on private land. Wildlife refuges may contain remnant native vegetation, as well as habitat provided by wildlife corridors, windbreaks, woodlots or farm dams.

Under the terms of the *Biodiversity Conservation Act 2016*, Wildlife Refuges are one of three main types of voluntary private land conservation agreements. They are managed by the newly-formed Biodiversity Conservation Trust (BCT) which was established under the Act.

In 2017-18, the area protected in Wildlife Refuges increased by almost 79,000 hectares across the region, an increase of almost 37% compared with 2016-17. The largest increase was in the Bourke LGA where the area of Wildlife Refuges increased to 180,950 hectares from 100,158 last year. There were also smaller increases reported in the Bathurst, Blayney, Cabonne, Cowra, Dubbo, Gilgandra, Mid-Western, Narromine, Oberon, Warren and Warrumbungle LGAs.

Indicator – Total Area protected under voluntary conservation agreements

The other two main types of voluntary private land conservation agreements under the *Biodiversity Conservation Act 2016* are Conserva-



tion Agreements and Biodiversity Stewardship Agreements.

Conservation Agreements are voluntary agreements between the BCT and landholders to conserve and manage biodiversity on an area of land. Biodiversity Stewardship Agreements are used for landholders wishing to generate and sell biodiversity credits under the Biodiversity Offsets Scheme. They provide permanent conservation and management of the biodiversity values on the land.

As shown in Figure 5, it appears that increased investment by the BCT and the change to the structure of agreements have resulted in an overall increase for this

indicator. These changes have resulted in a threefold increase in the conservation areas on private land reported this year across the region, with significant changes by LGA.

For example, Lachlan LGA had a total of 639 hectares under the voluntary conservation agreements in 2016-17, whereas the reported area in 2017-18 was 22,322 hectares.

Indicator – Extent of Travelling Stock Reserves in LGAs

The total area of Travelling Stock Reserves in the reporting region was unchanged since last year.

CASE STUDY: Barking Owl Tree Hollow Augmentation Project (Warrumbungle LGA)

During 2017-18, Warrumbungle Shire Council implemented its first wildlife habitat enhancement program. The project received a grant from the Central West Local Lands Service (LLS) and, in partnership with the local LLS Office, 68 augmented hollows have been installed at two Travelling Stock Reserves (TSRs) on the Baradine Road, one near the locality of Yearinan and the other near the village of Bugaldie. Previous surveys of the sites confirmed the presence of Barking Owls in the same area of Baradine Road.

The artificial hollows were installed by Northwest Complete Tree Services' Sam Bragg in conjunction with local ecologist, David Paull, using a technique which excavates hollow chambers into the existing tree, rather than using 'nest-boxes' which have a limited life-span. A face piece is cut from a small section of trunk and an artificial space is created inside. An entrance hole is also added. The face plate is then re-installed over the cut section and screwed back onto the tree.

This technique is similar to those used in projects undertaken by other Councils, such as the Superb Parrot hollow augmentation program, except it was determined in this case, that to reduce disease risk and impact to living trees, hollows were installed only in dead timber, either dead trees or limbs of living trees. Due to ring-barking of trees in the past, some areas on the TSRs had high numbers of dead trees, making them ideal candidates for hollow enhancement.

The Barking Owl is listed as vulnerable to extinction in NSW under the *Biodiversity Conservation Act 2016* mainly due to loss of habitat for both the bird and its prey. Studies on the diet of the Barking Owl in the Pilliga area show that it can take a wide variety of prey, but prefers tree-living mammals, particularly the Ringtail possums and gliders, including the threatened Squirrel Glider. Both the owl and its prey are reliant on the availability of hollows in standing trees for their survival.

To cater for this variety in the diet of the owl, different sized hollows with corresponding different size entrance holes were incorporated into the project design, with 14 large, nine medium-sized (for possums) and 45 small hollows (for gliders and bats).



The Barking Owl Project, creation of augmented hollows (Simone Tenne).



Australian King Parrot,
Orange LGA.

Indicator – Proportion of Council reserves that is bushland/remnant vegetation

In 2017-18 there was a slight increase in the proportion of Council reserves that is bushland/remnant vegetation compared with 2016-17.

Threatened species

There are numerous threatened species and Endangered Ecological Communities (EECs) across the region. Box-Gum Woodland, (also known as Box Gum Grassy Woodland) is one

of the most threatened communities in the State with 7% of original extent remaining and is listed on both State and National registers. It was widely found across the region, however the high level of clearing linked to agricultural land use has caused significant decline.

Indicator – State Threatened species listed in Central West and Lachlan Catchments

No data is available for this indicator. NSW threatened species data has been reorganised by bioregion based on the Interim Biogeo-

graphic Regionalisation of Australia. These bioregions do not correspond to the CMA areas previously used for reporting this indicator and they also relate quite poorly to the current SoE reporting region.

Threats

There are several threats to biodiversity in the region including land clearing, invasive plants species and feral and pest animals.

Indicator – Fish restocking activities: non-native species

Approximately 172,000 non-native fish (brown and rainbow trout) were restocked across the region in the current reporting year which is the lowest total reported in the nine years that this indicator has been tracked. It is likely that the drought conditions in the region were a major cause of the decline in fish restocking.

Indicator – Number of declared noxious weeds

The *Noxious Weeds Act 1993* was wholly repealed when the *Biosecurity Act 2015* commenced on 1 July 2017. Under the Biosecurity Act invasive weeds are now known as 'Priority Weeds'.

LLS across the reporting region have created a list of State and Regional Priority Weeds with expected outcomes and

CASE STUDY: Tree Augmentation to Assist with Superb Parrot Recovery (Orange LGA)

Due to historic land clearing and in many cases the absence of old, mature trees in the Central Tablelands landscape, there is a decline in the numbers and distribution of many hollow-dependent fauna species. Creating hollows utilising the hollow augmentation technique allows us to create a solution for habitat loss in the medium to long term while revegetation plantings mature and begin to generate hollows naturally.

The hollow augmentation technique provides a much more natural hollow structure for hollow users such as Superb Parrots and Gliders with better insulative properties, a more natural appearance and the absence of unnatural square edges and manufactured materials not found in natural hollows.

The technique involves using a chain saw to cut into the trunk or larger branches to make a chamber and then re-attaching the outside section of trunk, (or faceplate) with screws and then inserting a hole into the faceplate to allow entry into the hollowed out chamber.

This technique has had almost instant success with birds inspecting the manmade hollows as soon as they have been installed. A Tree Augmentation project, supported by the Central Tablelands Local Land Services will see some 200 hollows created in the central tablelands, with 40 in the Orange LGA.

To complement the augmentation of existing standing trees in the Gosling Creek Precinct two trees designated for removal adjacent to the Orange Botanic Gardens were transported and recently re-stood in the Gosling Creek Precinct to provide harbor and habitat for desirable fauna species in the area. The mature eucalypts were strategically placed in a stand of remnant eucalypts. Both trees had naturally-occurring hollows and complement the existing remnant trees in the area. The trees are in actual fact being recycled.



Building parrot hollows.

CASE STUDY: Release of native fingerlings (Narromine LGA)

Around 4,000 Murray Cod fingerlings were released into the Macquarie River at Narromine in early February 2018 to help restore the native fish population in natural waterways. A further 8,000 Golden Perch fingerlings were also due to be released later in the year, however due to poor breeding conditions this year, the additional fingerlings were not available for release.

The release is part of a 'dollar for dollar native fish stocking' program between the Department of Primary Industries, Recreational Fishing Trust, Narromine Shire Council and the Macquarie Cotton Growers Association.

The program aims to:

- Enhance recreational freshwater fishing opportunities;
- Support local communities in the stocking of high value native fish species;
- Assist in the development of regional aquaculture industries; and,
- Increase community and industry involvement in, and awareness of responsible stocking.

The release in February marks the twentieth year that Narromine Shire Council has participated in the program with an estimated 160,000-200,000 fingerlings being released over that period.

At the time of the release, the fingerlings are around five centimetres long and it is estimated that they take three to four years to reach maturity.

Fish stocking is recognised for its importance to the community in terms of providing quality recreational fishing, conservation outcomes and employment opportunities, as well as assisting in reversing the impacts of introduced species to the natural waterways.

Murray cod fingerling release.



recommended measures for each species. Councils can also nominate Local Priority Weeds that are a problem within their LGA and specified expected outcomes and control measures for these weeds.

Data was still available for noxious weeds in 2017-18; however, this indicator will require amendment to reflect the changes related to the *Biosecurity Act 2015*.

In 2017-18, the Central Tablelands and Central West regions had a total of 102 declared noxious weeds, and a significant number of environmental weeds present. This number is unchanged from last year.

Response

Land clearing

Indicator – New Voluntary Conservation Agreements, Property Vegetation Plans & biobanking

The Central West LLS reported 24 Voluntary Conservation Agreements for 2017-18 which is similar to the level of activity reported for this indicator last year. No data was provided by the Central Tablelands LLS.

Indicator – Roadside vegetation management plans

Fourteen (14) of the 16 Local Councils reported that they had a roadside vegetation management plan. During 2017-18 Bathurst

CASE STUDY: Roadside Reserve Extension Project (Mid-Western LGA)

In 2017, Mid-Western Regional Council was awarded a grant of \$60,000 from Central Tablelands Local Lands Service Targeted Ecosystems Program to assist in the enhancement of high conservation value roadside vegetation throughout the LGA.

Council developed a Roadside Vegetation Management Plan in 2011 which mapped all of the roads in the region as having high, moderate or low conservation value. This plan was used to identify areas to target for this project.

The project involved employing a casual Weeds Officer to work with one permanent Council Weed Officer to control weeds along roadsides classed as having high or moderate conservation value. Council spot sprayed along 642 km of roadside during a six month period. The casual Weeds Officer gained valuable experience and on-the-job training, and has gone on to permanent employment with Council's weeds department.

Council also advertised funding for landholders interested in undertaking planting projects adjacent to high or moderate conservation value roadsides. Council received 42 applications and selected eight landholders to plant 2,200 tubestock plants, the aim of which was to extend the roadside vegetation into private property and improve the habitat linkages.

Land adjacent to EEC and/or known threatened species habitat was highly prioritised and landholders who could provide in-kind assistance in the form of fencing, ripping and slashing were also prioritised.

Planting was done by a contractor using locally-sourced stock. A total of 15.7 ha was planted which resulted in 216 ha of improved connectivity. All landholders agreed to the continued maintenance of the plantings on their property.

Council worked with Watershed Landcare and the Mudgee office of the Local Lands Service to engage landholders and promote the project.



Roadside extension onto private property near Windeyer.

CASE STUDY: Neville Cemetery Ecological Surveys (Blayney LGA)

Blayney Shire Council identified Neville Cemetery as an ideal location to monitor and maintain the delicate native flora and fauna of the area. Neville Cemetery is comprised of a well-developed perennial grassland dominated by native grasses and herbs.

The cemetery contains a high diversity of native forbs which have become locally rare and/or have a limited distribution across known populations.

Council engaged with stakeholders to assist in carrying out the work. Two mosaic burns were conducted, one in spring and another in the following autumn. These mosaic burns were conducted with the assistance and guidance of the Local Aboriginal Lands Council.

Following the burns, transects were identified to monitor what changes to the vegetation took place.

In the area which was subjected to a mosaic burn in spring 2015, there has been a significant improvement in infiltration capacity as the litter, perennial plant and cryptogam covers increased in depth with slight states of litter decomposition already becoming evident.

Following the second mosaic burn a higher diversity of native species was identified in both of the burnt locations. The highest diversity continued to be recorded in the 2015 spring burn area which had an increase from 30 to 38 native species per 0.04 ha plot. In the 2016 burn location, a total of 27 native species were recorded which is an increase from 15 native species recorded the previous year.

In the two unburnt control plots, the diversity of species was much lower.

Spring burning has shown positive ecological outcomes in the longer term despite the short term decrease in ecological function and integrity. Burning appears to have promoted species diversity by reducing the dense comparative ground covers, however it may also result in the grassland becoming more vulnerable to invasion by exotic species.

Following the success of the controlled mosaic burns Council is developing Shire-wide management plans for cemeteries, installing new rabbit proof fencing and fostering relationships with stakeholders to create a diverse seed bank.

To ensure the continued success of this project Council ensures that its staff always wash down and clean mowing equipment before entering a site to limit the introduction of weed species. Council has alternate mowing regimes in place for the Neville Cemetery when compared to the adjoining external cemetery areas.

Council received further funding to run the “Hollows for Habitat” program as a way to value-add to the works currently being carried out. Further planning will see interpretive signage and a mown walk way included at the Neville cemetery. All of this work has been carried out whilst the Cemetery has been active with burials and ceremonies.



Mosaic burns being conducted at Neville Cemetery

Regional Council upgraded its roadside vegetation management plan.

Rehabilitation

Rehabilitation and sustainability projects have been developed by organisations to help reduce the impact of land clearing and other threatening processes on biodiversity and to ensure some level of connectivity within the increasingly fragmented landscape.

Indicator – Habitat areas revegetated

During 2017-18, 68.3 hectares of habitat area was rehabilitated across the region. This was a decline in the levels reported in previous years after a large increase last year mainly due to a Green Army project in the Mid-Western LGA.

Indicator – Vegetation protected and rehabilitated through LLS incentive funding

In 2017-18, 20,222 hectares of vegetation was reported as being protected and rehabilitated through the Central West LLS. This continues the decline reported last year but is still significantly more than the activity reported in the few years prior to 2015-16. No data was provided by the Central Tablelands LLS.

Indicator – Area of roadside vegetation rehabilitated

A total of 29.3 hectares of roadside vegetation was rehabilitated in 2017-18 by five

Councils. This was slightly more roadside rehabilitated than last year. Over 90% of the rehabilitated area was in the Blayney and Mid-Western LGAs.

Threatened species

Indicator – Threatened species actions implemented

The number of threatened species actions implemented across the region in 2017-18 was 19, six more than reported in 2016-17. Seven Councils reported actions this year, including:

- Bathurst Regional Council continued management of road maintenance activities to prevent impacts to the Purple Copper Butterfly and strategic riparian revegetation for the Regent Honeyeater
- Warrumbungle Shire Council successfully augmented a hollow project for barking owls.

Native fish

Indicator – Fish restocking activities: native species

In 2017-18, 213,498 native fish were restocked across the region. This is a 63% decline since last year and is the lowest total recorded since 2008. The low flow in the region's rivers due to drought conditions is most likely a contributing factor in the low levels of restocking.

Invasive species

Indicator – Invasive species (listed noxious or Weeds of National Significance) under active management

In 2017-18, there was a 7.5% decrease in the number of invasive species being actively managed by the Local Councils across the region. The decrease was in the Dubbo and Mid-Western LGAs where numbers were lower due to drought conditions in the area and a change in classification from noxious to priority weed species.



Sacred Kingfisher,
Orange LGA.

CASE STUDY: Recovery of the Mac (Bathurst LGA)

NSW Government and local fishermen united to improve the health of the upper Macquarie River through the “Recovery of the Mac” project.

Recent field surveys conducted by the NSW Department of Primary Industries (Fisheries) identified that riparian and in-stream habitats are generally in poor condition in the upper Macquarie River. Willows were identified as having a major impact, there were few native trees, few native shrubs, refuge holes for fish had been filled in and two weirs were blocking fish passage.

The Recovery of the Mac project was therefore developed to restore lost habitat and address declining native fish populations in the Murray-Darling Basin.

Bathurst Regional Council collaborated with the Sofala Branch of the Central Acclimatisation Society, Central Tablelands Local Land Services, Department of Primary Industries (Fisheries), and the Central West Councils Environment and Waterway Alliance to carry out the project.

