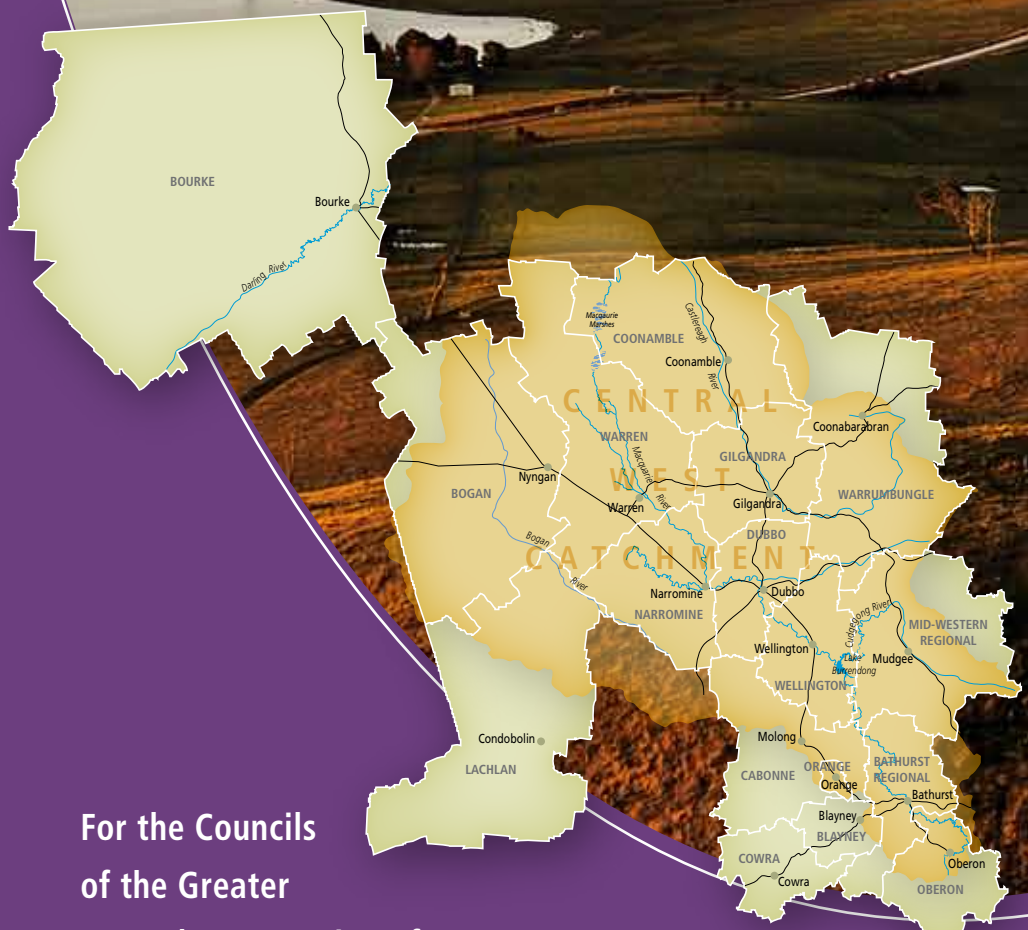
Regional State of the Environment Report

2011–2012
Comprehensive Report



For the Councils of the Greater Central West Region of NSW:

Bathurst, Blayney, Bogan, Bourke, Cabonne, Coonamble, Cowra, Dubbo, Gilgandra, Lachlan, Mid-Western, Narromine, Oberon, Orange, Warren, Warrumbungle, Wellington

NSW GOVERNMENT | Catchment Management Authority Central West

Acknowledgements

Catchment Management Authority
Central West

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Abbreviations

ABS	Australian Bureau of Statistics
AFGC	Australian Food and Grocery Council
AHIMS	Aboriginal Heritage Information Management System
ANZECC	Australian and New Zealand Conservation Council
APC	Australian Packaging Covenant
BFMC	Bush Fire Management Committee
BOD	Bathurst Orange Dubbo Alliance
BOM	Bureau of Meteorology
CAP	Catchment Action Plan
Centroc	Central West Regional Organisation of Councils
CFI	Carbon Farming Initiative
CMA	Catchment Management Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water (former)
DoP	Department of Planning
E10	Ethanol blended fuel (up to 10%)
EC	Electrical Conductivity
EECs	Endangered Ecological Communities
EPA	Environmental Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EWP	Environmental Watering Plan
GHG	Greenhouse Gas
GL	Gigalitres
GPT	Gross Pollutant Traps
GRDC	Grains Research Development Council
Gt	Gigatonnes of carbon
ha	Hectares
HHW	Household Hazardous Wastes
INFFER	Investment Framework For Environment Resources
kL	Kilolitres
km^2	Square kilometres
LBL	Load Based Licensing
LEP	Local Environment Plan
LGA	Local Government Area
LHPA	Livestock Health and Pest Authorities
MDBP	Murray-Darling Basin Plan
MDF	Medium Density Fibre
MER	Monitoring, Evaluation and Reporting
MGC	Mobile Glass Crusher
ML	Megalitres
MLA	Meat and Livestock Australia
MRF	Material Recovery Facility
NEPM	National Environment Protection Measure
NGERS	National Greenhouse and Energy Reporting System
NPI	National Pollutant Inventory
NRM	Natural Resource Management
NSW	New South Wales
OEH	Office of Environment and Heritage
PAS	Priorities Action Statement
PM10	Particulate Matter (10 microns or less)
POEO Act	Protection of the Environment Operations Act 1997
PVPs	Property Vegetation Plans
REC	Roadside Environment Committee
ReSAP	Regional Sustainability Action Plan
Regional SoE	Regional State of the Environment
RFS	Rural Fire Service
RMS	Roads and Maritime Services
RVIP	Roadside Vegetation Implementation Project
RVMPs	Roadside Vegetation Management Plans
SDL	Sustainable Diversion Limit
SGU	Small Generation Unit
SIS	Species Impact Statement
SoE	State of the Environment
STC	Small-scale Technology Certificate
STP	Sewage Treatment Plant
TSC Act	Threatened Species Conservation Act 1995
WONS	Weeds of National Significance
WRI	Western Research Institute
WTP	Water Treatment Plant

Message from the Chairman

This marks the last Regional State of the Environment report to be prepared under the current Division of Local Government reporting system. From next year all the participating Councils will move to the new Integrated Planning and Reporting Framework. This framework identifies that the Councils will still be required to prepare annual reports which will include reporting on their environmental objectives, and that the annual report in the year in which a Council election is held must include a State of the Environment Report.

ABOVE Tom Gavel, Chairman, Central West Catchment Management Authority

Many of you in the community will have recently been involved with your local Council's Community Strategic Planning. Your input will provide the framework for the future of your Local Government Area, and the outcomes identified will form the basis of future reporting. Prior to this, you may have also participated in the review of the Central West Catchment Action Plan (CAP), which provides the shared vision and framework for natural resource management across the region based on the current and future resilience of our natural systems.

At this time of transition, the Councils and the Central West Catchment Management Authority (CMA) determined that it was an opportune moment to review the past few years' Regional State of the Environment Reports, together with the participating Councils' Community Strategic Plans and the new Central West CAP, to identify synergies and align environmental reporting in the future. We look forward to the outcomes of the review later in the year.

Looking back over the past five years of Regional State of the Environment reporting, it is certainly clear that the reports have shown the breadth of sustainable, environmental, natural and cultural heritage activities being undertaken by the Councils, the Central West CMA and other regional organisations.

Across the region we have been able to identify trends, and show that with the proper level of funding support and capacity building, we can undertake meaningful works to protect and improve our land, water, vegetation, biodiversity, natural

BELOW Old church at Eugowra, Cabonne Council

and cultural heritage so that both our natural resources and the social fabric of our region continue to prosper.

We commend all the participants involved with this reporting, which has set a benchmark for the region, and hope that it will continue into the future.

Tom Gavel
Chairman
Central West Catchment Management Authority

Ian Armstrong
Chairman
Lachlan Catchment Management Authority

Rory Treweeke
Chairman
Western Catchment Management Authority

ABOVE Balloon Festival, Cabonne LGA

LEFT Bald Hill Reserve, Dubbo

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. It also provides a platform for community action by raising awareness and understanding of key environmental issues, which in turn helps people and organisations make informed decisions regarding future management actions to reduce negative impacts on the environment.

The *Local Government Act 1993* required that all local Councils in NSW produce an annual SoE report on major environmental impacts, related activities and management plans. Under the 1993 Act, Councils were required to specifically report on:

1. Land
2. Air
3. Water
4. Biodiversity
5. Waste
6. Noise
7. Aboriginal heritage
8. Non-Aboriginal heritage

In each of these environmental themes particular reference was required to be made to:

- management plans relating to the environment
- special Council projects relating to the environment
- the environmental impact of Council activities

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

The implementation of this Framework was staggered across the 152 NSW Councils. All of the participating Councils in this Report are 'Group 3 Councils' in the Framework implementation process, meaning that Community Strategic Plan and Delivery Programs had to be adopted by 30 June 2012.