Two weirs within the Macquarie River in Bicentennial Park were modified to allow fish passage through this section of the river. Selected rocks were removed from the centre of each weir structure with assistance of Department of Primary Industries - Fisheries (Aquatic Rehabilitation Unit). The rocks were then relocated to create habitat or placed on the riverbanks to reinforce these areas. The adjacent riverbanks were then revegetated to reduce potential erosion and provide habitat.

Council’s river crew controlled willows along another reach of the Macquarie River at Gormans Hill. A community planting day was then held with volunteers from the local fishing groups to revegetate the river banks with native riparian species to replace these weeds. Over time these plantings will contribute towards the rehabilitation and improved habitat within this section of the Macquarie River.

Community education was also undertaken with the aim of creating greater awareness of the benefits of riverine habitat rehabilitation for native fish populations. The project was featured on websites such as Fishing World and Fish Habitat Network, the Conservation in Action conference, and the National Carp Control roadshow presentation.



Recovery of the Mac works (Col Gordon).

CASE STUDY: South Dubbo Weir Project (Dubbo LGA)

Mayor of the Dubbo Region, Councillor Ben Shields, officially opened the South Dubbo Weir upgrade, rock ramp, fishway and interpretive signage on Friday 29 June 2018.

The project, which commenced in 2015, has improved the public safety of the South Dubbo Weir located along the Macquarie River in Dubbo. The Weir had become a serious hazard to public safety and since its construction in 1941-1942 nine people had drowned at the Weir. The most recent deaths occurred in 2008 and 2011.

In addition to improving public safety, the project has helped to reduce the weir's environmental impact through the addition of a fishway. Weirs have long been known to have a major detrimental impact upon the health and population size of native fish species by blocking natural fish routes. In particular, Murray Cod and Golden Perch are impacted by weirs as they travel up and down the Macquarie River throughout their life to find food, shelter, mates and spawning sites.

The project involved reinforcing the original weir; constructing an 80 metre long rock ramp downstream of the weir using 23,000 tonnes of rock; and, incorporating shallow pools and artificial rapids into the rock ramp to enable native fish to swim over the weir and migrate upstream.

The project was one of Dubbo Regional Council's most important infrastructure projects, costing a total of \$5.31 million, and involving multiple stakeholders from local community members, to engineers and environmental scientists.

Interestingly, the project's construction phase coincided with the Dubbo region experiencing its sixth wettest year on record. At this time the Macquarie River rose alarmingly but to the enormous satisfaction of the engineers, the rock ramp and fishway held fast, functioning as intended, and providing proof of the high quality of design and construction. The engineers are confident that the upgraded weir, rock ramp and fish way will not need any further major work for another 50-80 years.



Upgraded South Dubbo Weir, including rock ramp and fishway.



Water and Waterways

Increasing water consumption and declining water quality are two important environmental issues in the region. The quantity of available water is often variable due to the periodic effects of drought and flood. Many rivers in the Murray-Darling Basin have been dammed to provide a reliable water supply for agriculture and urban use and increasing demand is placing pressure on inland water systems.

Suma Park Dam,
Orange LGA.



The quality of water within the river and groundwater systems is also under threat from industrial, urban and agricultural pollution sources, as well as from treated wastewater and stormwater.

Regional impacts of climate change and variability will include less reliable water supplies in the catchments as a result of higher temperatures, variable rainfall and higher evaporation rates. There are increased risks of more intense storms and flooding between protracted droughts.

Lower flows and higher temperatures may also reduce water quality within the region. For example, low flows, higher temperatures, and elevated nutrients create a more favourable environment for potentially harmful algal blooms. In addition, decreases

in runoff due to climate change may reduce the extent and function of freshwater wetlands that provide habitat for birds and other wildlife including the regionally significant Ramsar-listed Macquarie Marshes.

WATER QUALITY

Condition

Surface water and groundwater quality

Indicator – Average salinity levels in selected streams

Salinity is measured by placing a conductivity probe in a water sample and measuring the flow of electricity between the electrodes.

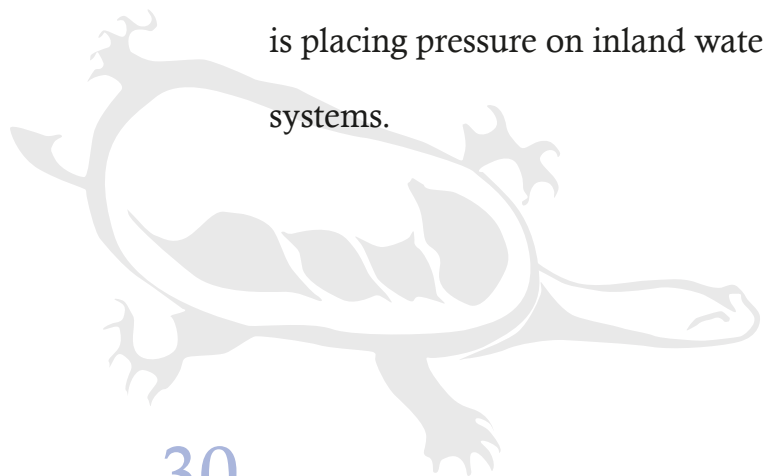


Table 4: Summary Table of Indicator Trends – Water Quality

Issue	Indicator	2014-15	2015-16	2016-17	2017-18	Trend
Surface & Ground Water Quality	Average salinity levels in selected streams (EC)	506	503	438	556	⬇️
	E.coli remote from wastewater treatment plants	194	212	276	401	⬇️
	Average Total Nitrogen in selected streams (mg/L)	0.65	2.2			
	Average Total Phosphorus in selected streams (mg/L)	0.03	0.08			
	Average Turbidity in selected streams (NTU)	12	11			
Riparian	Riparian vegetation recovery actions (number)	27	25	35	44	⬆️
	Riparian vegetation recovery area (ha)	167	178	214	248	⬆️
Industrial/ Agricultural Pollution	Load Based Licencing Volume (kg)	213,219	177,785	274,043	142,673	⬆️
	Exceedances of license discharge consent recorded (number)	13	15	20	15	⬆️
	Erosion & Sediment Control complaints received by Council (number)	48	63	74	74	⬇️
Stormwater Pollution	Number of gross pollutant traps installed	78	84	95	98	⬆️
	Total catchment area of GPTs (ha)	5,513	5,389	5,439	5,584	⬆️
	Water pollution complaints (number)	47	35	34	38	➡️
Town Water Quality	Number of instances drinking water guidelines not met	224	281	147	81	⬆️
	Number of drinking water complaints	810	289	976	294	⬆️

 improvement
  no or little change
  worsening trend

Note – the above trends are for data in 2014-15, 2015-16, 2016-17 and 2017-18 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2017-18. They should be read in terms of the limitations for indicators discussed throughout this chapter. Refer to the Appendix for a list of Councils included in the trend data.



Castlereagh River,
Gilgandra LGA (Barbara
Scott Photography).

Salinity levels can be critical to the survival of some aquatic plants and animals. Many aquatic species can survive only within certain salinity ranges so changes in salinity levels result in changes to the variety and types of species found.

Salinity problems occur where deep rooted vegetation is removed from the land and through some farming practices such as flood irrigation. This means that much more water can infiltrate the soil and causes the water table to rise. This water can move towards the surface, bringing with it large amounts of salt from underground storage. After the water

evaporates, high concentrations of salt remain which can eventually find its way into water-courses. Variation in conductivity between regions can be influenced by changes in geology between areas.

There was a 27% increase in the average salinity level for the three locations which had data available for each of the last four years, probably due to lower water levels. Increased salinity was recorded at each of the three sites: the Bogan River at Gongolgon, the Cudgegong downstream of Windamere dam, and the Macquarie River at Carinda. Note that due to the paucity of available data, the

latter site has been included this year even though it is technically outside the region (it is upstream of Warren in the Walgett LGA).

Indicator – Average Total Nitrogen in selected streams

Indicator – Average Total Phosphorus in selected streams

Indicator – Average Turbidity in selected streams

Water quality sampling results have been collated from eleven streams or rivers in the region. These results have provided a three year analysis for Total Nitrogen, Total Phosphorus and turbidity.

No data was provided this year by the NSW Government for these indicators.

Indicator – E.coli remote from wastewater treatment plants

Indicator organisms are bacteria whose presence in water gives a simple and meaningful indication that faecal contamination has occurred. Such organisms are always present in high numbers in the faeces of humans (and other warm blooded animals and birds).

One of the major indicator organisms of faecal pollution is *Escherichia coli* (*E.coli*). When indicator bacteria are detected in water, their presence indicates that excrement from birds, animals or humans has recently polluted the water and that all types of pathogens (bacteria, viruses, protozoans and parasites) may also be present.

In 2017-18 the average *E.coli* per 100 mL increased by 45% to 400.6 as measured at seven locations in the region. Much higher *E.coli* levels were recorded in the Bathurst, Cabonne and Oberon LGAs. The 1,200 *E.coli* organisms per 100 ml in Bathurst LGA was the highest level yet seen across the region in six years of reporting (50% more than the previous highest reading which was also in Bathurst LGA last year).

Town Water Quality

Indicator – Number of instances drinking water guidelines not met

As shown in Figure 6, the incidences of drinking water guidelines not met were almost 45% less in 2017-18 than in 2016-17, with a particularly big decline reported in the Mid-Western LGA. The total across the region is the lowest in ten years of reporting reflecting continued strong improvements in drinking water quality due to a series of NSW Government and Local Council initiatives.

Indicator – Number of drinking water complaints

The number of drinking water complaints this year was less than a third of the level in 2016-17 with this improvement almost entirely due to a reduction in the Dubbo region after a large spike in complaints last year.

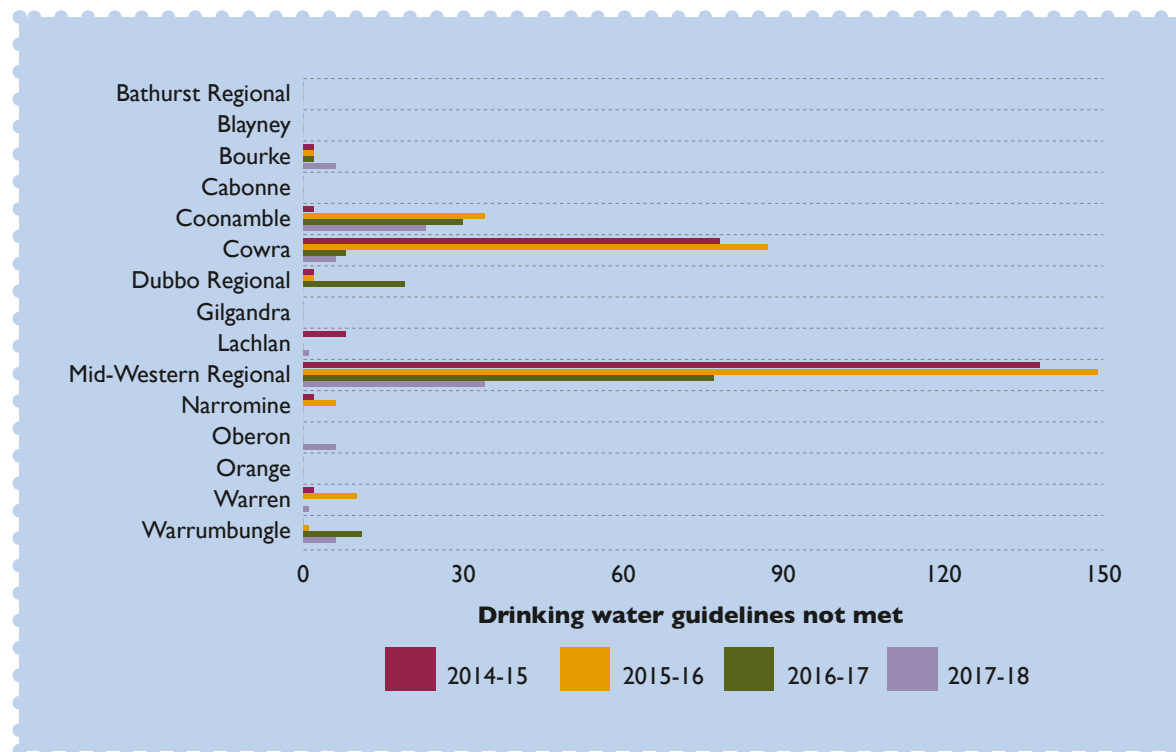


FIGURE 6: Number of instances in which drinking guidelines have not been met.

Threats

Industrial/Agricultural Pollution

Indicator – Load Based Licensing volume

The load-based licensing (LBL) scheme sets limits on the pollutant loads emitted by holders of environment protection licences, and links licence fees to pollutant emissions. LBL is a powerful tool for controlling, reducing and preventing air and water pollution in NSW.

In 2017-18 the total load based licencing volume of pollutants almost halved (48% less)

compared to 2016-17 for the thirteen Councils reporting in each of the last four years.

Approximately 81% of the decrease came from Orange LGA where a return to drier conditions reversed the abnormally high discharges reported last year.

Indicator – Exceedances of license discharge consent recorded

In 2011, the NSW Government passed legislation (*Protection of the Environment Legislation Amendment Act 2011*) which requires Councils to monitor their discharges to the environment (land, water or air) as part

of their Environment Protection License conditions.

The number of incidents of licence discharges exceeding the allowed amount decreased by a quarter in 2017-18 for the thirteen Councils reporting this data in each of the last four years.

Notably however Warrumbungle Shire Council has been excluded from this analysis as it did not report for the previous two years. The Council reported 40 exceedances this year for its first year of reporting.

Indicator – Erosion & Sediment Control complaints received by Council

One measure of the threat to waterways from sediment pollution is the number of erosion and sediment control complaints received by the local Councils. The complaints can range from sediment spilling out of construction sites to obvious plumes of sediment flowing into streams.

The total number of erosion and sediment control complaints across the region was unchanged in 2017-18 for the thirteen Councils reporting in each of the last four years. Notable increases in complaints in the Bathurst, Cabonne and Lachlan LGAs were offset by decreases in the Coonamble, Dubbo and Mid-Western LGAs.

Indicator – Water pollution complaints

In 2017-18, Bathurst, Dubbo and Orange Councils received all but two of the 38 water

pollution complaints in the region. Mid-Western and Oberon were the only other Councils to receive a complaint.

Response

Riparian rehabilitation

The restoration of riparian (river bank) zones is being carried out across streams throughout Australia, costing millions of dollars annually. These efforts are motivated by an understanding that the overall health of our streams is intimately linked with condition of the riparian zone.

Indicator – Riparian vegetation recovery actions *Indicator – Riparian vegetation recovery area*

In 2017-18 there was a significant increase in both the number and area of riparian vegetation recovery actions compared with 2016-17.

Cabonne LGA again reported the largest recovery area of 135 hectares, whilst Dubbo LGA reported 22 discrete riparian vegetation recovery actions.

Stormwater pollution

Litter enters waterways through stormwater and can negatively impact upon water quality and aquatic fauna. Installation of gross pollutant traps (GPTs) is a Council response to litter impacts. These devices trap larger pollutants such as litter and coarser sediments

in stormwater drains and outlets, but they do not trap smaller particles or heavy metals. While there are ongoing costs associated with maintenance and cleaning of these traps, there are significant benefits to aquatic ecosystems and the visual appearance of waterways.

Indicator – Total catchment area of GPTs

Three new GPTs were installed this year in the Gilgandra, Dubbo and Oberon LGAs. The latter two were responsible for the reported increase in catchment area served by GPTs in the region.

WATER QUANTITY

Condition

Indicator – Dam levels

Dam storage levels indicate both the recent rainfall and the pressures that water consumption place on water storages. Six dams in the region – Carcoar, Wyangala, Lake Cargelligo, Windamere, Oberon and Burrendong – were used to indicate dam levels.

No data was supplied by the NSW Government for this year. However, at the end of the 2017-18 reporting period, dam capacities were:

- Carcoar Dam 54%
- Wyangala Dam 54%
- Lake Cargelligo 68%
- Windamere Dam 40%
- Oberon Dam 54%
- Burrendong Dam 27%

Table 5: Summary Table of Indicator Trends – Water Quantity

Issue	Indicator	2014-15	2015-16	2016-17	2017-18	Trend
Dam Levels	Average dam levels	41.3%	39.6%			
Water extraction	Number of Water Supply Work Approvals from surface water sources	2,335	2,168	2,288		
	Volume of surface water permissible for extraction under licences (GL)	725	720	729		
	Number of Water Supply Work Approvals from groundwater resources	16,856	16,781	17,012		
	Volume of groundwater permissible for extraction under licences (GL)	235	222	231		
	Actual volume extracted through groundwater licences (GL)	92	94			
Council water consumption	Area of irrigated Council managed parks, sportsgrounds, public open space (ha)	1,021	1,139	1,198	1,139	↓
	Water used by council for irrigation (including treated and untreated) (ML)	1,833	1,782	1,674	2,490	↓
Town water consumption	Annual metered supply (ML)	25,278	27,026	25,968	29,541	↓
	Annual consumption (Total from WTP) (ML)	25,696	25,419	26,273	28,602	↓
	Average annual household mains potable water usage (kL/household)	234.4	250.1	243.8	270.3	↓
	Average level of water restrictions implemented	0.5	0.6	0.4	1.0	↓
	Water conservation programs (number)	14	14	6	19	↑

 improvement
  no or little change
  worsening trend

Note – the above trends are for data in 2014-15, 2015-16, 2016-17 and 2017-18 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2017-18. They should be read in terms of the limitations for indicators discussed throughout this chapter. Refer to the Appendix for a list of Councils included in the trend data.



CASE STUDY: Riversmart agreement (Warren LGA)

Warren Shire Council and RiverSmart Australia have formed an agreement that describes their partnership arrangement to support and work collectively for the operation of the Windows on the Wetland Centre and develop education, recreation, heritage and tourism for the Warren LGA.

The main aims of the agreement are:

- Learning and building capacity. This includes the sharing of knowledge and lessons learned, organisational development and sustainability and conservation initiatives;
- Conservation, communications and building a conservation ethic. This includes the joint promotion of sustainability strategies as well as communications that will build public conservation awareness and support for conservation;
- Tourism awareness. This includes co-operation to deliver tourism outcomes that promote the region's natural and cultural assets; and,
- Grant funding. To work collaboratively to apply for grant funds identified in jointly agreed strategic planning documents that benefit the environment and tourism development.

It is hoped with both Council and RiverSmart Australia working together, the Centre and Warren will thrive not only economically but with also a major focus on the awareness and conservation of the natural environment of the LGA, including all wetlands and watercourses, and their flora and fauna.

Window on the Wetlands Centre, Warren.



Threat

Surface and Groundwater Extraction

Irrigation places significant pressure on water resources. Historically over-allocation of water licences has seen additional stress placed on aquatic habitats such as the Macquarie Marshes despite the requirement for environmental flows. The demand for groundwater extraction, particularly for irrigation, is increasing in the long-term and placing additional pressure on aquifers and ecosystems.

Indicator – Number of Water Supply Work Approvals from surface water sources

The right to extract irrigation water from surface water sources is regulated under the *Water Management Act 2000*. Under this Act, every pump used to extract water has to have a “Water Supply Work Approval”.

No data was supplied by the NSW Government for this year.

Indicator – Volume of surface water permissible for extraction under licences

Under the *Water Management Act 2000*, irrigators require an “Access Licence” to extract water from surface water sources governed by a water sharing plan, via one or more pumps (Water Supply Work Approvals).

The Access Licences are volumetric entitlements and can be bought and sold with or separately to the land with which they were originally associated.

No data was supplied by the NSW Government for this year.

Indicator – Actual volume extracted through surface water licences

No data was supplied by the NSW Government for this year.

Indicator – Number of Water Supply Work Approvals from groundwater resources

As with surface water, every bore used to extract water has to have a “Water Supply Work Approval”.

No data was supplied by the NSW Government for this year.

Indicator – Volume of groundwater permissible for extraction under licences

No data was supplied by the NSW Government for this year.

Indicator – Actual volume extracted through groundwater licences

No data was supplied by the NSW Government for this year.

Town Water Consumption

Reticulated water consumption is relatively small in comparison to that used for irrigation. In the region it accounts for about 4% of water consumption compared with 88% used for irrigation and 8% for stock and domestic use (Murray Darling Basin Committee, 2007). Nevertheless, with many towns and regional centres growing, there are increasing pressures on water used for town water supplies.

Indicator – Annual metered supply

Metered water supply rose by 13.8% in 2017-18 compared to the previous year for the ten Councils that have reported this data in each of the last four years. The 29,541 megalitres reported by these ten Councils was the highest total reported in the eleven years this indicator has been tracked and over 2,500 megalitres more than the previous highest annual total.

Indicator – Annual consumption (Total from WTP)

As shown in Figure 7 overleaf, in 2017-18 total water consumption rose by 8.9% compared to the previous year for the ten Councils that have reported this data in each of the last four years. Dubbo LGA consumed a total of 12,116 megalitres (a 28% increase) from four water treatment plants (WTPs) across the LGA (it is possible that prior years' data did not include all four WTPs).

Spring Creek overflows,
Orange LGA



Indicator – Average annual household mains potable water usage

In 2017-18, household water consumption rose by 10.9% compared with 2016-17. Oberon Council reported a very small decrease but the other eight of the nine Councils that have reported this data in each of the last four years, reported an increase.

Council Water Consumption

Due to the large number of services they provide, local Councils may be large users of water in comparison to businesses and households. Their efficient use of water is therefore critical to overall water consumption as well as their important role in educating and leading the community in water use minimisation.

Indicator – Area of irrigated Council managed parks, sportsgrounds, public open space

The 4.9% decrease in the total irrigated area in 2017-18 entirely reversed the increase reported last year. Lachlan and Orange LGAs reported significant reductions in their irrigated area.

Indicator – Water used by Council for irrigation (treated and untreated)

Approximately 49% more water was used for irrigation in 2017-18 compared to the previous year by the thirteen Councils that have reported on this indicator in each of the last four years.

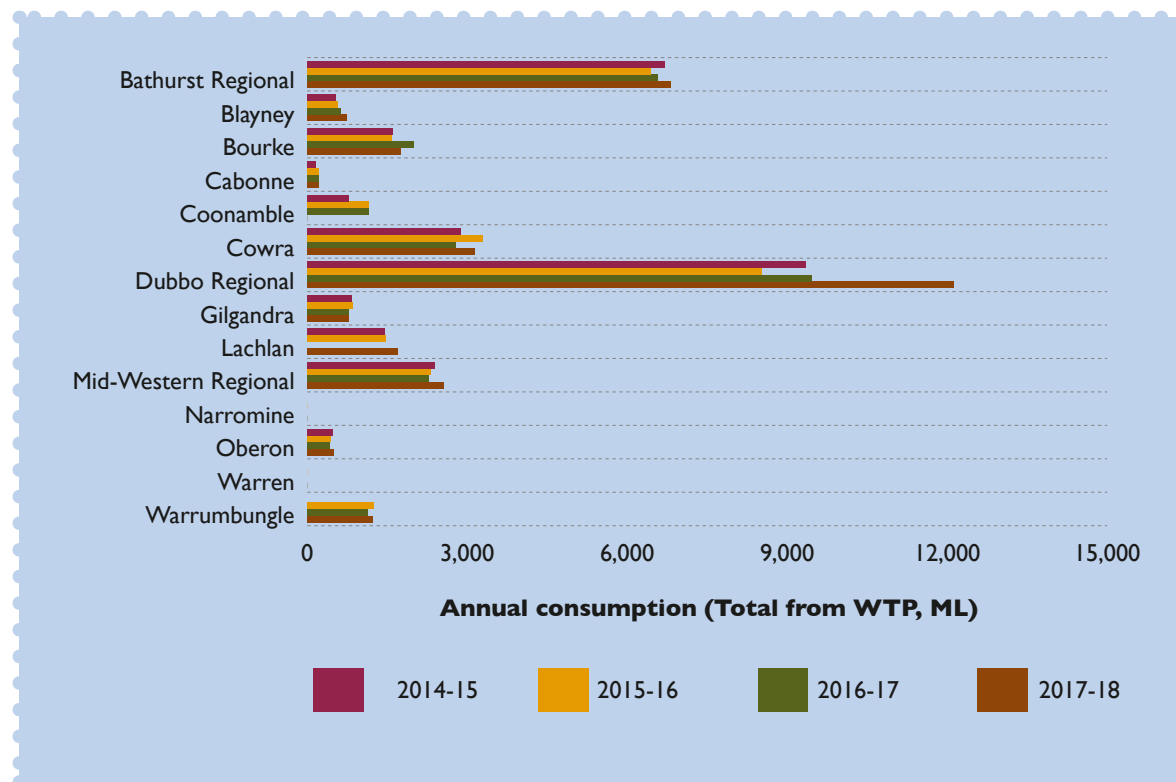


FIGURE 7: Annual town water consumption.

Dubbo LGA's consumption rose by almost 450 megalitres this year and it used more water than all the other Councils combined.

Response

Town Water Consumption

Indicator – Level of water restrictions implemented

Six Councils in the region had water restrictions in place during 2017-18 which is double the number of Councils with restrictions last

year. The Councils with water restrictions were Bourke, Cabonne, Lachlan, Narromine, Orange, Warrumbungle.

As of March 2018, Warrumbungle LGA was on Level 6 (the highest level) restrictions highlighting the severity of the drought in parts of the region. At this time its town water supply Timor Dam was at 28.1% of dam capacity. This dam level was the lowest level that it has been since its construction in 1964 and is lower than the worst level recorded during the 2002 – 2010 Millennium Drought. At the end of the 2017-18 reporting period, Timor Dam had dropped to 24% capacity.

CASE STUDY: Protecting the beautiful Macquarie River – the role of Gross Pollutant Traps (Dubbo LGA)

Everyone in the Dubbo region is connected to the Macquarie River. In the urban areas of Dubbo and Wellington every kerb, pipe, drain, swale, wetland, road, house, business, park, and recreational area is connected back to the Macquarie River via a vast stormwater network. Unfortunately, the stormwater as it flows through this network collects trash, cigarette butts, leaf litter, sediment, oils, pet waste and more.

Dubbo Regional Council uses a variety of water quality improvement measures, including Gross Pollutant Traps (GPTs), to capture this litter and remove larger pollutants from the stormwater before it enters the Macquarie River.

GPTs are installed either above or below the ground and come in many different shapes and sizes. They can often be seen as large metal structures where stormwater pipes meet the river. Each one serves a particular catchment upstream filtering out pollutants before they enter the water.

Since 2008, Council has increased the number of GPTs installed across the Macquarie River catchment area from 20 to 62. That is a massive increase of 42 GPTs in ten years, or close to four GPTs installed per year.

The GPTs are constantly inspected and cleaned by Council to ensure that as many pollutants as possible are captured and removed. The waste removed is collected and taken to the nearest waste and recycling centre for disposal.

While Council is busy street sweeping, rubbish collecting, and emptying all 62 GPTs, it is important that the community play its part in protecting the beautiful Macquarie River by:

- always putting litter in the bin;
- keeping leaves, soil, grass, and rubbish away from drains;
- never dumping oils, fertilisers or soapy water into the gutter;
- cleaning stormwater drains of debris when gardening; and,
- picking up after pets.



Litter collected in GPT.

CASE STUDY: Improving water access and security (Cabonne LGA)

Cabonne Council in association with its Central Tablelands Regional Water Security Partners, Orange City Council and Central Tablelands Water received NSW Government funding under the Restart NSW Water Security for regions program to improve water access and security. The project aims to provide a secure domestic water supply to the towns of Molong, Cumnock and Yeoval.

The Molong Creek Dam yield is inadequate during drought to service the area, and the existing secure yield will not meet the predicted demand. The project is being delivered in two stages, with the initial construction of a 9.8 km raw water pipeline from Orange to the Molong Creek Dam. The project will make use of the Orange City Council water reticulation system by accessing potable water as an emergency water supply.

The second phase of the drought proofing project is the construction of a 49 km length of potable water pipeline from Molong to Cumnock and Yeoval townships. The project will make use of water storage dams located at Molong Creek Dam and Borenore Dam, and the available capacity of the water treatment facility situated at Molong. Ancillary structures including water tanks, break tanks, pump stations, chlorination and telemetry systems will be required to be installed along the proposed route.

Improved water security for the towns of Cumnock and Yeoval would enable potential for sustained long term growth and development. Following completion of the Molong to Cumnock and Yeoval pipeline project these towns will access the Molong Creek Dam supply and benefit from improved water quality and increased water yield.

The design and location of the pipelines within road reserves has taken into account environmental impacts including measures implemented to address aquatic ecology (53 watercourse crossings), flora and fauna assessment, and Indigenous and Non-Indigenous heritage assessment.

Pipe line construction work at Cumnock
(Leon Sutherland, Cabonne Council).



Indicator – Number of water conservation programs

Nineteen different water conservation programs were reported across the Bathurst, Bourke, Cabonne, Dubbo, Gilgandra, Narromine and Orange Councils. Programs included rainwater tank rebates in the Bourke LGA and distribution of free frost covers for water meters in Dubbo. New initiatives included:

- Odds & Evens water restriction program including time allocations in the Narromine LGA
- Water saving tips included in water rates bills by Gilgandra Shire Council.

Lake Cargelligo,
Lachlan LGA





People and Communities

This chapter reports on environmental issues relating to people and communities including Indigenous and non-indigenous cultural heritage, community engagement in environmental matters and air quality.

Councils are responsible for urban planning, infrastructure, some aspects of environmental and heritage protection and restoration, protection and conservation of resources, provision of community facilities, and community services.

Biddon Homestead,
Gilgandra LGA
(Barbara Scott
Photography).



Cultural heritage incorporates both Indigenous and non-Indigenous heritage and both may be threatened by increased development and a lack of management and awareness.

Community volunteering is important to the implementation of environmental actions in many Council areas. Volunteers can be bought together for specific projects or can be

drawn from existing community groups including Landcare, Greening Australia and other local environment groups.

Air pollution can be harmful to our health. Air pollution can contain a mixture of solid particles, liquid droplets and gases from a variety of sources such as industry, motor vehicles, heating appliances, and tobacco smoke.