An example from Cowra Shire Council of the development of a Community Strategic Plan and its environmental objectives is provided as a case study in this section of the Report.

The Framework identifies that the Councils will still be required to prepare annual reports which will include reporting on their environmental objectives, and that the annual report in the year in which a Council election is held must include a SoE Report.

This Report is therefore the last required in the original SoE reporting structure with its eight environmental themes as listed above.

RIGHT Dining at a vineyard, Cabonne LGA

Case Study: Cowra Shire Community Strategic Plan

The Community Strategic Plan is the highest level plan that a NSW Council is required to prepare. Its purpose is to identify the community's main priorities and aspirations for the future and to plan strategies to achieve these goals. The Community Strategic Plan belongs to the residents of that community. While a Council does have a custodial role in initiating, preparing and maintaining the Community Strategic Plan, the priorities and aspirations it includes must represent the wishes of the community.

With that premise in mind, Cowra Council began the job of formulating a new Cowra Community Strategic Plan in 2011. From the outset, Council set out to consult with the local community in a way that encouraged the broadest possible community involvement, promoted understanding of the planning process and ensured community ownership of the resulting plan.

A formally adopted Community Strategic Plan is not a new concept to the residents of Cowra Shire. In 2006, community representatives undertook facilitated planning that identified seven future directions to follow during the next 30 years. These future directions: Health and Well-being; Education Training and Research; Lifestyle; Governance; Business and Industry; Transport and Infrastructure and Natural Resource Management were already well understood by residents, but the task facing Cowra Council was to ensure that they were still seen as relevant by the local community.

The community consultation process began in September 2011. Commencing with the annual Cowra Springtime Show, Council staff and Councillors undertook two months of open meetings and information sessions throughout Cowra Shire. Media releases were circulated and mail outs organised to further spread the message. Using a simple survey Council asked:

- Are we on track?
- Is the strategic planning process understood?
- Are the outcomes identified in 2006 still an appropriate base for the revised Community Strategic Plan now required by the Division of Local Government?

From community responses the answer was a resounding yes. Community meetings and information sessions were positive and showed a solid understanding of the strategic planning process. The seven future directions identified in 2006 were endorsed and each strategic objective, designed to break down the future directions into achievable goals, was individually reviewed.

The resulting feedback justified Cowra Shire Council's belief in the existing community planning process. Over 90% of respondents supported the future directions already in place and suggested changes to specific strategic directions to ensure that they are in line with current community priorities and expectations.

The important place natural resource management (NRM) occupies in the Cowra Shire Community Strategic Plan was confirmed with many survey responses endorsing the need to maintain a healthy environment and to secure environmental sustainability for Cowra Shire.

Survey responses also questioned whether the strategic objective 'Make Cowra a centre of environmental excellence' was achievable or even fully understood by the wider community and it was proposed that the wording of the objective could be changed to 'Promote the importance of environmental excellence in the Cowra community'.

The Natural Resource Management Advisory Committee argued that any such change would diminish the strong commitment made in 2006 to pursue the very best environmental outcomes for Cowra Shire. After further debate it was decided to leave the strategic objective unchanged but to acknowledge that Council and other interest groups may need to better promote just what is meant by the term environmental excellence.

Overall, the consultation process associated with development of the Cowra Community Strategic Plan 2012 -2036 was smooth and positive. The residents of Cowra Shire have shown solid understanding of the planning process and have assumed ownership of the completed plan. Consensus has been sought, feedback received and changes made to a document that can justifiably take its place as Cowra Shire Council's highest level planning instrument.

Cowra Shire Peace Bell

Figure 1: *Map showing participating Council areas and catchment boundaries*

What is a Comprehensive Report?

Under the original reporting structure, a Council must produce a Comprehensive SoE Report for the year ending after each election of Councillors. As there were Council elections in 2012, the 2011-12 report is a Comprehensive report. A Supplementary report is required in intervening years.

A Comprehensive SoE Report differs from a Supplementary Report in that it establishes environmental indicators and reports on trends in relation to those indicators. It must also provide detailed information on the impact of activities implemented to improve the environment. A Supplementary report updates trends and reports on environmental impacts that have been introduced since the last Comprehensive report.

Catchment Management Authorities (CMAs), created by the *Catchment Management Authorities Act 2003*, are also required to provide reports on the progress made towards the regional natural resource management (NRM) framework, the Catchment Action Plan (CAP). This Regional SoE Report provides benchmarks for measuring catchment-scale changes in the environment as measured by the local Council, and should be linked into both Council and CMA management plans.

This is the fifth Regional SoE Report supported by the Central West CMAs and the 17 local Councils. It primarily reports on trends in relation to the last Comprehensive Report completed in 2008-09. Supplementary Reports were produced in 2007-08, 2009-10 and 2010-11.

Why a Regional SoE Report?

Environmental issues are not restricted to Council boundaries. Regional SoE 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.

The initiatives presented in this Report for each participating Council do not reflect all of the initiatives undertaken by Councils during the reporting period. Furthermore, the format of the Regional SoE Report does not allow for each Council to identify progress on their environmental management and sustainability plans, which some Councils have previously included in their SoE Reports. Councils can append additional information specific to their Council to this Report, should they wish.

Who is involved?

As shown in Figure 1 most of the participating Councils are situated, totally or partly, in the area of the Central West Catchment. Bourke Shire Council is located wholly in the Western Catchment while Cowra, Lachlan and parts of Blayney and Oberon lie in the Lachlan Catchment. Parts of Mid-Western lie within the Hunter-Central Rivers Catchment and parts of Warrumbungle lie within the Namoi Catchment.

The participating Councils are:

- Bathurst Regional Council
- Blayney Shire Council
- Bogan Shire
- Bourke Shire Council
- Cabonne Council
- Coonamble Shire Council
- Cowra Shire Council
- Dubbo City 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
- Wellington Council

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

What are Catchment Management Authorities?

Thirteen CMAs have been established across the State by the NSW Government to ensure that regional communities have a significant say in how natural resources are managed in their catchments.

The CMAs are locally driven organisations with a board that reports directly to the NSW Minister for Primary Industries. These statutory bodies coordinate NRM in each catchment. They are responsible for involving regional communities in management of NRM issues facing their region, and have been the primary means for the delivery of funding from the NSW and Australian Governments to help land managers improve and restore the natural resources of the State.

A profile of the three CMAs relevant to this report is provided below.

Central West CMA

The Central West Catchment, located in Central Western NSW, has a diverse range of people and industries. It covers approximately 84,842km² from the central tablelands around Oberon Bathurst and Rylstone to the western plains around Nyngan and Coonamble. The catchment supports the major centres of Bathurst, Orange, Mudgee and Dubbo. There are also many other smaller but significant townships including Coonamble, Gulargumbone, Nyngan, Warren, Coonabarabran, Gilgandra, Coolah, Trangie, Narromine, Wellington, Gulgong, Peak Hill, Molong and Oberon.

The Central West Catchment is home to approximately 190,000 people, including an Indigenous population of approximately 12,000 people (7% of the population) (Australian Bureau of Statistics, 2011).

Major industries in the catchment include agriculture, agribusiness, tourism, mining and viticulture. One of the main reasons that NRM issues are so complex within the Central West Catchment is the highly diverse range of agricultural uses. The eastern highlands and western plains are dominated by grazing, the Central West slopes and inner plains support extensive winter cropping. Mudgee, Orange and the Bell River floodplain are places of intense viticulture and horticulture and the Macquarie River floodplain is home to irrigated cotton and other summer crops. Mining and gas production are increasing as the Catchment has a range of mineral resources. Existing mines are in Cadia, Ulan and Triton, with a number of new mines proposed including at Dunedoo and Peak Hill.

The Central West Catchment includes the Castlereagh, Bogan and Macquarie River valleys. It is flanked by the Barwon-Darling catchment to the west and north-west, the Namoi catchment to the north-east, Lachlan to the south and Hunter and Hawkesbury-Nepean catchments to the east. While the upper reaches of the Bogan and Castlereagh Rivers are largely unregulated, rivers in the Macquarie Valley are highly regulated. Windamere Dam on the Cudgegong River upstream of Mudgee has a capacity of 368,000 ML and the Burrendong Dam located at the junction of the Macquarie and Cudgegong River at Wellington has a capacity of 1,189,000 ML. River regulation and water extraction has had substantial effects on flow regimes, with changes to seasonal flow patterns, reduced variability and changes to flood intensity.

The region possesses a wide diversity of landforms, vegetation species and communities. It incorporates the internationally recognised Macquarie Marshes, the Warrumbungles National Park and important areas of remnant Endangered Ecological Communities including Box Gum Grassy Woodland.

At the time of European settlement, the Central West Catchment supported a complex mosaic of forests, temperate and semi-arid woodlands, wetlands, shrublands, heaths and grasslands. Clearing for agriculture and subsequent degradation has significantly modified 62% of the vegetation. This modification has included reducing much of the cover to a large number of small, isolated remnants on the less fertile and productive soils, and a smaller number of scattered larger reserved remnants. For example, the Box and Ironbark woodlands which originally occupied large parts of the slopes and plains have been reduced by as much as 90%, and are now among the most significantly altered plant communities in NSW (Central West CMA, 2008a). Modification to vegetation communities is also likely to have impacted on individual species such as Ingram's zieria (*Zieria ingramii*), an endangered species under NSW and Commonwealth legislation, only known to occur in the Catchment.