Table 6: Summary Table of Indicator Trends – People and Communities

Issue	Indicator	2014-15	2015-16	2016-17	2017-18	Trend
Active community involvement	Environmental volunteers working on public open space (hrs)	11,733	13,491	10,646	10,317	↓
	Number of environmental community engagement programs	108	119	104	108	↓
	Number of growers markets/local food retailers specialising in local food	130	139	163	152	↑
Community Impacts	Number of days that air pollution maximum goals for particulate matter were exceeded	1	1	0	3	↓
Indigenous Heritage	Number of Indigenous sites on AHIMS register	10,579	10,850	10,899	11,393	↑
	Inclusion in DCPs & rural strategies (number of Councils which include)	11	11	11	11	→
	Extent of liaison with Indigenous communities (self-assessed from 0 = none to 3 = High)	1.5	1.4	1.8	1.9	↑
	Development approvals on listed Indigenous sites (number)	15	14	11	4	↑
	Number of Indigenous heritage management actions/responses	4	3	8	10	↑
Non-Indigenous Heritage	NSW Heritage Items (number)	109	112	114	115	↑
	Locally listed heritage items (number)	2,667	2,656	2,663	2,668	→
	Actions to protect non-Indigenous heritage (including management plans)	35	29	20	40	↑
	Heritage buildings on statutory heritage lists demolished/degraded in past year	3	1	1	4	↓
	Heritage buildings on statutory heritage lists renovated/improved in past year	86	72	114	94	↑

- ↑ improvement
- no or little change
- ↓ worsening trend

Note – the above trends are for data in 2014-15, 2015-16, 2016-17 and 2017-18 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2017-18. They should be read in terms of the limitations for indicators discussed throughout this chapter. Refer to the Appendix for a list of Councils included in the trend data.

FIGURE 8: Number of
Indigenous sites on the
AHIMS register

Condition

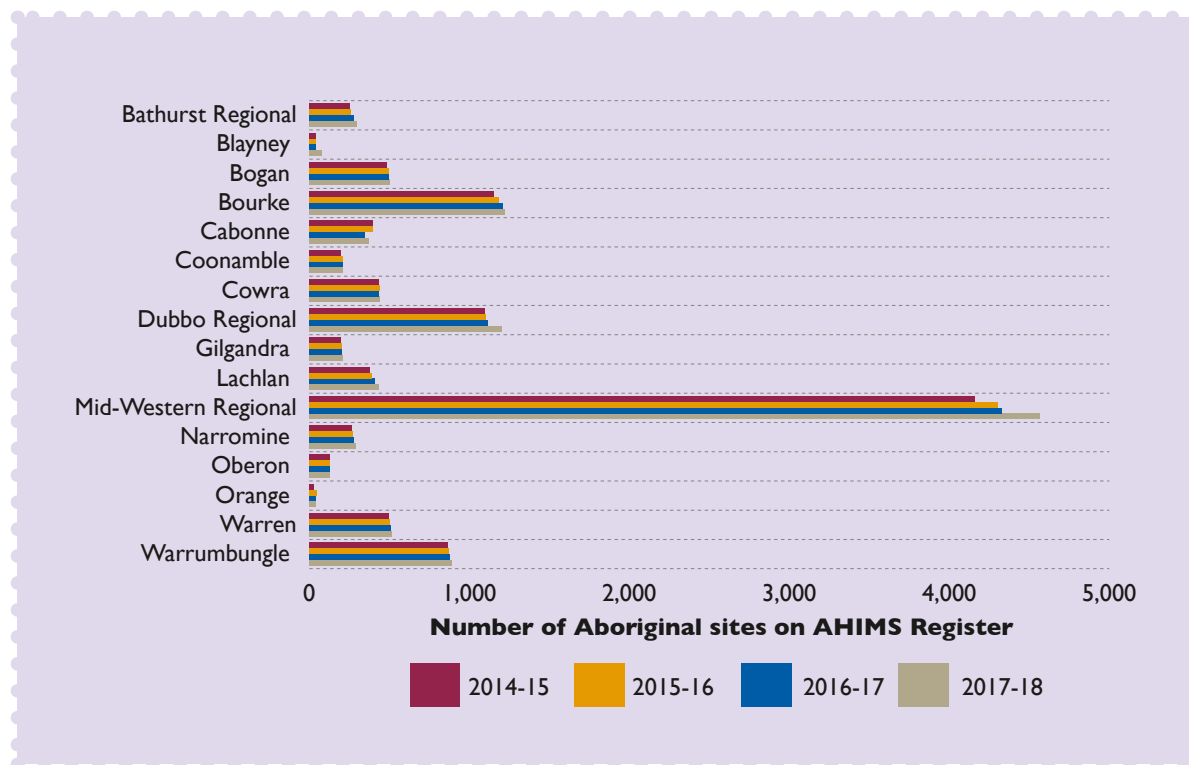
Air

Much of the State-level air quality monitoring is confined to the Greater Metropolitan area which includes Sydney, Wollongong and Newcastle. NSW Office of Environment and Heritage (OEH) monitors one site in the reporting region, Bathurst; however, ozone and particulates are the only air pollutants measured at this site. Particulates can include particles, dust, smoke, plant spores, bacteria and salt. Particulate matter may be a primary pollutant, such as smoke particles, or a secondary pollutant formed from the chemical reaction of gaseous pollutants.

Human activities resulting in particulate matter in the air include mining; burning of fossil fuels; transportation; agricultural and hazard reduction burning; the use of incinerators; and the use of solid fuel for cooking and heating.

Particulate matter can be usefully classified by size. Large particles usually settle out of the air quickly while smaller particles may remain suspended for days or months. Rainfall is an important mechanism for removing particles from the air.

The size of a particle also determines its potential impact on human health. Larger particles are usually trapped in the nose and throat and swallowed. Smaller particles may reach the lungs and cause irritation there.



Fine particles can be carried deep into the lungs and irritate the airways. When exposed to particulate pollution, people suffering from heart disease may experience symptoms such as chest pain, and shortness of breath.

Indicator – Air pollution maximum goals for particulate matter exceeded

Air pollution maximum goals were exceeded at the Bathurst testing station on two days in March 2018 for PM10 particulate matter and one day in May 2018 for fine particles (PM2.5).

Indigenous heritage

The land has great significance to Indigenous people for the role it plays in social and political relations and the cultural construction and transmission of knowledge, as well as spiritual values.

Indicator – Number of Indigenous sites on AHIMS register

In 2017-18 there were 11,393 sites across the region listed on the Aboriginal Heritage Information Management System (AHIMS)



register. As shown in Figure 8 across the region there were 494 sites added since last year, with new sites added in 14 of the 16 LGAs.

Non-Indigenous heritage

Indicator – NSW Heritage Inventory items

There was only one new site listed under the NSW Heritage Act across the region: the Cliefden Caves Area (Natural and Cultural Landscape) near Mandurama in the Cowra LGA. The Cliefden Caves karst

system is one of the most cavernous limestone areas in New South Wales and contains 67 recorded caves. The site has been assessed at state level of significance in historical, social, research and rarity contexts.

Indicator – Locally listed heritage items

The only changes to locally listed heritage items this year were the addition of a total of five sites in the Bathurst, Blayney and Dubbo LGAs.

Threats

Development

Indicator – Development on listed Indigenous sites

Four developments on listed Indigenous sites were reported in 2017-18 with three of these in the Cabonne LGA.

Indicator – Heritage buildings on statutory heritage lists demolished / degraded in past year

Four listed heritage buildings were degraded in the region during the last year: two in the Mid-Western LGA and one in each of the Bathurst and Bourke LGAs.

Indigenous dancers,
Dubbo LGA.

Response

Environmental Volunteerism

Indicator – Environmental volunteers working on public open space

The 10,317 person hours logged by environmental volunteers working on public open space across the region was 3% less than in 2016-17 for the 13 Councils that reported this indicator in each of the last four years. Lachlan Shire Council reported over 600 hours compared to 40 or less in prior years, with several sizeable volunteer planting

CASE STUDY: Multipurpose Function Venue (Lachlan LGA)

In November 2017, Lachlan Shire Council announced the completion of the \$2.7 million SRA Pavilion. The Pavilion is a multipurpose venue funded by the NSW Government and Lachlan Shire Council. The new facility will provide the Shire with a venue that can hold a variety of functions, such as weddings, concerts, parties, exhibitions, conferences, sporting events, presentations, indoor markets and annual show exhibitions.

The new Pavilion replaced the existing SRA Hall constructed in 1938. The Hall was condemned due to a number of risks and hazards identified (mainly structural), leaving community groups, sporting organisations, the show society and the general public without a venue for major events. The dilapidation of the building encouraged Council to apply for grant funding under the Public Reserves Management Fund Program.

The new Pavilion not only generates social and economic activity but enhances the visual aesthetics of the sporting grounds and town's image.



Multipurpose Function Venue from the air.

projects. Cowra Shire Council dropped to zero from 350 hours a year but this was because volunteer time was replaced by employing a local Indigenous group.

Indicator – Number of environmental community engagement programs

The number of environmental community engagement programs across the 14 Councils reporting in each of the last four years rose by 3.8% in 2017-18. There were increases in the number of programs run by some of the smaller councils including Gilgandra which ran six programs including recycling stalls at local shows, recycling adverts on TV, a BYO coffee cup promotion and a local Waste to Art competition.

Local food outlets

Indicator – Number of growers' markets/local food retailers specialising in local food operating within LGA

There was a small decrease in this indicator in 2017-18 due to Cabonne Council reducing its number after reporting fifteen new outlets last year. The Cabonne LGA does however still have almost half the region's total number of growers markets and/or local food retailers specialising in local food. Whilst growth in this indicator may have slowed, there were still new outlets reported such as the two new organic and local food shops which opened in Coonabarabran during 2017-18.

Indigenous heritage

Indicator – Indigenous heritage inclusion in DCPs & rural strategies

Thirteen (13) Councils in the region considered Indigenous heritage within their planning and approval processes, including Narromine and Warren Shire Councils who did not report meeting this indicator every year.

Indicator – Extent of liaison with Indigenous communities

Six (6) Councils in the region reported having a high level of liaison with local Indigenous groups, and 13 of the 15 Councils reported some level of liaison. Examples include Warren Shire Council holding quarterly meetings with the Local Lands Council, and Narromine Shire Council signing a new MOU with the local Aboriginal community.

Indicator – Actions to protect Indigenous heritage (including management plans)

In 2017-18, a total of ten specific Indigenous heritage management actions/responses were reported across the region. This is the equal highest number recorded (level with 2013-14) since this indicator was first evaluated in 2008-09. An example was Cabonne Council which worked with the local Indigenous community to amend a proposed pipeline development to avoid disturbance of identified Aboriginal sites.

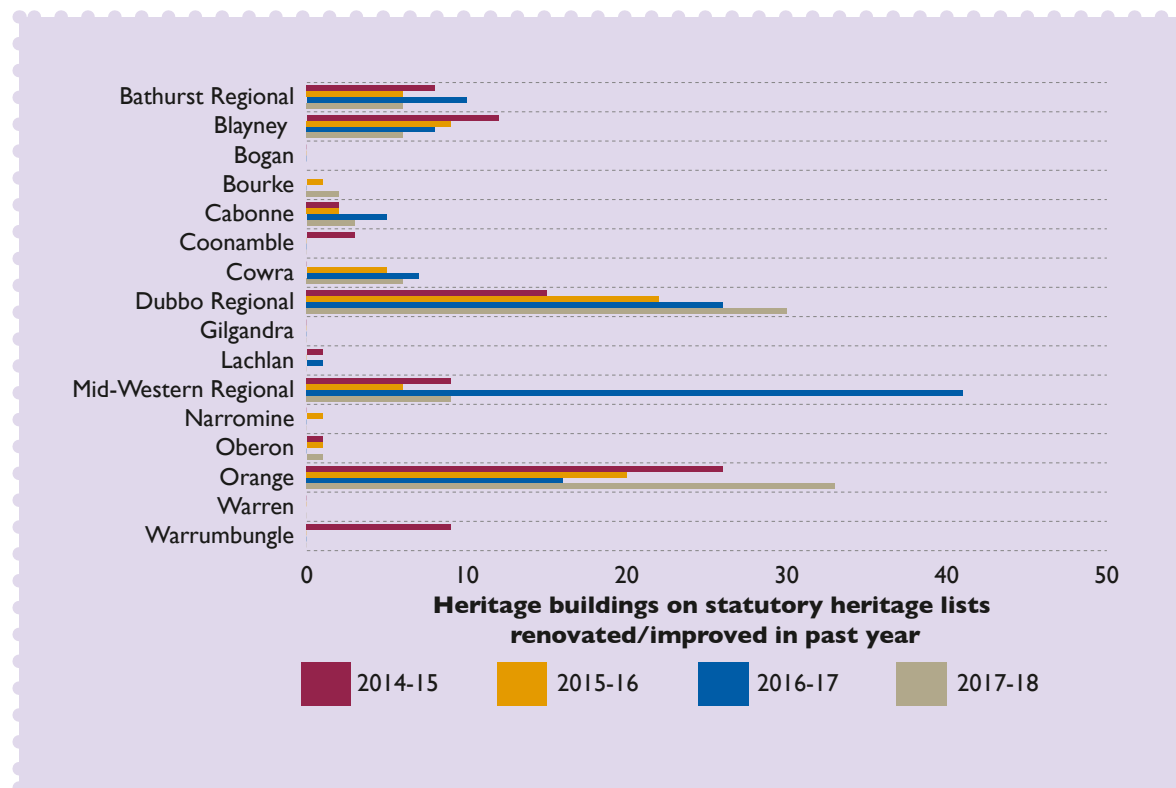


FIGURE 9: Number of Heritage buildings on statutory heritage lists renovated/improved

Non-Indigenous heritage

Indicator – Actions to protect non-Indigenous heritage (including management plans)

In 2017-18, there were 40 actions reported by the 13 Councils which have measured this indicator in each of the last four years – this was double last year's number. The most active Councils were Bathurst, Blayney, Dubbo and Gilgandra. Nine buildings within the Gilgandra Shire were renovated/repared by local property owners and community groups with the help of the Council's Local

Heritage Fund, including the original Gilgandra hospital and police station.

Indicator – Heritage buildings on statutory heritage lists renovated / improved in past year

In 2017-18, 94 heritage listed buildings were renovated or improved across the region, including 30 within the Dubbo LGA and 33 within the Orange LGA.

As shown in Figure 9, this figure is lower than last year's but higher than preceding years.

Water tower art by
John Murray,
Coonamble LGA



CASE STUDY: Conservation in Action Conference - Bathurst

‘Conservation in Action: research to reality’ was a conference held at Bathurst in May 2018 that successfully brought together industry leaders in the conservation field. From scientists to policy makers, program managers through to specialists in implementing works in the field, this event pulled together all disciplines of natural resource management to demonstrate how the conservation industry is turning research into reality.

The conference was organised as a partnership between Central West Councils Environment & Waterways Alliance, Central Tablelands Local Land Services and Central Tablelands Landcare and attracted 150 delegates from across NSW, Victoria, Queensland and the ACT.

The conference program boasted a full two days of presentations from leaders in their respective fields with sessions pulling together research findings and case studies as well as successfully demonstrating all of the policies, programs and plans in between that enable environmental practitioners to implement best management practice on the ground.

The major sponsor of the event was Bathurst Regional Council which supported the event through the provision of the Bathurst Memorial Entertainment Centre, a nationally recognised performing arts centre with outstanding facilities for a conference of this type.

Speakers from a variety of institutions (Local, State and Federal Government, education, Landcare and private industry) were invited to present. They were selected based upon their expertise in their respective fields and were limited to 12 minute presentations in order to provide highlights of their work as a teaser to encourage conference delegates to further engage, make connections and lead to future partnerships and work in recovering threatened species.

This approach proved hugely successful with 95% of delegates polled advising that their networks had expanded as a direct result of attending the conference.



CASE STUDY: Dealing with illegal dumping (Coonamble LGA)

Coonamble Shire Council operates a waste management facility on the western side of Coonamble on the Quambone Road. This is where the refuse for the towns of Coonamble, Gulargambone and Quambone is deposited after weekly collection.

However, as is the case in many shires, illegal dumping is an ongoing problem. In Coonamble this is of particular concern in an area known as the “Back Stock Route” which is situated very close to the township on the eastern side, just over the levee bank and between the levee bank and the Council Common. The overflow from the Warrena Weir flows under a bridge into a creek and the stock route along the creek bed. Water in this creek varies from non-existent in times of drought to very large volumes in times of flood.

The close proximity to town whilst being hidden from view by the levee bank and tree tops makes this site ideal for illegal dumping. Council spent 24 hours with a back hoe and tip truck collecting rubbish which included household rubbish, dead animals and old fencing.

A scrap metal buyer was also engaged who removed more than ten abandoned vehicles of various ages and stages of decay. This has cleared the watercourse.

Council has placed fallen trees in the watercourse to slow the flow of water when the weir overflows to make for a more prolonged access for wildlife. This ponding or pooling effect is also assisting in the growth of trees which have been planted to help stabilise the banks of the creek.

Council in conjunction with the Castlereagh Macquarie County Council, has sprayed for priority weeds including African Boxthorn, Bathurst burr, Noogoora burr and Prickly pear.

Council is pleased to have removed the dumped rubbish and made the area more habitable for aquatic species and other wildlife.



Example of illegal dumping.



Towards Sustainability

The term sustainability can have a different meaning to different people. It's about taking what we need to live now, without jeopardising the potential for people in the future to meet their needs. Environmental sustainability involves making decisions and taking action in the interests of protecting the natural world, with particular emphasis on preserving the capability of the environment to support human life.

Solar panels, Aquatic Centre, Orange LGA



Local Councils, who play a key role in managing the natural environment and leading by example, need a sound understanding of sustainability so they are able to reduce environmental impacts and associated costs and improve the quality of life for their local communities.

This chapter outlines what the Councils in the reporting region are doing to move towards environmental sustainability in the areas of:

- Waste management
- Resource purchasing and use
- Climate change
- Policies and procedures.

Condition

Solid Waste

Solid waste generated within the reporting area originates from the following general sources:

- Municipal: comprises general household waste and garden organics (including waste from the Councils' kerbside collections and waste taken directly to landfills by residents).
- Construction and Demolition: includes waste from construction and demolition activities generally associated with development.

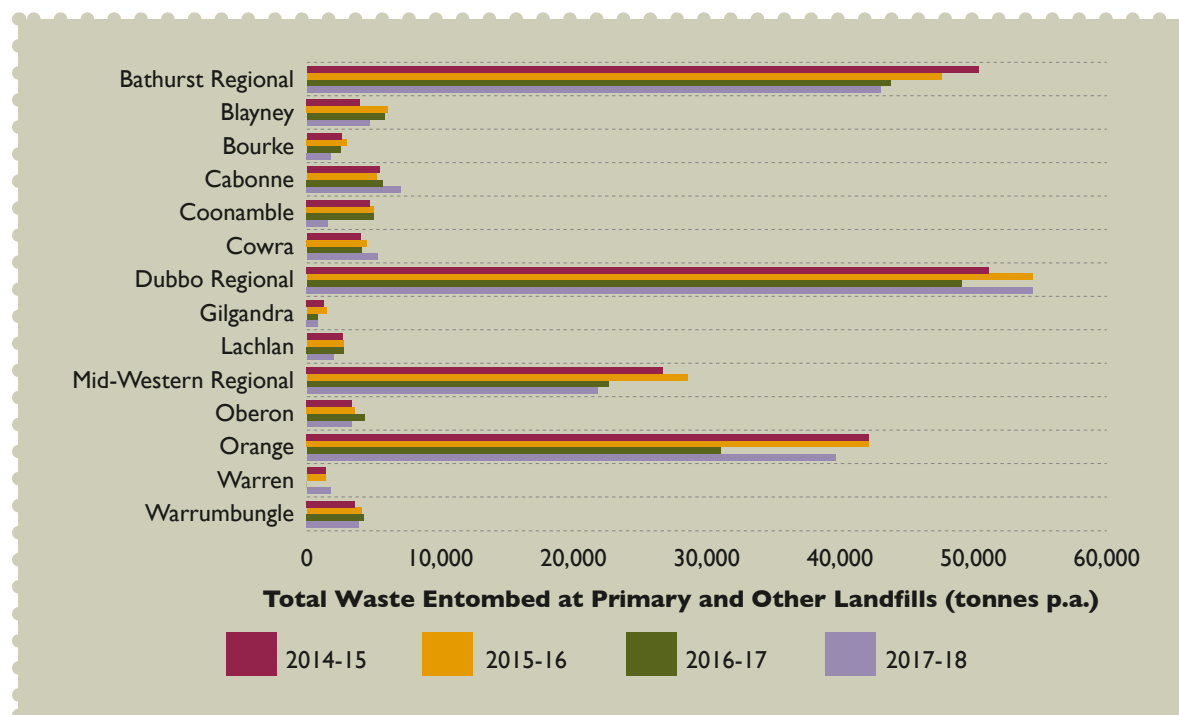
Table 7: Summary Table of Indicator Trends – Towards Sustainability

Issue	Indicator	2014-15	2015-16	2016-17	2017-18	Trend
Waste Generation	Total waste entombed at primary landfill (tonnes)	174,000	180,000	146,000	151,000	↑
	Total waste entombed at other landfills (exc recyclables)(tonnes)	27,841	28,310	35,939	38,461	↓
	Average total waste generated per person (tonnes)	0.93	0.95	0.78	0.83	↑
	Average cost of waste service per residential household	\$280	\$304	\$337	\$349	↓
Hazardous/ Liquid Waste	DrumMuster collections (number of drums)	37,313	26,418	64,238	91,077	↑
	Household Hazardous Wastes collected (kg)	36,705	41,577	50,964	40,939	↓
Reduce	Organics collected (diverted from landfill) (tonnes)	26,576	29,150	40,442	35,240	↑
	E-Waste collected (diverted from landfill) (tonnes)	41	49	82	109	↑
Recycle	Volume of material recycled(tonnes)	24,723	29,327	25,949	32,417	↑
	Volume of material recycled per person (kg)	109	123	111	139	↑
Littering and illegal dumping Engineering, Infrastructure and Civil Works	Number of illegal waste disposal complaints to Council	437	327	464	544	↓
	New road construction (km)	27	10	15	17	↑
	Road upgrades (km)	1,443	751	1,315	1,249	↓
Risk Management	Flood management plans/ flood mapping - increase in area covered (ha)	695	0	2,513	303	↓
	Hazard reduction burns (number)	9	21	15	14	↑
Climate Change Mitigation	Office paper used by Council (A4 reams)	26,272	24,524	23,799	21,227	↑
	Council sustainability initiatives (number)	59	70	59	67	↑
	Council mitigation initiatives (number)	20	23	23	31	↑
Council Greenhouse Gas Emissions	Annual electricity consumption for Council controlled facilities (MWh)	68,137	66,558	71,540	74,320	↓
	Annual natural gas consumption for Council controlled facilities (Gj)	35,088	35,492	43,374	36,597	↑
	Annual bottled gas consumption for Council controlled facilities (L)	32,580	29,254	40,591	39,273	↓
	Total fuel consumption (KL)	8,371	8,345	7,538	8,277	↓
	Proportion of Council's electrical energy demand met from council-owned renewable energy infrastructure	0.75%	0.88%	1.29%	1.50%	↑
	Council total operational greenhouse gas emissions (tCO _{2-e/year})	191,000	221,000	208,000	191,000	↑
Community Greenhouse Gas Emissions	Small scale renewable energy uptake (kW installed)	11,116	11,413	10,856	17,818	↑
	Number of solar water heaters and heat pumps installed	302	230	163	170	↓

 improvement
  no or little change
  worsening trend

Note – the above trends are for data in 2014-15, 2015-16, 2016-17 and 2017-18 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2017-18. They should be read in terms of the limitations for indicators discussed throughout this chapter. Refer to the Appendix for a list of Councils included in the trend data.

FIGURE 10: Total waste entombed at primary and other landfills



- Commercial and Industrial: includes waste from commercial activities in the area including businesses and restaurants etc.

This waste requires transport, recycling where possible or disposal which uses significant energy resources, as well as creating potential pollutants in the form of air and water pollution and greenhouse gas emissions such as methane. Noise pollution may also occur at some landfills or from the transport of waste.

Indicator – Total waste entombed at primary landfill

Indicator – Total waste entombed at other landfills (excluding recyclables)

As show in Figure 10, total waste to landfill for the region (primary plus other landfills) rose by 4.2% compared to 2016-17. A large proportion of the increase this year was due to a one-off event in Orange where the demolition of the old Orange Base Hospital resulted in over 9,000 tonnes of asbestos contaminated materials and soil from the site being taken to the primary landfill.

Indicator – Average total waste generated per person

The average waste per person in the region was just over 0.8 tonnes in 2017-18. There is still a large disparity between the rural LGAs and those LGAs with larger population centres such as Bathurst, Dubbo and Orange. These LGAs each average approximately 1 tonne per person compared to a range of 0.2 to 0.67 tonnes per person for the smaller LGAs, and just under 0.9 for Mid-Western.

Indicator – Average cost of waste service per residential household

The average cost of waste services has increased by 4.3% across the region in 2017-18 compared to the previous year. The cost of waste services rose in all but one of the LGAs this year. The only Council to report a lower waste service cost was the Coonamble Shire, which reported its lowest average cost since 2012-13.

Threats

Illegal Dumping

The number of complaints about rubbish dumping does not necessarily reflect the frequency of incidents, nor the impact of illegal dumping. It does, however, indicate community awareness of illegal dumping and

Indicator – Illegal waste disposal complaints to Council

Road construction and upgrades

Indicator – New road construction

Indicator – Road upgrades

Greenhouse Gas Emissions

Illegal dumping,
Dubbo LGA.

Indicator – Annual electricity consumption for Council controlled facilities

water facility pumping and associated increased electricity use.

Indicator – Annual natural gas consumption for Council controlled facilities

As with electricity, the use of gas provides an indication of contributions made by Councils to greenhouse gas emissions. It should be noted that natural gas has a lower carbon footprint than conventional electricity, meaning that changes to the number of premises using gas instead of electricity could provide potential greenhouse emission reductions.

Only five Councils reported any use of gas for Council controlled facilities and their total consumption fell by over 15% during the

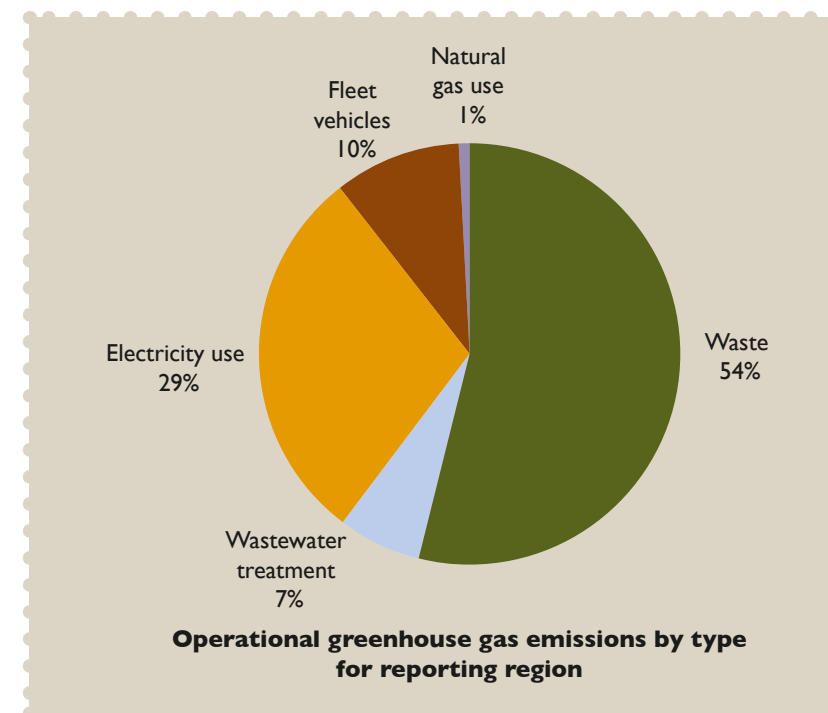
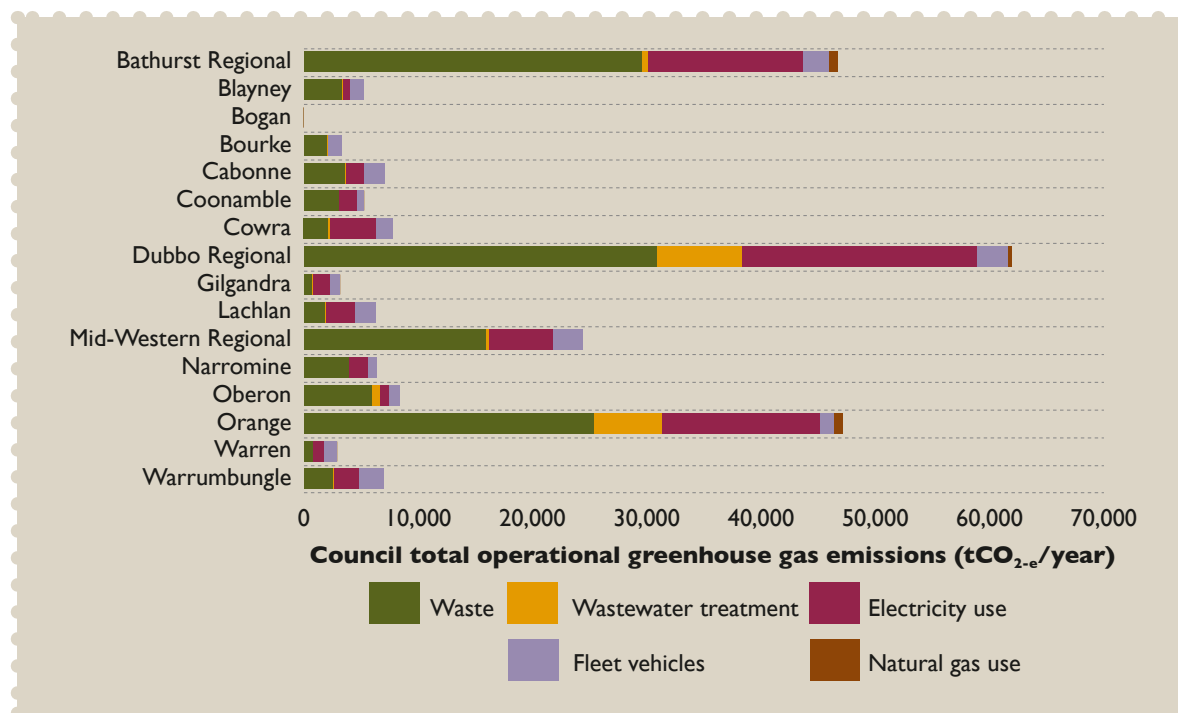


FIGURE 11: Council total operational greenhouse gas emissions 2017-18

2017-18 year. Blayney and Dubbo Council's usage reverted to previous levels after a large one-off increase reported last year.

FIGURE 12: Sources of Council generated greenhouse gas emissions across the region 2017-18

Indicator – Annual bottled gas consumption for Council controlled facilities

Bottled gas has lower CO₂ emissions than some energy sources, such as coal fired electricity, making it a better choice for the environment.

Bottled gas consumption decreased by 3.2% for the seven Councils that reported this statistic. Dubbo Regional Council consumes 66% of the bottled gas reported for the region, however its 2017-18 usage was 8.5% less than in 2016-17.

Indicator – Total fuel consumption

As with electricity and gas consumption, fleet fuel use is a significant contributor to greenhouse gas emissions from Council operations.