A broad variety of native fauna have been recorded across 82 vegetation types. As further land degradation continues, 65% of fauna are classified as 'declining', with 11 species classified as extinct in the Catchment (Central West CMA, 2011b).

In many instances, the dominant species of those communities which have been heavily cleared are still relatively common in the landscape. However, remnants often occur as single trees or small groups of mature or senescent trees; these stands typically have little, if any, of the original understorey structure and species diversity, have no regeneration, and have essentially ceased to exist as functional ecosystems. In the case of native grasslands, remnant elements are generally scattered throughout the improved pastures, which dominate much of the region, as well as roadside remnants and travelling stock routes.

Lachlan CMA

The Lachlan Catchment covers an area of approximately 84,700 km^2 and has a population of 105,000 people (Australian Bureau of Statistics, 2011), producing 14% of NSW's agricultural production. This includes an Indigenous population which is 3% of the total population. The Catchment encompasses 24 Local Government Areas.

The Lachlan River rises near Gunning and terminates in the Great Cumbung Swamp near Oxley, 1,450 river kilometres to the west.

Major tributaries of the Lachlan include the Abercrombie, Boorowa, Belubula, Crookwell Rivers and Mandagery Creek. The main dam regulating flows in the Lachlan River is Wyangala Dam, which has a capacity of 1,220,000 ML and is located at the junction of the Lachlan and Abercrombie Rivers. The Belubula River is regulated by Carcoar Dam which has a capacity of 36,000 ML and is located about 10 kilometres downstream of Blayney.

The landscape forms tablelands, slopes and plains, with a variety of soil types from robust to fragile and acidic to sodic. These complexities have a significant impact on salinity requiring effective management for erosion control, nutrient and salinity management (Lachlan CMA, 2011a).

Western CMA

The Western Catchment is the largest catchment in NSW, covering some 230,000 km^2. It is bounded to the east by the Barwon and Bogan Rivers, and includes the Barwon-Darling, Culgoa, Paroo, Warrego, Narran, Bokhara and Birrie River systems. It takes in the whole of the Bourke and Brewarrina Shires and significant portions of Central Darling, Cobar and Walgett Shires and the Unincorporated Area.

As well as a range of permanent and seasonal river systems, it also includes the largest and most diverse areas of natural rangelands within NSW (Western CMA, 2011). Native vegetation in the area includes open woodlands, native pastures, chenopod shrub lands and timbered areas. The native vegetation is largely intact, with invasive native scrub presenting a large problem.

The catchment is predominantly leasehold land, administered under the *Western Lands Act 1901* by the Department of Primary Industries. There are more than 630 pastoral and agricultural holdings.

The population of the Western Catchment is approximately 18,000 people, with an Indigenous population of 20% of the total population (Australian Bureau of Statistics, 2011).

Predominant land uses in this semi-arid zone are grazing, dryland cropping, irrigated cotton production, mining, tourism and nature conservation. Bourke, Brewarrina, Cobar, Walgett, Lightning Ridge and Broken Hill are the major service centres.

For more detailed information about the CMAs refer to the websites below.
Central West CMA: www.cw.cma.nsw.gov.au
Lachlan CMA: www.lachlan.cma.nsw.gov.au
Western CMA: www.western.cma.nsw.gov.au

The region at a glance

The 17 local Councils participating in this Regional SoE Report cover a diverse area of Central and Western NSW, totalling approximately 145,169km^2. The percentage of the total reporting area covered by this SoE for each Council is provided in Figure 2.

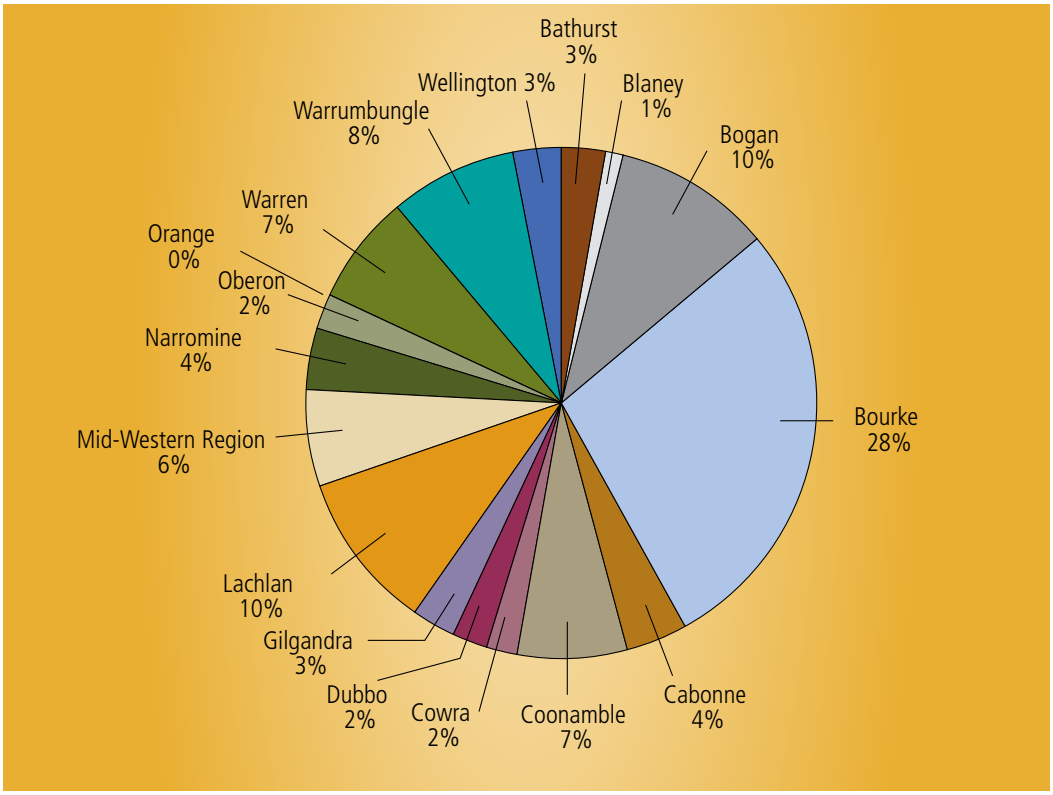


Figure 2: Percentage of total reporting area by Council LGA

Community Profile

As shown in Table 1, in 2011 it was estimated that the population of the region covered by this report was 222,458 (Australian Bureau of Statistics, 2011). This represents a slight rise in regional population from the 2006 Census of about 7,000 people. A few LGAs such as Bathurst and Orange had significant increases in population. Some experienced considerable declines in population, including Bourke (7%), Coonamble (4%), Gilgandra (3.4%), Lachlan (2.9%), Cowra (2.6%) and Warrumbungle Shire (2.2%).

Employment in the Central and Western area is mainly in agriculture, manufacturing, retail, education, property, business services, and health and community services. Employment data for the most recent census was not available at the time of reporting, however previous census data had shown unemployment to range from 3.7% to 12.2% across the participating LGAs (Australian Bureau of Statistics, 2009).

There are some differences in age between the region and the Australian average (Table 2); generally this is reflected by fewer people in the middle age groups and therefore higher percentages of children and people over 55 years (Australian Bureau of Statistics, 2011).

Urban/regional distribution data from the most recent census was not available at the time of reporting. As of the 2011 census, there were higher proportions of people living in regional or remote areas in the Central West and North West statistical regions (which cover most of the reporting region) compared to the State average of 73% of people living in major cities (Table 3). This has a significant impact on the provision of services and also the environmental impacts caused by human settlement with a high proportion of people living in the reporting area within the inner regional centres. There is also a greater percentage of the population with Aboriginal or Torres Strait Islander heritage (8.4%) compared to the national average (2.5%).

In 2008, Centroc with the Western Research Institute (WRI) produced a report on population projections for its member Councils showing:

- Population projections on an LGA-by-LGA basis for the 16 Centroc member councils over the next 25 years based on research that has industry credibility
- Commentary on population projections into the future
- Projections that utilise data provided by Centroc on developments in the Centroc region
- Assessment and commentary on population projections from NSW Department of Planning and Infrastructure (DoPI).