Fuel consumption from Council owned vehicle fleet and plant was significantly higher in 2017-18 than in 2016-17 for the 14 Councils reporting this data in each of the last four years.

E10 consumption in the region has actually declined over the last few years and is less than 30% of regular unleaded petrol consumption, whilst the use of biodiesel and LPG is almost non-existent.

Indicator – Council total operational greenhouse gas emissions

Total greenhouse gas emissions calculated for the region in 2017-18 were 10.2% less than reported in 2016-17. The largest contributing factor was an increase in the methane flaring offsets from Bathurst and Dubbo LGAs.

Before offsets, the total emissions for the region (as shown in Figure 11) were similar to 2016-17, largely due to increased electricity consumption across the region compared to 2016-17.

The sources of Council generated greenhouse gas emissions across the region in 2017-18 are shown in Figure 12.

CASE STUDY: Moving to Electric Vehicles (Bathurst Regional LGA)

Bathurst Regional Council has strategically acknowledged that there will be change within the automotive landscape over the next decade and electric vehicles will be increasingly popular. At the moment, electric vehicles (or EVs) represent a very small proportion of the Australian car market, but this is predicted to increase to 20-40% in the next 7-10 years. It is therefore very important to be prepared for this change.

Tesla is leading the change in the EV market. The cars are comfortable, desirable, fast and cool - they can even drive themselves. Like all EVs, Teslas can be charged at the owner's home but when travelling distances greater than the 450-550 km range, a place to recharge quickly is needed. The Tesla Supercharger can recharge the battery pack to 80% in around 30 minutes. So far, Superchargers had been placed along key routes from Brisbane – Sydney – Canberra – Melbourne – Adelaide. Inland routes were the next logical step and there was an opportunity to make Bathurst the first city in Central NSW to have a Supercharger installed.

Tesla agreed that at approximately 200 km from Sydney, Bathurst was key to opening up inland NSW. In December 2017, a temporary Supercharger was installed in the CBD whilst approvals are sought for a larger permanent location. Located in the middle of the city, the 2-bay temporary Supercharger is in a great spot. Indeed, most drivers use the time to wander around town, buy a coffee, sit down for lunch or do some shopping. That's money spent in the local community.

The same rationale can be applied to other EV owners and if the predicted change happens, the city needs to be ready. Council is now investigating locations for universal chargers that can be used by any model of electric vehicle. These will be placed in central city locations and also near key tourist attractions. They will be a mix of fast chargers (for stop and go) and slower destination chargers for visitors happy to wander around the local sights.

EV charging stations are an important part of Bathurst Regional Council's Smart City Initiative. The city is positioning itself to be a regional leader in not only supporting cleaner transport in the tourist economy, but also within Council fleet and the local community.



Temporary Supercharger, Bathurst CBD (Joel Little).

CASE STUDY: Return and Earn (Warren LGA)

Warren Shire Council, after receiving overwhelming support from the local community, approached Tomra Cleanaway NSW regarding the establishment of a reserve vending machine or over-the-counter collection point at the Local Council.

After consultation with Tomra Cleanaway NSW, Council realised that as it did not open its administration centre during weekend hours that housing the collection point within Council buildings was not suitable.

Council's Waste Committee drafted and sent letters to business houses within the LGA to contact the Return and Earn contractor to register their interest in hosting an over-the-counter collection point.

There was a lot of interest from business houses, with JC's Cotton Café and Takeaway in Dubbo Street awarded the contract.

The scheme has been a roaring success with some weeks of trade recording up to 18,000 deposits.

Council's waste committee has also written to local sporting groups, charities and community groups outlining the fundraising benefits of the scheme and requesting local groups to ask for the donation of containers at their events to raise additional funds, as well as prevent the containers entering landfill.



Over-the-counter collection point, Warren.

Response

Hazardous Chemicals

Councils in the region are active participants in the DrumMuster program, which provides a collection service for agricultural chemical containers on an ongoing basis throughout the region.

Indicator – Farm chemical drums collected through DrumMuster collections

Over 91,000 farm chemical drums were collected through DrumMuster across the region in 2017-18. This was 42% more than 2016-17 and more than three times the number reported two years ago. The LGA with the highest number of drums collected was Narromine for the second consecutive year. There were also large increases in collections within the Lachlan and Warren LGAs.

Hazardous Waste Collection

NetWaste and participating Councils introduced a biennial hazardous household waste collection for member Councils in response to limited alternative services available.

Indicator – Household Hazardous Wastes collected

The amount of household hazardous waste recycled through the NetWaste contract fell

by almost 20% in 2017-18 compared with 2016-17. The only increases were in the Dubbo, Gilgandra and Narromine LGAs.

Reducing waste disposal

Avoiding the creation of waste is generally seen as the best strategy for dealing with the problems it creates. Key responses to deal with waste include reducing the volume of waste reaching landfills, minimising the environmental impacts of waste facilities, and encouraging the development of new waste treatment and recycling facilities.

Indicator – Garden organics collected (diverted from landfill)

The total volume of garden organics collected for the region decreased slightly in 2017-18 compared to last year's record total. The almost 37,000 tonnes collected however is still substantially higher than for previous years. Significant increases occurred in the Bathurst, Dubbo and Gilgandra LGAs. Warrumbungle LGA reported no collections this year compared to 5,000 tonnes collected last year.

Indicator – E-Waste collected (diverted from landfill)

E-waste items sometimes contain precious metals such as copper and platinum that should be reused. Computer screens and TVs contain toxic chemicals such as lead, mercury

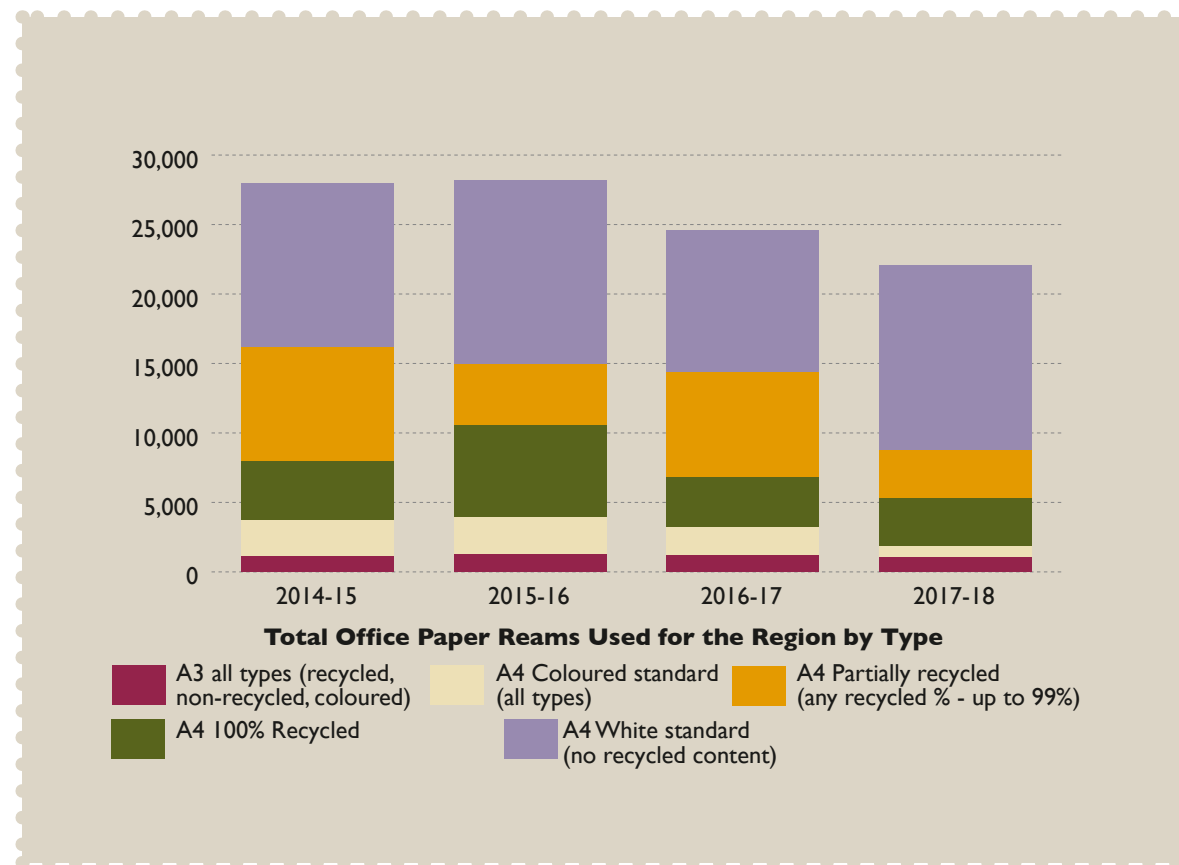


FIGURE 13: Amount of office paper used across the region

and arsenic, which can leach out from landfills and into waterways.

The e-waste collected is diverted from landfill and around 95% of materials recovered are recycled.

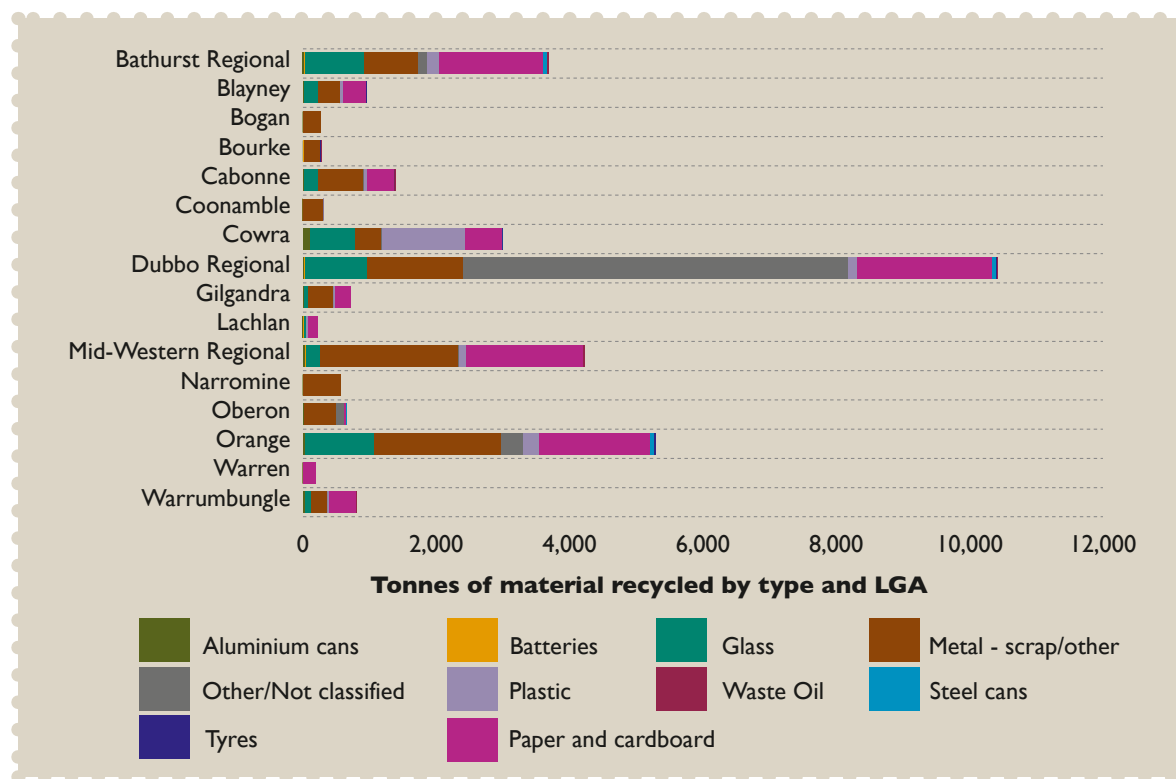
E-Waste collection increased by 33% in 2017-18, the second highest level of collection in ten years. Mid-Western Regional Council had the highest level of e-waste collection for the third successive year, with 34.5 tonnes (or 31% of the region total).

Indicator – Office paper used by Council

As relatively large employers and community leaders, local Councils can be used as one indicator of changing office practices and increased awareness to minimise the use of office paper.

As shown in Figure 13, there is a continuing steady decline in the total quantity of office paper used by Councils across the region with a further decrease of almost 11% in 2017-18 compared with

FIGURE 14: Type of materials recycled 2017-18



2016-17. This positive result however has been offset by a decrease in the amount of recycled or partially recycled paper being utilised by Councils, with usage dropping to just over 30% from an average of over 40% in the three previous years.

Reuse

After reduction of potential waste, reuse is the next most effective method of waste management. This should be done prior to discarding or recycling any materials.

Indicator – % Effluent reuse & location of reuse

Eight Councils reported reusing effluent and/or biosolids during 2017-18. For example, Coonamble Shire Council reported reusing effluent to maintain turf at its racecourse.

Recycle

Indicator – Volume of material recycled

Indicator – Volume of material recycled per person

The total amount of material recycled across the region in 2017-18 was 25% higher than in

2016-17, with an average of 139 kg recycled per person across the 15 LGAs that have reported this data in each of the last four years.

The two LGAs with the highest recycling rates in 2017-18 were Cowra and Dubbo each reporting 200 kg or more recycled per person.

The breakdown of the type of materials recycled in each LGA is shown in Figure 14.

Resilience to natural hazards

The region has been impacted greatly by natural hazards in recent years. These natural hazards include flood, drought, heatwaves and bushfires.

Resilience is defined as the ability of a community or ecosystem to 'bounce back' to normal functioning after a crisis (emergency or disaster). Some communities can transform, improve and therefore 'bounce forward' after these events.

Risk mitigation is a key to natural hazard resilience and in the region includes the preparation and implementation of flood and bushfire risk management plans.

Indicator – Flood management plans/flood mapping – increase in area covered

The NSW Floodplain Development Manual (2005) requires Councils to prepare floodplain risk management studies and plans for flood-impacted communities within their LGA.

During the 2017-18 year, Cowra Shire Council completed a new flood study

CASE STUDY: Investigating a new method for kerbside waste compaction (Bogan LGA)

Bogan Shire Council is currently investigating the effectiveness of kerbside waste compaction by Hydraulic Ram for trench disposal as compared to the traditional compaction method by traxcavator.

The trigger that brought about the investigation was the reduction of disposal cell size approved under the Bogan Shire Council Environmental Impact Statement (EIS) for the Nyngan Waste and Resource Management Facility located on Canonbar Road.

The specifications for the reduced cell size were intended to control five primary environmental problems caused by landfill:

- Protection of the natural aquifer;
- Preventing fire;
- Preventing wind-blown litter;
- Prevent scavenging; and,
- Leachate management.

The outcome of the EIS consent prompted a rethink which questioned if the traditional method of landfill management sought by the EIS could be made more effective.

Preliminary investigations identified the existence of equipment currently on the market that could economically and more effectively meet the EIS requirements as compared to the traditional traxcavator method.

It was revealed that not only did the alternative equipment have the capacity to compress kerbside waste to a 4:1 ratio and greater but when combined with landfill minimisation achieved by a manned waste facility then the current life expectancy of 16 years would be increased to 64 years.

The process of hydraulically ramming kerbside waste into solid blocks has not only indicated a significant cost saving when compared to traditional methods but also has there is the added advantage of greater control over the identified environmental problem areas addressed in the EIS.

A comprehensive information and cost analysis is currently being prepared with a view to making recommendations for Council's consideration.