Information supplied by the member Councils regarding future major developments was used to generate estimates of employment

Table 1: Comparison of regional population 2006 with 2011

LGA	2006 - Census	2011 - Census	2011 population as part of region
Bathurst Regional	35,845	38,219	17.2%
Blayney Shire	6,593	6,985	3.1%
Bogan Shire	2,883	2,900	1.3%
Bourke Shire	3,095	2,868	1.3%
Cabonne	12,396	12,821	5.8%
Coonamble Shire	4,208	4,030	1.8%
Cowra Shire	12,475	12,147	5.5%
Dubbo City	37,843	38,805	17.4%
Gilgandra Shire	4,522	4,368	2.0%
Lachlan Shire	6,669	6,476	2.9%
Mid-Western Regional	21,086	22,318	10.0%
Narromine Shire	6,508	6,585	3.0%
Oberon	5,030	5,040	2.3%
Orange City	35,338	38,057	17.1%
Warren Shire	2,750	2,758	1.2%
Warrumbungle Shire	9,808	9,588	4.3%
Wellington	8,120	8,493	3.8%
Total	215,169	222,458	

Table 2: Percentage of age groups in the region compared to Australia, 2011

Age group	Total Number	Percentage	Australia percentage
0-4 years	16,098	7.2	6.6
5-14 years	31,600	14.2	12.7
15-24 years	28,646	12.9	13.3
25-54 years	82,339	37.0	41.8
55-64 years	27,763	12.5	11.6
64+ years	36,324	16.3	14.0

and the associated population impact under three scenarios namely:

Scenario A – 100% of new mining, health-related and high technology jobs are assumed to be filled by people migrating into the LGA. 50% of other new jobs are assumed to be filled by people migrating into the LGA with the balance being filled by the existing workforce.

Scenario B – 50% of new mining, health-related and high technology jobs are assumed to be filled by people migrating into the LGA. 25% of other new jobs are assumed to be filled by people migrating into the LGA with the balance being filled by the existing workforce.

Scenario C – 10% of new mining, health-related and high technology jobs are assumed to be filled by people migrating into the LGA. 5% of other new jobs are assumed to be filled by people migrating into the LGA with the balance being filled by the existing workforce (WRI, 2008).

Table 4 shows the predicted population for the Centroc region under the different scenarios. The mid-range scenario suggests an average annual growth of 0.91% between 2011 and 2021 or an average growth of 0.54% per annum between 2011 and 2031 (WRI, 2008). The predictions, however, are based on historical data and are only estimates so the further into the future they are made, the less reliable they become. It is also worth noting that the predictions made in the report vary significantly to those made by the ABS, most notably in the LGAs of Cabonne and Blayney where they are underestimated and Lachlan and Wellington where they are over-estimated. Overall, the data presented in the report tends to be consistently slightly higher than the ABS estimated resident population.

Climate in the Central West

The climate of the Central West is highly variable as it covers a large geographic area and a range of topographies. Broadly, these can be grouped into tablelands, slopes and plains, reflecting the influence of the Great Dividing Range in the east through the slopes to the floodplains of the west and north-west. Figure 3 shows there is an overall decline in average annual rainfall moving west from the tablelands to the plains (Bureau of Meteorology, 2012). Figure 4 shows the average daily minimum and maximum temperatures are lowest for the tablelands, intermediate for the slopes and highest for the plains (Bureau of Meteorology, 2012).

In 2010, the NSW Department of Environment, Climate Change and Water (DECCW) produced a report detailing the impacts of climate change on the biophysical environment of NSW (DECCW, 2010). This report predicts that by 2050, the climate will be hotter and drier, with storms increasing in frequency and intensity. Increased evaporation is likely to lead to drier soil conditions, with declining plant cover on the slopes and plains and an increase in sodic soil surface.

Table 3: Percentage of urban/regional distribution 2011

Place of residence	NSW Average	Central West and North West statistical subdivisions
Major city	72.8	0
Inner regional	20.1	60.5
Outer regional	6.5	30.5
Remote	0.5	8.3
Very remote	0.1	0.7

Table 4: Projected population for the Centroc region

	2011	2016	2021	2026	2031
DoP Projections (2005)	206,610	209,180	212,230	215,230	217,680
WRI Scenario A	215,691	235,630	249,944	253,108	254,720
WRI Scenario B	211,189	222,762	231,254	233,844	235,389
WRI Scenario C	207,584	212,444	216,287	218,414	219,886

ABOVE Sheep grazing near Lawson Creek, Mid-Western LGA

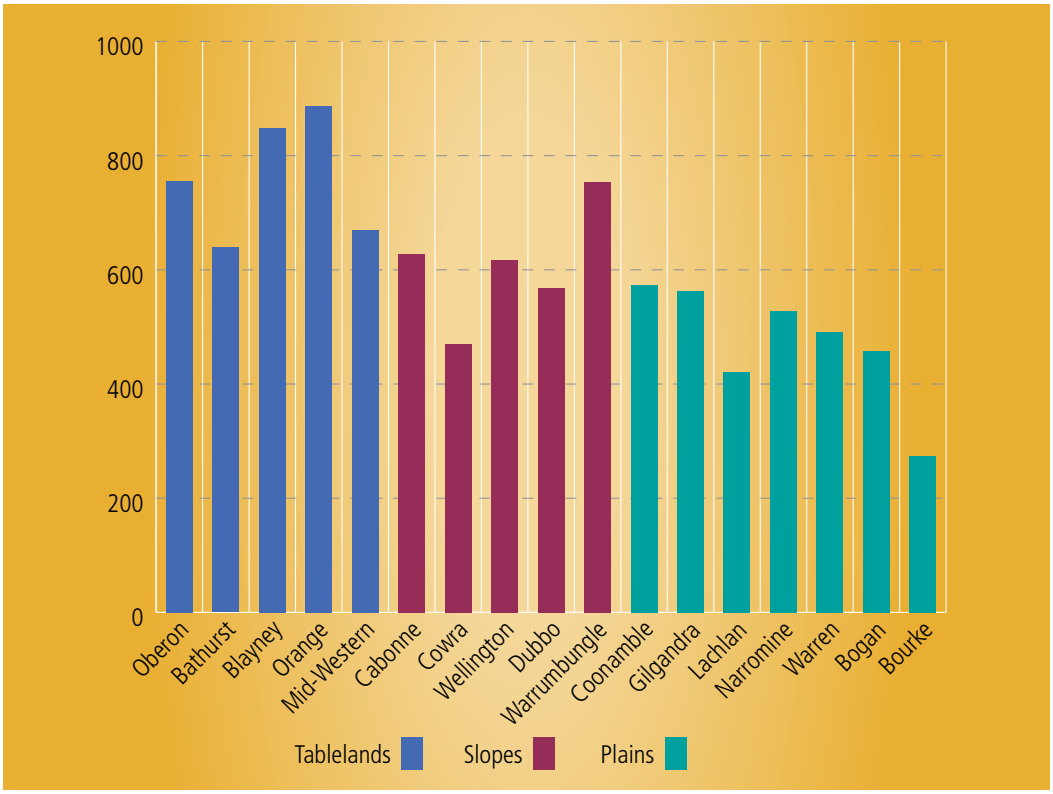


Figure 3: Annual Average Rainfall of Central West LGAs
(Source: Bureau of Meteorology)

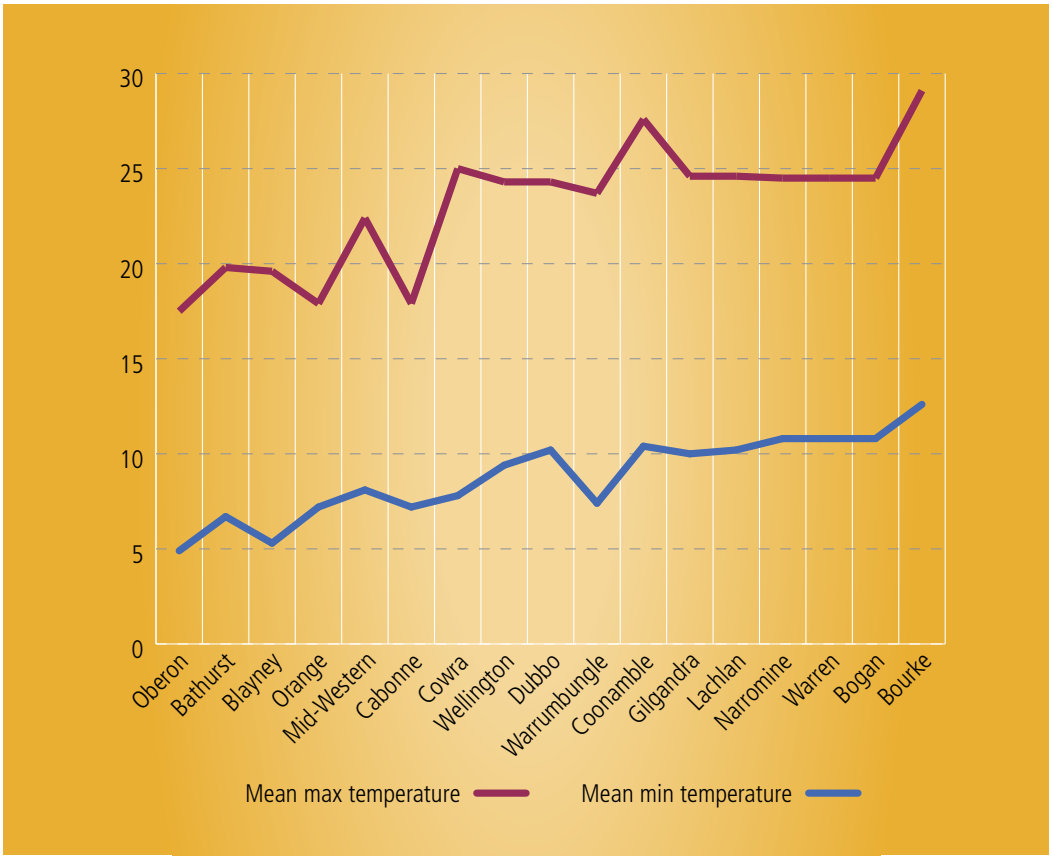


Figure 4: Annual mean temperatures for Central West LGAs
(Source: Bureau of Meteorology)

This report

Themes

As discussed above, this report covers the 'traditional' themes used in NSW SoE reporting as required by legislation. The traditional reporting themes have been included under the following main themes for the report:

- Land
- Air
- Water
- Biodiversity
- Human Settlements
- Waste
- Towards Sustainability

The last main theme ('Towards Sustainability') is a diversion from the traditional SoE reporting themes and reflects the desire for the participating Councils and CMAs to help move their local communities towards environmental sustainability.

Environmental issues

In 2009, each participating Council identified key environmental issues. These environmental issues were categorised and have been addressed under the themes as issues or sub-issues.

It should be stressed that the number of issues and sub-issues related to each theme does not reflect the importance of that theme in comparison to other themes. However, it reflects more the range of disparate issues under each theme.

It should also be noted that although they are discussed primarily under one theme, several issues such as climate change, relate to other themes in the Report.

Environmental 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.

A suite of indicators has been identified that help report on the environmental themes and issues listed above. A list of Councils that provided data for each indicator is found in the appendix of this Report.

ABOVE Wilpinjong mine, Mid-Western LGA

Where data for 2008-09, 2009-10, and 2010-11 is available, it is provided along with data for 2011-12 in a summary table at the commencement of each theme chapter. Some data for the previous years in the summary tables is not directly comparable to that shown for the reporting year (2011-12). This is due to either recalculation of the previous data or a change in the Councils included in the comparison.

One of the main aims of the 2011-12 Comprehensive Report is to identify trends for each indicator since the last Comprehensive Report prepared in 2008-09. To do this the trend reported is based on comparing the average of the previous three years of reporting with the 2011-12 data. The trend arrows used in the summary table are:

- improvement
- no or little change
- worsening trend

There is an explanation for each trend within the chapter and possible reasons for it occurring.

Pressure-State-Response

The conventional way of reporting on each theme is using the 'Pressure-State-Response' model. This order has been modified to State-Pressure-Response in this Report to initially highlight the current situation. Wording has also been changed as follows: Pressure to 'Threat', State to 'Condition'.

Land

This chapter focuses on the condition of the land in the participating Council areas. 'Land' is a natural asset that consists of a diversity of geological forms, topsoil availability, and soil health.

Land supports natural systems and is available to support a variety of human uses. Changes in vegetation and patterns of settlement and land use continue to be significant sources of pressure on Australia's natural and cultural environment. The landscape of the reporting area is diverse in character, including residential, agricultural, industrial and natural landscapes. However, a major issue in the region is land degradation caused primarily by soil erosion, salinity and contamination.

Land Degradation

Condition

The soils of the catchments vary according to geology, climate and landscape. Soil health issues can be broken up into three components - fertility (salinity, acidity, and nutrients), biology (the number, condition and type of soil biota) and physical characteristics (structure, sodicity and erosion) (Central West CMA, 2011a). There is a high degree of interaction between the causes and effects relating to fertility, biological activity and physical characteristics. The tablelands and slopes have ratings of poor soil health, but there is a trend toward improved cropping and grazing management practices.

Lower nutrients and poorer soil types are characteristic of the tablelands due to higher total rainfall. The geology of the area is dominated by coarse grained, acidic rocks resulting in sandy textured soils that are developed in-situ and susceptible to erosion (Central West CMA, 2011a).

The slopes have variable geology with soils types that are less fragile and have higher nutrient levels. They also have naturally higher salt stores, increasing the risk of land degradation due to salinity (Central West CMA, 2011a).

The plains are dominated by alluvial and aeolian soil development resulting in higher fertility and clay contents that have a higher shrink-swell potential and can be susceptible to compaction problems.

Table 5: Summary Table of Indicator Trends – Land Degradation

Issue	Indicator	2008-09	2009-10	2010-11	2011-12	Trend
Contamination	Contaminated land sites - Contaminated Land Register	5	6	8	8	↓
	Contaminated land sites - potentially contaminated sites	886	876	895	915	↓
	Contaminated sites rehabilitated	16	11	7	13	↑
Erosion	Erosion affected land rehabilitated (ha)	14,214	588	92	2,066	↓
	Flood Damage ($)	*	*	31M	14M	↑
Salinity	Salinity affected land rehabilitated (ha)	89,010	0	0	3,370	↓

** Data not available for these years*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008-09, 2009-10, 2010-11 and 2011-12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011-12. They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011-12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils included in the trend data.

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 (OEH) maintains a register of Contaminated Sites (www.environment.nsw.gov.au/whoweare/registers.htm). All participating Councils in the reporting region also maintain a list of potentially contaminated sites based on past land use.

ABOVE Agricultural landscape near Molong

Indicator – Number of contaminated land sites (Contaminated land register)

As shown in the summary table (Table 5), the total number of sites in the Contaminated Land Register across the region was unchanged in 2011-12. However, one site was taken off the register in Dubbo LGA and one new site was added in Warren LGA. Currently, there is one site in each of the Bathurst, Cabonne, Cowra, Dubbo, Lachlan, Oberon, Orange and Warren LGAs. There has been a general worsening in this trend when averaged since 2008-09. This is likely due to better identification of existing sites rather than an increase in contamination per se.

Indicator – Number of contaminated land sites (potentially contaminated sites)

Local Councils deal with other contamination under the planning and development framework, including *State Environmental Planning Policy (SEPP) No. 55 – Remediation of Land* and the Managing Land Contamination – Planning Guidelines. This type of site, although possibly contaminated, does not pose an unacceptable risk under its current or approved use to the best of Council's knowledge. The planning and development process will determine what remediation is needed to make the land suitable for a different use.

In 2011-12, local Councils across the reporting region identified 915 potentially contaminated sites. As shown in the summary table (Table 5), this was an increase of 20 sites over the previous year and 29 more than 2008-09. The majority of the increase in the last year was in Narromine LGA which identified a further 16 potentially contaminated sites compared with the number for the previous three years (Figure 5).

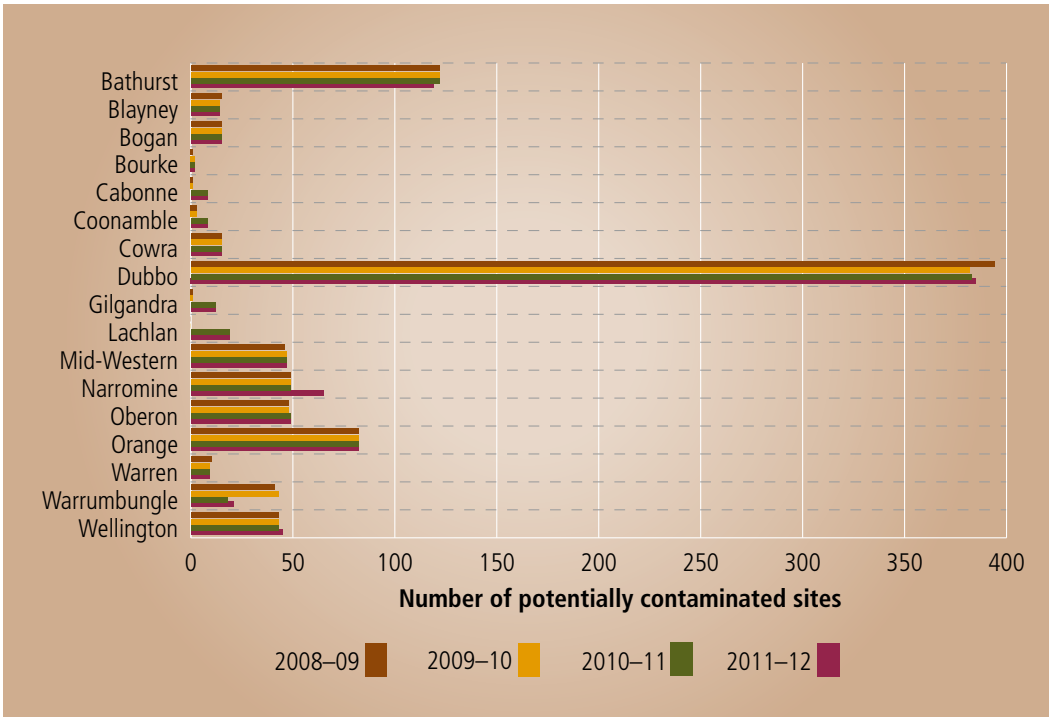


Figure 5: Number of potentially contaminated sites in each LGA

Although this indicator is reported as a worsening trend (as shown in the summary table at the start of this chapter), the overall increase since 2008-09 probably indicates that Councils have become more aware of previously contaminated sites and are now including them on their registers so that these issues can be addressed should a change in land use warrant it.