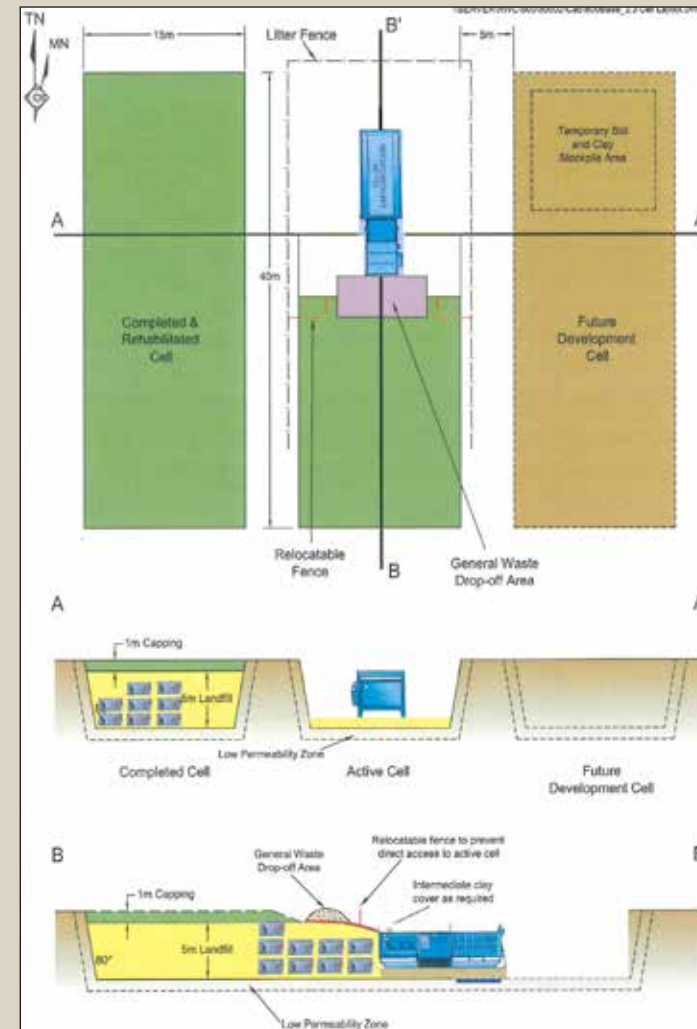


Diagram of Waste Facility

CASE STUDY: Container Deposit Scheme (Cowra LGA)

Cowra's Container Deposit Scheme (CDS) commenced on 1 December 2017. This scheme was introduced as a litter reduction campaign by the NSW Government through the Environment and Protection Authority (EPA).

Cleanaway/ Tomra were the preferred coordinators of this scheme to run the logistics for the NSW State area. Once this scheme commenced Cleanaway/ Tomra was left in possession of a significant amount of recyclable products once the CDS component was completed.

The CDS product is entirely made up of recyclable materials, with legislation governing the CDS stating that all materials collected under this scheme must be recycled. Cleanaway have its own recycling facilities in major urban areas, however they do not have such a facility located in the Central West area. This leaves Cowra Shire Council's Materials Recycling Facility (MRF) as a viable option. Therefore Council was approached to accept the containers deposited via the scheme by Cleanaway/ Tomra throughout the Central West including Cowra, Bathurst, Orange, Mudgee, Oberon, Dubbo, Parkes, Forbes, Lithgow and Wellington.

Cleanaway/ Tomra drop the materials off to the facility, with Council taking ownership of the material for sorting and recycling. Council agreed to enter into a 12 month trial until the end of November 2018 to test the viability of the operation, with a view to entering into an extended contract (up to ten years) with Cleanaway/ Tomra. The facility has now been processing this material since December 2017 and has proven to be a profitable business opportunity for the Cowra Shire Council.

Since the CDS commenced, Council processed on average 300 tonne per month of materials. The yearly total is expected to exceed 3,000 tonne.

Since January the MRF has employed five casual staff. This has been needed to ensure the product can be sorted, processed and loaded for shipment. The influx of the material has increased the workload of all staff at the facility significantly. This is due to the need to receive, sort, process and ship materials, as well the substantial accounting required to ensure compliance and auditing of the financials.



Container storage

covering an area of 303 hectares. In addition, ongoing flood studies are underway in Mid-Western (Mudgee) and Coonamble LGAs.

Indicator – Hazard reduction burns

Hazard reduction works provide areas of reduced fuel that can significantly reduce fire behaviour and aid fire suppression activities. There are different types of hazard reduction for bushfire including controlled burning, mechanical clearing like slashing undergrowth, or even reducing the ground fuel by hand.

Although hazard reduction burns are advantageous to the safety of communities and properties, they can have at least a deleterious impact on the natural environment if they are not conducted sympathetically with the appropriate fire regime for each vegetation community.

There were 14 hazard reduction burns reported across the region in 2017-18. Eleven (11) of these were within the Mid-Western LGA, impacting a total of 1,175 hectares.

Indicator – Natural disaster declarations

LGAs declared natural disasters are eligible for Natural Disaster Assistance Schemes. These schemes include disaster assistance for individuals, loans for primary producers, loans to small businesses and grants to Councils.

The following natural disasters were declared within the region during 2017-18:

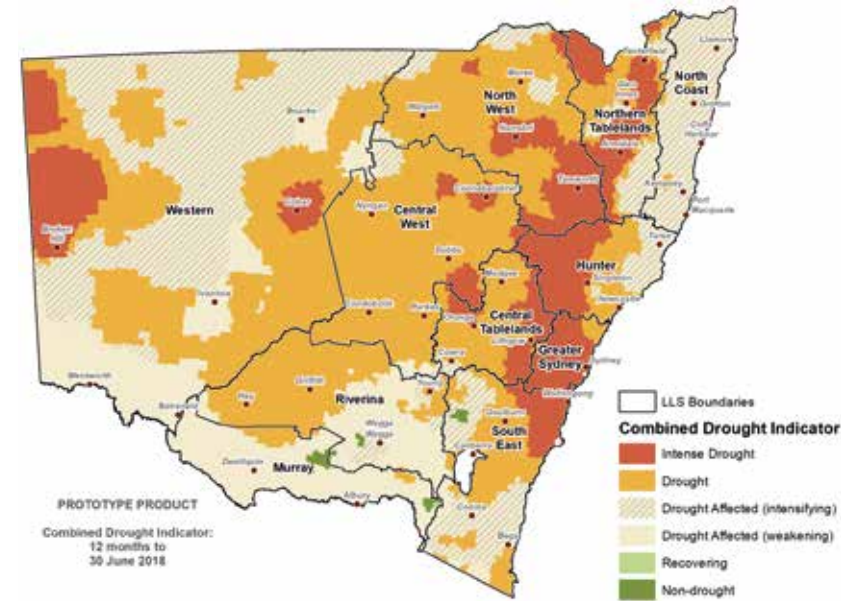
- Bushfires - 9 February 2018
 - Bathurst
 - Cabonne
 - Orange
- Bushfires - 23 January 2018
 - Mid-Western
- Bushfires - 17 January 2018
 - Warrumbungle
- Storms - 18 November 2018
 - Bogan

Drought

On 12 March 2018, the majority of the region was declared as under drought onset conditions including the following LGAs:

- Bathurst
- Blayney
- Cabonne
- Coonamble
- Cowra
- Dubbo
- Gilgandra
- Mid-Western
- Narromine
- Orange
- Oberon
- Warren
- Warrumbungle

As of 31 March 2018 parts of the Dubbo, Cabonne, Orange, and Warrumbungle LGAs were declared as under drought.



As of 30 June 2018 every LGA was declared as under drought, with parts of Orange, Dubbo, Cabonne, and Warrumbungle declared as under intense drought. Bourke LGA, however, was designated as under drought watch. Figure 15 is a map showing the extent of drought across NSW at the end of 2017-18.

FIGURE 15: Extent of drought conditions in NSW as at 30 June 2018 (source: NSW Department of Primary Industries).

Indicator – Best environmental practices in engineering, infrastructure and civil works

Roadside environments may contain the only local stands of remnant vegetation including threatened species and EECs. Best practices should be conducted to ensure minimal impact on these environments. Best environ-

mental management practices could include vegetation offsets, diversions around high conservation areas (e.g. koala habitat) and introduction of safe access methods for crossing animals.

Indicator – Application of best practice environmental management (BPEM) in new roads

Nine (9) of the 15 Councils within the region reported that they include BPEM in new road projects, including Gilgandra Shire Council which explicitly checks roadsides for threatened species before commencing work.

Indicator – Application of design measures in response to climate change in new infrastructure

Six (6) Councils (Blayney, Cabonne, Dubbo, Gilgandra, Lachlan, and Warrumbungle) indicate that they apply design measures in response to climate change when constructing new infrastructure. Dubbo Regional Council has reported applying Water Sensitive Urban Design to some developments.

Council sustainability initiatives

These indicators have been introduced to try and better gauge how proactive the Councils are in response to sustainability and climate change challenges.

Indicator – Inclusion and demonstrable implementation of environmental sustainability criteria within purchasing policies

Eight (8) Councils reported including environmental sustainability criteria within their purchasing policies. For example, Bathurst Regional Council have developed Environmental Sustainability Guidelines to encourage sustainable procurement.

Indicator – Council sustainability initiatives

There was a 13.6% increase in Council sustainability initiatives when compared to 2016-17. This was mainly due to increases in the number of initiatives reported by Bathurst, Cowra, Dubbo, Lachlan, Mid-Western and Warren Councils. Lachlan Shire Council reported five initiatives this year: waste to art competition, report illegal dumping campaign, recycling education campaign, double sided printing and paperless iPads initiatives.

Indicator – Council mitigation initiatives

Climate change mitigation refers to efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behaviour.

The 35% reported rise in this indicator for 2017-18 compared with 2016-17 is probably

somewhat exaggerated by more proactive awareness and reporting of initiatives from some Councils.

However, this does not detract from the many positive mitigation initiatives across the region, including:

- Bathurst Regional Council's energy efficiency projects at the airport, Post Office & Civic Centre
- A Solar Feasibility Study by Oberon Shire Council.

Indicator – Council adaptation initiatives

Adaptation refers to dealing with the impacts of climate change whilst mitigation means dealing with the causes of climate change by reducing emissions. Adaptation involves taking practical actions to manage risks from climate impacts, protect communities and strengthen the resilience of the economy.

Only four Councils (Bathurst, Dubbo, Gilgandra and Narrromine) reported implementing Council adaptation initiatives during 2017-18. The amalgamation of Dubbo and Wellington Councils has led to a review of current plans and policies by Dubbo Regional Council.

Renewable energy

Renewable energy is generally defined as energy that is collected from resources which are naturally replenished on a human timescale, such as sunlight, wind, rain,

CASE STUDY: Reinforcing the social and environmental benefits of recycling (Gilgandra LGA)

Gilgandra was chosen to film a short video used in a television and social media campaign educating the local community about how the contents of their yellow-lidded bins are recycled by hand by people in their community. This was part of a wider project by NetWaste and included two other Material Recovery Facilities (MRFs) in Mudgee and Cowra. The message of the campaign was Help Us Help You, reinforcing the social and environmental benefits of recycling in our communities.

In Gilgandra, the supported employees of Carlinda separate recycling by hand. This is a community service provided for those with a disability where they can live and work as independently as possible. Stuart Skelly was the local spokesperson for the Help Us Help You campaign and said, “We really like the job, we sort the bottles, PETs, papers and cardboard and aluminum cans, it’s a big job.”

Residents of Gilgandra enjoy an efficient, fortnightly kerbside recycling service with a yellow-lidded bin. Its contents are processed by Carginda employees at the Gilgandra Waste Facility MRF and then sold onto companies that recycle the materials into new products. Recycling in Gilgandra has environmental and social benefits. Locals believe that recycling gives them the opportunity act in a way that helps the environment, while also providing employment and empowerment for people with a disability living in their own community.

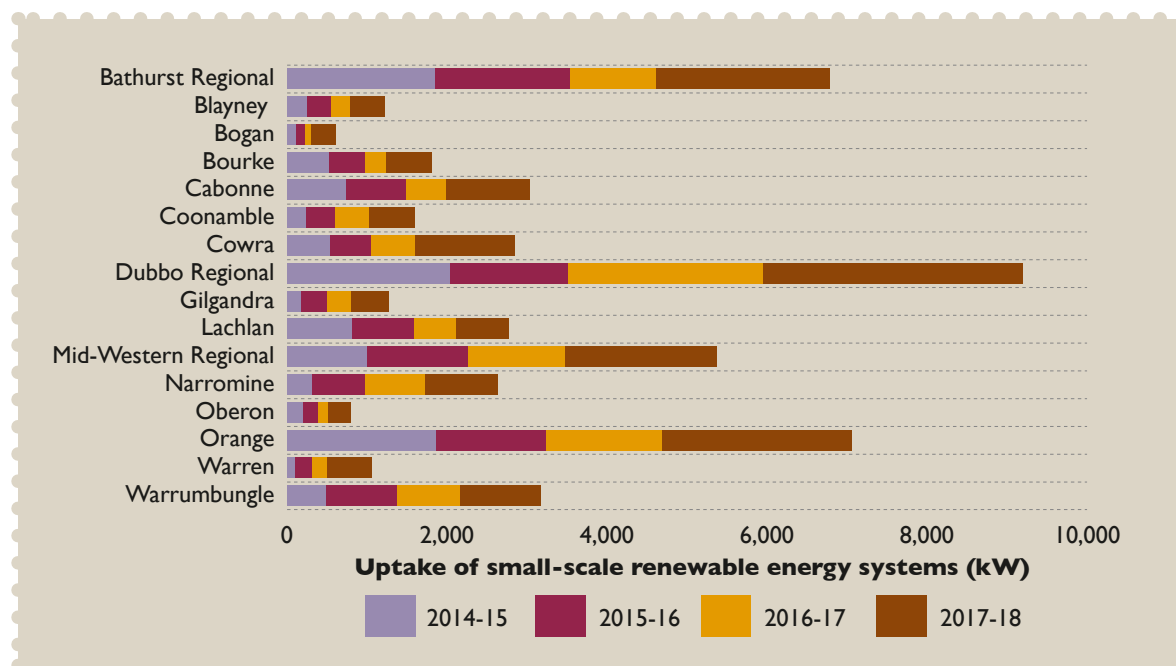
The Carlinda supported employees are a hard working crew and the campaign was an opportunity to go behind-the-scenes to witness what they do five days a week. The work they do is dusty, smelly and sometimes dangerous. Needles, dead animals, rotting food and maggots, dirty disposable nappies, and asbestos waste have all come into the MRF and into the hands of the Carlinda employees. This distresses the workers and stops work while the site is cleaned up. It also goes against the purpose of recycling, as Stuart explains, “It’s not a robot that does this job, it’s actually people. When all the rubbish is mixed in the lot ends up going into landfill.”

The videos were produced to educate local residents about their local recycling service, promote clean recycling, and reduce contamination rates. In Stuart’s own words, “I want to remind the community to put recycling in the recycling bins and garbage into garbage bins.”



Employees of Carlinda separate recycling by hand.

FIGURE 16: Uptake of small-scale renewable energy systems across the region (kW)



tides, waves, and geothermal heat. Renewable energy comes from natural sources that can be replaced or ‘renewed’ without harming the environment or contributing to the greenhouse effect and global warming.

Indicator – Council facilities consuming Greenpower

The GreenPower Program is a government managed scheme that enables Australian households and businesses to displace their electricity usage with certified renewable energy, which is added to the grid on their behalf.

Cowra was the only Council to report any

consumption of Greenpower by Council facilities in the entire region during 2017-18, and even its consumption was only very small.

Indicator – Proportion of Council’s electrical energy demand met from Council-owned renewable energy infrastructure

Bathurst, Cowra, Dubbo, Gilgandra and Orange Councils have each installed solar panels at some of their facilities. Bathurst Regional Council reported that over 4% of its electricity demand (excluding street lighting) was now being met by 304.47 kW of solar PV installed at its facilities. Warrumbungle Shire Council reported that 10% of its demand was

being met by solar panels installed on most Council buildings - the highest proportion in the region.

Indicator – Small scale renewable energy uptake

The Small-scale Renewable Energy Scheme creates a financial incentive for owners to install eligible small-scale installations such as solar water heaters, heat pumps, solar panel systems, small-scale wind systems, or small-scale hydro systems. This indicator tracks the total kilowatts installed for solar panels and small-scale wind and hydro systems.

As shown in Figure 16, there was a large increase in solar panel capacity installed within the region during 2017-18, with a growth of 64% compared to 2016-17. Increases were recorded in every LGA.

Indicator – Number of solar water heaters and heat pumps installed

An estimated 170 solar water heaters and air sourced heat pumps were installed across the region in 2017-18. This was a small increase on last year’s number but the trend is still strongly declining since 2011-12.

The solar hot water market has shrunk in recent years, mainly due to the falling cost of solar PV systems which can provide much or all of the electricity needs of a home, including hot water. Uptake of air source heat pumps has been quite slow due to their relatively high cost but they may





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Appendix — Data contributed by and sourced for Councils

Issue	Sub-Issue	Indicator	Unit of Measure	Bathurst Regional	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo Regional	Gilgandra	Lachlan	Mid-Western Regional	Narramine	Oberon	Orange	Warren	Warrumbungle	Central West LLS	Central Tablelands LLS
Land																					
Land use: planning and management	Contamination	Contaminated land sites - Contaminated Land Register	Number	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Contaminated land sites - potentially contaminated sites	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Contaminated sites rehabilitated	Number	◆	◆		◆	◆	●	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
	Erosion	Erosion affected land rehabilitated	Hectares	◆	◆		◆	●	●	◆	◆	◆	◆	◆	◆	◆	◆	●	●	◆	
		Number of development consents and building approvals	Number	◆	◆		◆	◆	●	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Landuse conflict complaints	Number	◆	◆		◆		●	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Loss of primary agricultural land through rezoning	Hectares	◆	◆		◆	◆	●	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
Agricultural Land	Sustainable agriculture	Farm entities demonstrably practicing sustainable agricultural practice	Hectares																	◆	
		Extent of agricultural lands affected by severe/moderate salinity	Location & sq km																		
Mining		Number and type of operating mines and quarries, licenced under EPA PO& EO Act	Number	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Area covered by Extractive Industries and mining exploration projects	Hectares	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
Biodiversity																					
Biodiversity	Habitat Loss	Total area in the National Parks Estate	Hectares	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Vegetation protected and rehabilitated through CMA incentive funding	Hectares																	◆	
		Council Reserves - total area	Hectares	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	●	◆	◆	●	◆		
		Council Reserves - bushland/remnant vegetation	Hectares	◆	◆		◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Voluntary Conservation Agreements, Property Vegetation Plans & biobanking	Number																	●	
		Addition to National Park estate	Hectares	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
		Area of State Forests	Hectares	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		

Issue	Sub-Issue	Indicator	Unit of Measure	Bathurst Regional	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo Regional	Gilgandra	Lachlan	Mid-Western Regional	Narramine	Oberon	Orange	Warren	Warrumbungle	Central West LLS	Central Tablelands LLS
Biodiversity	Habitat Loss	Change in Area of State Forests	Hectares	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Area protected in Wildlife Refuges	Hectares	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Area protected under voluntary conservation agreements and property agreements	Hectares	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Extent of Traveling Stock Reserves in LGA	Hectares																		
		Habitat areas revegetated	Hectares	◆	◆		◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Clearing - area illegally cleared	Hectares & %																		
		Roadside vegetation management plans	Yes/No	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Roadside vegetation rehabilitated	Hectares	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆	●	◆		
	Decreasing occurrence of endangered species	State Threatened species listed in Central West & Lachlan Catchments	Number & list of species																		
		Threatened species actions implemented (e.g. PAS, recovery plans)	Number	◆	◆		◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Fish restocking activities: native species	Number	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Fish passages/ramps added	Kilometres																		
Noxious weeds and feral animals		Fish restocking activities: non-native species	Number	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Number of declared noxious weeds	Number of species	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●
		Invasive species (listed noxious or WONS) under active management	Number of species	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	●	◆		
Water and Waterways																					
Water quality	Environmental Flows	Annual volume released to rivers for environmental flows	GL																		
	Surface & Ground Water Quality	Average Turbidity in selected streams	NTU																		
		Average Total Nitrogen in selected streams	mg/L																		
		Average Total Phosphorus in selected streams	mg/L																		

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Water quality	Surface & Ground Water Quality	Average salinity levels in selected streams	EC			◆								◆				◆			
		E.coli remote from wastewater treatment plants	Organisms per 100mL	◆	◆		●	◆	●	●	◆	◆		◆	●	◆	●	●	●		
	Riparian	Riparian vegetation recovery actions	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●		
		Riparian vegetation recovery area	Hectares	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●		
	Industrial/ Agricultural Pollution	Load Based Licencing volume	Total kg of pollutants	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●		
		Exceedances of license discharge consent recorded	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●		
		Erosion & Sediment Control complaints received by Council	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●		
	Stormwater Pollution	Number of gross pollutant traps installed	Total number of GPTs currently installed	◆	◆	●	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	●
		Total catchment area of GPTs	Hectares	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Water pollution complaints	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
	Town Water Quality	Number of instances drinking water guidelines not met	Number of instances	◆	◆		◆	◆	◆	◆	◆	◆	●	◆	◆	◆	◆	●	◆		
		Number of drinking water complaints	Number & Type	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
Water quantity	Surface & Ground Water Extraction	Number of Water Supply Work Approvals from surface water sources	Raw number																		
		Volume of surface water permissible for extraction under licences	Gigalitres (GL)																		
		Actual volume extracted through surface water licences	Gigalitres (GL)																		
		Number of Water Supply Work Approvals from groundwater resources	Number																		
		Volume of groundwater permissible for extraction under licences	Gigalitres (GL)																		
		Actual volume extracted through groundwater licences	Gigalitres (GL)																		
	Council Water Consumption	Council managed parks, sportsgrounds, public open	Hectares	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Area of irrigated council managed parks, sportsgrounds, public open space	Hectares	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Water used by council for irrigation (including treated and untreated)	Megalitres (ML)	◆	◆		◆	◆	◆	◆	◆	◆	●	◆	◆	◆	◆	●	◆		
	Town Water Consumption	Annual metered supply	Megalitres	◆	●		◆	◆	◆	◆	◆	●	●	◆	◆	◆	◆	●	●		
		Annual consumption (Total from WTP)	Megalitres	◆	◆		◆	◆	◆	◆	◆	◆	●	◆	●	◆		●	●		
		Total water usage per connection type	Megalitres per annum	◆	◆		●	◆	◆	◆	◆	◆	●	◆	●	◆	◆	●	◆		
		Level of water restrictions implemented	Level (1-5)	◆	◆		◆	◆	◆	◆	◆	◆	●	◆	◆	◆	◆	●	◆		

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Water quantity	Town Water Consumption	Number of water conservation programs	Number of Programs	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Number of residential meters	Number	◆	◆		●	◆	◆	◆	◆	◆	●	◆	◆	◆	◆	◆	◆		
	Dam levels	Dam levels	Volume %																		
People and Community																					
Active community involvement		Environmental volunteers working on public open space	Person Hours	◆	◆		◆	◆	◆	◆	◆	◆	◆	●	◆	◆	◆	◆	◆		
		Number of environmental community engagement programs	Number of programs.	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Number of growers markets/local food retailers specialising in local food operating within LGA	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Municipal (domestic kerbside) waste	tonnes / person	◆	◆			●		●	◆	◆	●	◆		◆	◆	●	◆		
Community Impacts		Number of days that air pollution maximum goals for particulate matter were exceeded	days	◆																	
Valuing natural, built and cultural heritage	Management of Aboriginal Heritage	Number of indigenous sites on AHIMS register	Number & Type	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Inclusion in DCPs & rural strategies	Yes/No	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	●	◆	◆	◆	◆		
		Extent of liaison with indigenous communities (self-assessed from 0 = none to 3 = High)	Rank (0 = none, 3 = High)	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Development on listed indigenous sites	Number approvals	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Management plan/ strategy in place	Yes/No	◆			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Actions to protect indigenous heritage (including management plans)	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
	Management of Non-Aboriginal Heritage	NSW Heritage Inventory items	Number and type	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Locally listed heritage items	Number and type	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Actions to protect non-indigenous heritage (including management plans)	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Heritage buildings on statutory heritage lists demolished/degraded in past year	Number	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Heritage buildings on statutory heritage lists renovated/improved in past year	Number	◆	◆		●	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		

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Toward Sustainability																					
Management of Waste and Resource Recovery	Waste Generation & Disposal	Total waste entombed at primary landfill	Tonnes/annum	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	●	◆		
		Total waste entombed at other landfills (exc recyclables)	Tonnes/annum	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	●	◆		
		Average cost of waste service per residential household	\$ per household	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆		◆		●			
		Landfill emissions offset from methane flaring	kt CO2e-	◆	◆		●	●	◆	◆	◆	◆	◆	●		◆	◆	●	◆		
		Farm chemical drums collected through DrumMuster collections	Number of drums	◆		◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Household Hazardous Wastes collected	kg	◆	◆			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆		
	Waste Pollution	Garden organics collected (diverted from landfill)	Tonnes	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		E-Waste collected (diverted from landfill)	Tonnes	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	●	◆		
		% Effluent reuse & location of reuse	%	◆	◆		◆	◆	◆	◆	◆	◆	●	◆	●	◆	◆	●	◆		
		Amount of material recycled	Tonnes	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆	◆	◆	◆		
	Littering	Number of illegal waste disposal complaints to Council	Number of complaints	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
Engineering, Infrastructure and Civil Works		New road construction	km	◆	●		◆	◆	◆	◆	◆	◆	●	◆	◆	◆		●	◆		
		Road upgrades	km	◆	●		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		●	●		
		Inclusion and demonstrable implementation of environmental sustainability criteria within purchasing	Yes/No	◆	●		◆	◆	◆	◆	◆	◆	◆	◆		◆		●	●		
		Application of design measures in response to climate change in new infrastructure	Yes/No	◆	●		◆	◆	◆	◆	◆	◆	◆	◆		◆		●	●		
		Application of best practice environmental management (BPEM) in new roads	Yes/No	◆	●		◆	◆	◆	◆	◆	◆	◆	◆	●	◆		●	●		
Risk Management		Council adaptation initiatives	Yes/No	◆	●		◆	●	◆	◆	◆	◆	◆	◆	◆	◆		●	◆		
		Increase in area covered by flood management plans/ flood mapping	hectares	◆	●		◆	●	◆	◆	◆	◆	◆	◆	◆	◆		●	◆		
		Natural disaster declarations (events - flood bushfire and drought)	Hectares	◆	●		◆	◆	◆	◆	◆	◆	◆	◆	●	◆	◆	●	◆		
	Fire Regimes	Hazard reduction burns	Number & area	◆	◆		●	◆	◆	◆	◆	◆	◆	◆	◆	◆		●	◆		
Energy & Resource efficiency	Mitigation	Office paper used by Council (reams)	Number of reams ordered per annum	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●	◆		
		Council sustainability initiatives	List	◆	●		◆		◆	●	◆	◆	◆	◆	◆	◆	◆	●	●		
		Council mitigation initiatives	List	◆	●		◆		◆	●	◆	◆	◆	◆	◆	◆	◆	●	◆		

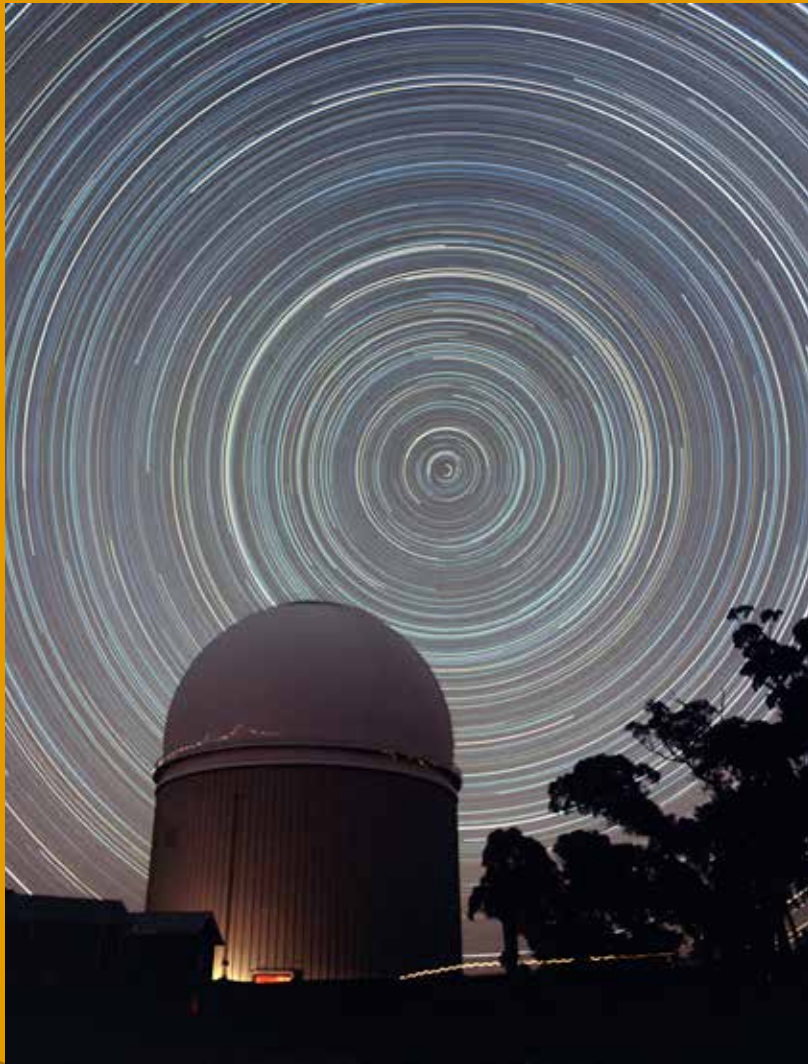
Issue	Sub-Issue	Indicator	Unit of Measure	Bathurst Regional	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo Regional	Gilgandra	Lachlan	Mid-Western Regional	Narromine	Oberon	Orange	Warren	Warrumbungle	Central West LLS	Central Tablelands LLS
Energy & Resource efficiency	Council GG Emissions	Annual electricity consumption for Council controlled facilities	MWh	◆	◆			◆	●	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Annual natural gas consumption for Council controlled facilities	Gigajoules	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Annual bottled gas consumption for Council controlled facilities	Litres	◆	◆				◆	◆	◆	●	◆		◆	◆	◆	◆	◆		
		Total fuel consumption	Total Kilolitres per annum	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Council facilities consuming Greenpower (relate to State Govt goal of Greenpower uptake)	%	◆	●			◆	◆	◆	◆	●		◆	◆	◆	◆	◆	◆		
		Proportion of Council's electrical energy demand met from council-owned renewable energy infrastruc	%	◆	●			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
	Community GG Emissions	Small scale renewable energy uptake	kw installed by LGA	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
		Number of solar water heaters and heat pumps installed	Number	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		

◆ Denotes those Councils that were compared in the trend analysis for these indicators

● Data contributed in 2017–18 but not compared in summary tables

□ Data not contributed





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