Erosion

Erosion is a significant land factor that influences water quality in our streams and terrestrial and aquatic habitat quality. Erosion generally occurs where land has been disturbed or where water concentrates, such as unsealed roads, roadsides and driveways, agricultural areas (cropping, land clearing and over grazing), industrial areas, stormwater outlets, where vegetation is otherwise removed and in waterways. Impacts from erosion include loss of arable land and habitat, weed invasion, soil loss, dust storms and sedimentation of waterways.

Salinity

While there are many causes of salinity (including irrigation and removal of vegetation), the effects on land resources can be very significant regardless of the cause. Salinity changes the soil structure, increasing the erosion hazard. Limited vegetation will grow on saline areas, reducing feed for stock, habitat for native species and changing the local ecosystem. Salt also affects infrastructure such as roads and buildings which may cause high economic impacts for the local Council and community.

A study of dryland salinity (DECCW, 2009) in the NSW part of the Murray-Darling Basin found that there were 18,559 ha of salt outbreaks in the Macquarie River catchment and 22,153 ha in the Lachlan River catchment. Of the 67 sub-catchments with salt outbreaks in NSW, the 27 highest ranked areas are all within the Macquarie, Lachlan and Murrumbidgee valleys.

BELOW An example of gully erosion, Mid-Western LGA

Threat

Five main threats to the Land resources of the region are:

1. Land clearing
2. Poor agricultural practices
3. Inappropriate development and land use change (including mining)
4. Climate change
5. Natural Hazards

Details about each of these threats are provided below.

Land Clearing

The clearing of natural vegetation compounds land degradation problems such as erosion and salinity. Rainfall and overland flow that would normally be taken up or slowed by vegetation erode sections of the land away, resulting in various forms of erosion. The clearing of native vegetation may also cause the water table to rise which brings salt deposits with it, increasing soil salinity and reducing the productivity of soils.

Poor Agriculture Practices

Agriculture can cause significant impacts on land if it is not managed sustainably. These impacts can include loss of groundcover, causing erosion and therefore loss of topsoil, changes to soil structure and health, increases in soil acidity and increased areas of soil scalds. Extreme impacts may lead to loss of soil fertility and desertification. Intensive agriculture in the plains areas of the Central

West is also causing rising acidity levels in areas that due to a lower rainfall have not previously experienced these problems (Evans and Scott, 2007). The inappropriate use of fertilisers is also a major contributing factor to soil acidification.

Inappropriate development and land use change (including mining)

The boom in global demand for Australian resources continues 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 addition to employment and wealth creation impacts of the resources boom, but may also negatively impact on the social structure of some smaller regional centres. The number and scale of active mines and exploration projects can threaten the local environment through possible contamination of groundwater, vegetation clearance and subsidence affecting surface water.

Indicator - Area covered by mining and mining exploration projects

Indicator - Number and type of operating mines and quarries, licenced under EPA PoEO Act

These indicators were first reported in the 2010-11 period and no updates of this data were available in the current reporting period, so no comparison with previous years is possible.

There is a significant area currently covered by exploration titles across every one of the 17 LGAs with the largest areas being in the Bourke and Warrumbungle LGAs, both having more than one million hectares under exploration titles. As of 2010-11, the total across the whole region was 7,426,548 hectares.

As of 2010-11 there were operating mines in 10 of the 17 LGAs with the largest area being the 87 active mining leases covering 22,382 hectares in the Mid-Western LGA. The Mid-Western LGA also had the largest number of exploration leases (75). The other active mining leases were in the Bathurst, Blayney, Bogan, Bourke, Cabonne, Cowra, Lachlan, Oberon and Wellington LGAs. Figure 6 shows the total area under both exploration and mining leases by LGA.

Climate Change

The predicted impacts of climate change will vary depending on various land features such as fertility, biology and physical soil characteristics mentioned above, as well as the area of green cover and water availability. However, while there is no uniform response, it is generally accepted that as temperatures rise, soil moisture and thus nutrient availability decreases, as does the soil's ability to support vegetation. This is particularly prevalent in arid lands compared to forested areas, where exposure combined with

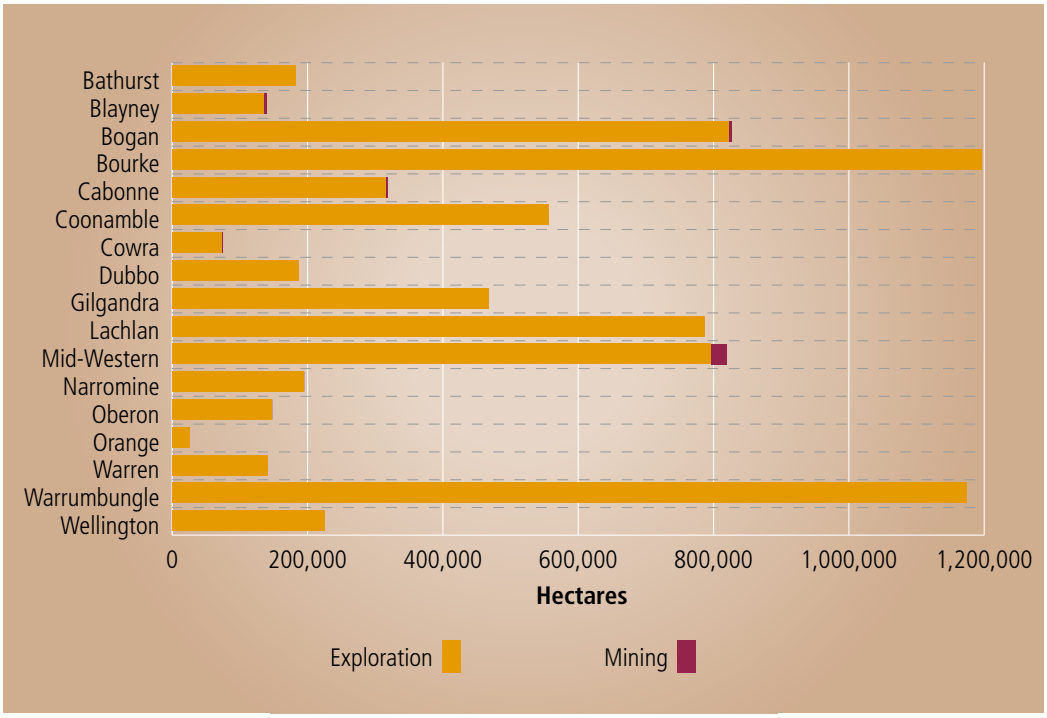


Figure 6: *Total area covered by mining and mining exploration projects as at 2010-11.*

ABOVE Aftermath of flooding in Wellington

increased temperatures causes a "baking" of the land.

Soils can also be either a net sink or a net source for greenhouse gases (GHG). In more densely vegetated areas, including perennial pastures, carbon dioxide (CO_2) is plentiful due to plant respiration. Because of the high availability of CO_2 in these areas, the growth rate of plants is also increased. This enhances soil organic matter and results in healthier soils. Healthier soils will support a greater population of micro-organisms. These soil micro-organisms also contribute CO_2 to the environment, however their contribution to building soil and soil carbon is far more significant. The amount of global carbon stocks in soil has been previously estimated as 1750 +/- 250 Gt (Royal Society, 2001).

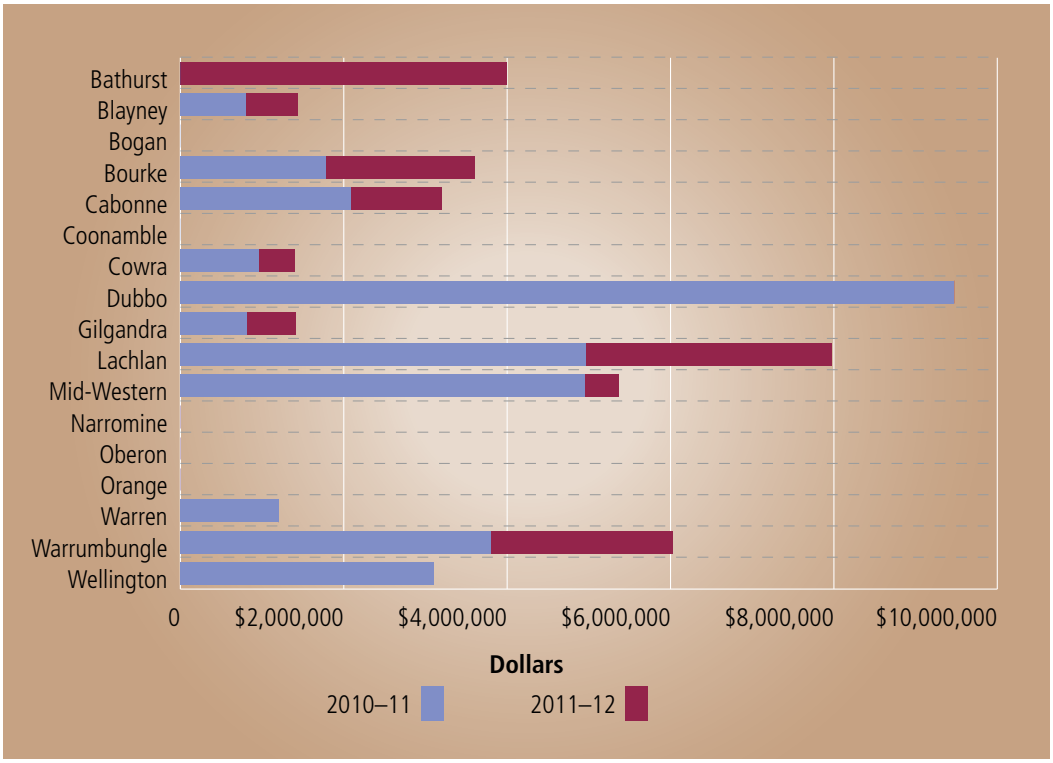
Natural Hazards

Indicator – Flood Damage (dollars)

The 2010-11 year saw a swing to higher than average rainfall and some extreme storm events associated with the La Ninã cycle. This led to extensive flooding in many areas and last year an indicator was included to measure the extent of flood damage in dollar terms.

The total estimated flood damage/ remediation bill across the region in the 2011-12 period was $14.2M with flood damage being quantified in 9 of the 17 LGAs (see Figure 7). This brings the cumulative cost of the recent flood events (2010-2012) to $45M. The highest costs in the current reporting period were in the Cabonne, Bourke, Warrumbungle, Dubbo and Bathurst LGAs which each reported flood damage/ remediation costs over $1M. It should be noted that the figure for Bathurst LGA in 2010-11 was not zero (figure was not available).

Figure 7: *Total estimated flood damage and remediation cost*



Response

Agricultural lands

A significant focus of CMA funding programs has been improving soil management in agriculture, not only for soil health but also to limit soil losses from impacts of stock, stormwater and flooding, and wind erosion. Targeted incentive funding for farmers has included increased groundcover percentages, improving soil tillage and improving the organic content of soils.

The Central West CAP outlines management targets, which include: 'by 2021, 20% of all soil landscapes under production are being actively managed to meet critical thresholds for groundcover and soil carbon Central West CMA, 2011b).'

Rehabilitation of degraded sites has also been a significant activity to reduce impacts on land resources. Programs undertaken by private landholders, the CMAs and Councils have included re-vegetation of streams and creeks to limit stream bank erosion; improving land management of salinity recharge areas, which also contribute to soil damage and erosion hazards; soil conservation works such as contour banks and gully remediation on farms and some public lands and improving industrial development rehabilitation conditions for larger impact activities such as quarries and mines.

The Central West CMA provides a series of best practice guides to assist landholders in improving agricultural land management. These guides include information on the topics of:

- Managing sodic soils
- Land and soil capability
- Soil management in pasture systems
- Economics of non-tillage farming systems
- Managing cropping soils
- Channel erosion
- Gully erosion

Conventional tillage methods and set stocking have significantly reduced perennial groundcover within the Lachlan Catchment as well. This contributes to wind and water erosion, soil structure decline, organic carbon loss and salinity. To improve soil health, the main management actions that are being implemented are based on maintaining optimal groundcover all year round, minimising ground disturbance from machinery and compaction by stock and machinery (Lachlan CMA, 2006).

More recently, both the Central West and Lachlan CMAs have implemented programs to increase soil carbon in agricultural lands. The Lachlan CMA, in partnership with the NSW Department of Primary Industries and OEH, has initiated a pilot program to develop and test a Market Based Instrument to sequester soil carbon in part of the Cowra Trough area of the Lachlan catchment (Lachlan CMA 2011b).

ABOVE Ploughing the paddocks, Mid-Western LGA

Erosion

Indicator – Extent of erosion affected land rehabilitated

Many of the reporting Councils have developed sediment and erosion control policies, which although relating primarily to urban areas, aim to mitigate the effects of stormwater on water quality. For example, they may require builders to install sediment

Wiradjuri saying—'Ngangaana-gu Kairai billa's dya Kairai billa's durai ngangana ngindu'
'Look after the land and the rivers and the land and the rivers will look after you'

(Cec Grant – 2001)

CASE STUDY: Rabbit Baiting Program in Blayney Shire

Blayney Shire Council has begun a pest management program in the numerous cemeteries around the Shire to limit the number of feral rabbits in the area.

A number of calls from concerned citizens notifying Council of the problems associated with the rabbits in the area, such as burrows and damage to grave sites, alerted Council to the problem and the Ranger began the process of researching the problem and possible solutions.

It was evident that the rabbits had been causing damage to the cemetery with many new burrows and areas of disturbed soil. With the rain, the burrows became larger making for a quite unsightly view for visitors.

Council's Ranger explained, "Rabbits are attracted to disturbed soil which makes for a horrible situation in a cemetery."

The management of the animal will be through a baiting program conducted by Council's Ranger, Stuart Adamson. The program was advertised to the community from Thursday 21 June to 4 July 2012 in the local newspaper.

On Tuesday 17 July, with the weather becoming sunnier, the process began by laying grain around the cemetery. The grain allowed the feral animal population to become familiar with, and to consume, a similar product to the bait.

Each day Council's Ranger checked on the cemeteries to monitor the grain amounts and any areas that showed evidence of high populations of the animal. After a week or so, the grain was then replaced by the bait and the waiting game began.

After two weeks, there was a noticeable decrease in the population. Council's Ranger explained, "Some of the burrows have been vacated and are now empty and the number of new holes are decreasing. The program has seen a considerable decline in numbers."

With notifications from the community, Council is well on the way to minimising the disastrous effects that this animal has on the area.

Ranger Stuart laying grain for the baiting program at Millthorpe Cemetery

controls around a site to prevent any erosion leaving the site, and to keep and stockpile topsoil for rehabilitation purposes.

The Central West CMA reported that 2,064 hectares of water ponding treatments were undertaken in the 2011-12 period. Although the total area rehabilitated is a lot lower than the 2008-09 number it is a significant increase compared to the last two years for work undertaken by that CMA. While this indicator is listed as a worsening trend, it should be noted that the 2008-09 number may also have included data for the two prior years due to the reporting system in place at the time.

Most Councils reported little or no erosion rehabilitation work, with the largest being five hectares of revegetation of the ring levee that surround the town for flood protection in Bogan Shire.

Contamination

Indicator – Number of contaminated sites rehabilitated

A range of projects have been undertaken across the reporting area to address contamination. Responses include research to locate and identify contaminated sites, and on-ground works to address contamination issues. Many of the Councils have identified a list of potentially contaminated sites and are seeking funding for cooperative projects. For example, Lachlan Shire Council identified older landfills and disused service stations as priorities for rehabilitation.

There are several projects being carried out across the region involving the rehabilitation of contaminated sites. Examples include Cabonne Council working on a former gasworks site at Molong (see case study) and Bathurst LGA in which several service station sites have been remediated.

All 17 participating Councils reported on the number of contaminated sites rehabilitated for 2011-12. They reported that 13 sites across the region have been rehabilitated. This is reported as an improving trend (as shown in the summary table at the start of this chapter) because there is an increase compared to the average of the three previous years for the 16 Councils that reported in all those years.

Salinity

Indicator – Extent of salinity affected land rehabilitated

Salinity management has traditionally been the role of the agricultural sector and the State Government through remedial works, education programs and monitoring of river salinity levels.

Councils may also address this issue depending on the current level of risk identified in the LGA and therefore the priority of the issue to the local community. For example, Dubbo City Council has identified urban salinity as an issue for some years. Urban salinity can affect infrastructure such as buildings, driveways, fences and roads, as well as limiting plant growth.

Council has therefore invested in a range of management options to effectively monitor and manage salinity in and around Dubbo.

CASE STUDY: Molong Gasworks

Molong, like many country towns, had its own gasworks which converted coal into 'town gas' from 1893 till 1966. Then the site was used for LPG gas distribution. Most infrastructure was demolished by about 1994. This involved burial of coaltar, oxides and ash. The coaltar is a pollutant which could contaminate underground waters.

Cabonne Shire Council has investigated the buried pollution and based on these investigations the Environment Protection Authority (EPA) issued a formal declaration in December 2011 that the gasworks site is 'significantly contaminated land'.

Council has received a grant of $500,000 from the NSW Government to assist in site cleanup.

Council went out to tender, which closed on 20 June 2012. Various proposals were submitted and a contract for $607,000 has been chosen. Remediation works will commence after the EPA licensing and approval requirements have been finalised.

Completion of these works will address an environmental problem and should enable this site to be safely used for business or commercial usage. It is strategically located near Molong's shops, motel and caravan park.

BELOW Loading the grain trains in Trangie

An example of the management options put in place by Dubbo City Council is the Dubbo Urban Salinity Network. Commencing in 2004 and consisting of 129 bores covering the Dubbo urban area, the Network is one of the best monitoring networks in Australia. Groundwater levels and conductivity data are collected monthly to assist Council in effectively managing salinity across the urban area.

Data collected by Dubbo City Council has shown that salinity issues in areas not previously considered to be at risk. Council is now using the data collected since 2005 to develop groundwater, soils and salinity hazard mapping to assist in future land use planning and salinity management. More details: http://www.dubbo.nsw.gov.au/CouncilServices/Salinity.html

Bathurst Regional Council has recently had a comprehensive salinity study undertaken, and is now determining how it can prioritise actions across the LGA.

The Central West CMA has identified the management of salinity as a priority action to achieve land management targets set under the new 2011-2021 CAP (Central West CMA, 2011b). The CMA also targets the replanting and management of recharge areas through the establishment of deep rooted perennials. It also addresses improving water efficiency in irrigation areas to limit groundwater recharge in saline areas, and encourages Councils to address urban salinity issues.

In the 2011-12 period, the Central West CMA reported that a total of 3,370 hectares of salinity affected land was rehabilitated, comprising of 1,511 ha of salinity affected grazing and 1,859 ha of salinity affected cropping land. As the total area rehabilitated is a lot lower than the 2008-09 number this indicator is reported as a worsening trend, even though the figure for 2011-12 is an improvement on the subsequent years. It should be noted, however, that the 2008-09 number may also have included data for the two prior years due to the reporting system in place at the time.

RIGHT Hay bales in the field

CASE STUDY: The Central West celebrates the Year of the Farmer

As a celebration of the 2012 Australian Year of the Farmer, the Central West CMA is working closely with Landcare on a program of events to recognise the efforts of our sustainable farmers who feed, clothe and house us all in an environmentally sustainable way.

Tom Gavel, Chairman of the Central West CMA has commented, "In conjunction with Landcare and our broader farming community, we work with some amazing innovative and sustainable farmers who strive to achieve a workable balance between production and conservation."

During the Year of the Farmer, the CMA is showcasing farmers' achievements to promote their hard work and demonstrate how others can become Landcare Farmers.

A diverse range of activities is being carried out throughout the year by both Landcare groups and the Central West CMA. Social media training has equipped farmers to effectively tell their story and farm tours and field days allow the community to see first-hand how their food is produced. A number of school activities also aim to help educate our youth about where their food comes from.

According to Watershed Landcare Coordinator, Thea Ridley, "this year is about promoting the central role agriculture plays in our country. There is a great need to re-connect producers to consumers, and vice versa, to bridge the gap in understanding where our food comes from, and what it costs –environmentally, socially and economically."

Landcare is about accounting for all of these costs, and this year, it focusses on celebrating farmers who successfully do that.

Both the NSW Farmer of the Year, Norm Smith, and the Conservation Farmer of the Year, Grant Byrne, farm within the Central West catchment.

Whether it's Michael Inwood's zero-emission farming in Bathurst, large scale conservation tillage at Nyngan with the Wass brothers or the Job family's sustainable grazing approaches near Yeoval; there are lots of farmers in the region with a passion to move farming into a new more sustainable era of production.

Further information about the 2012 Australian Year of the Farmer can be found at www.cw.cma.nsw.gov.au

Air

This chapter focuses on the condition of the air (atmosphere) in the participating Council areas. Globally, the condition of the air has been heavily scrutinised in recent times due to its potential impact on climate change.

RIGHT Windmill in the snow

The atmosphere regulates the type and amount of radiation that hits the earth's surface from the sun (via the ozone layer), regulates temperature (through the 'greenhouse effect') and provides the gases that plants need to grow and animals, including people, need to breathe. However, some substances in the atmosphere may reduce the air's quality, and pollution resulting from smoke, industrial and agricultural emissions can at times be a problem within the reporting area.

Air Pollution

Condition

Table 6: Summary Table of Indicator Trends – Air

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Urban Air Pollution	Number of days that air pollution maximum goals for particulate matter were exceeded*	5	8	0	1	↑
Industrial Pollution	Number of premises on the National Pollution Inventory	49	48	45	46	↑
	Number of Environment Protection Licenses issued	202	194	192	202	↓
Odour	Number of odour complaints received by Council	120	89	117	91	↑
	Number of odour complaints received by EPA	25	89	50	29	↑
Air Pollution Complaints	Number of air quality complaints to EPA Pollution Line	103	45	148	35	↑
	Number of air quality complaints to Council	101	112	131	134	↓

**data collected at Bathurst – only monitoring station in the reporting area*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008-09, 2009–10, 2010–11 and 2011–12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011–12.They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils included in the trend data.

Regional Air Quality

Much of the State-level air quality monitoring is confined to the Greater Metropolitan area which includes Sydney, Wollongong and Newcastle. 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. Particulate pollution can also aggravate existing respiratory diseases such as asthma and chronic bronchitis (DECCW, 2009a).

Indicator – Number of days that air pollution maximum goals were exceeded

The National Environment Protection Measure (NEPM) sets maximum goals or standards for each pollutant type, except for visibility which is set by OEH.

During the 2011-2012 reporting year there was one day where particulate matter exceeded the National Environment Protection Measure (NEPM) standard for PM10 particles (which is an average daily reading of 50 micrograms per cubic metre). PM10 is used to define air particles that are up to 10 micrometres in diameter and are among the coarser particles that can be measured in air quality analysis.

This continued the improvement recorded in 2010–11 compared to the total of eight and five exceedances during the previous two years. This change is probably due to the wetter conditions experienced in the region over the last two years, as the main contributors to high PM10 particle levels in the region (including in Bathurst) are dust storms, bushfires and burn-offs.

Air Quality Complaints

Indicator - Number of air quality complaints to local Councils

Indicator – Number of air quality complaints to the EPA Pollution Line

As shown in the summary table (Table 6), the number of complaints to the local Councils about air quality matters (not including odour issues) was very similar to the 2010–11 number but greater than the previous years, thus the worsening trend.

There was a total number of 134 air quality complaints to Councils in 2011–12 from the 17 participating Councils. The types of complaints across the Council areas are shown in Figure 8. As in 2010–11 they are spread evenly across the four categories of burn-offs, dusts, wood smoke and other. This is a change from 2008 to 2010 where dust and burn-offs were the main specified air quality complaints.

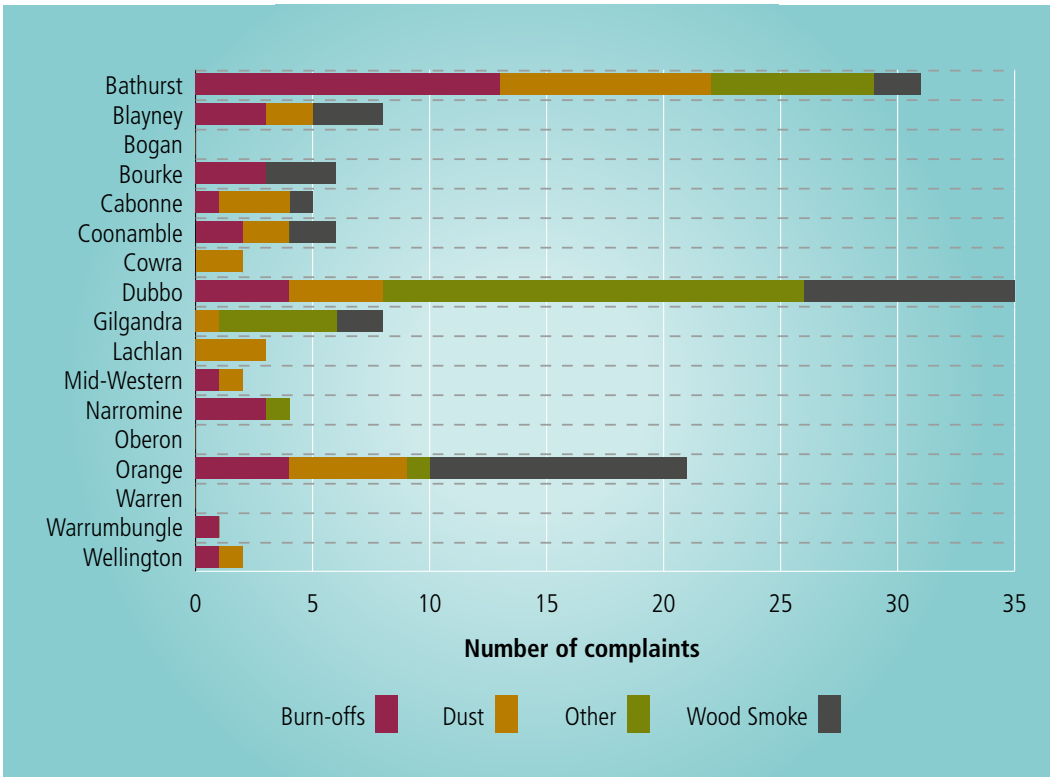


Figure 8: Types of air quality complaints to local Councils 2011–12

ABOVE Blue skies and cumulus clouds, Cabonne LGA

Complaints reported to the EPA Pollution Line by contrast, showed a large decrease this year, falling to the lowest level in the last four years: 35 in 2011–12 compared to 148 in the 2010–11 year. However, the change is almost entirely explained by Mid-Western LGA where complaints fell from 145 last year to 28 this year. The Mid-Western LGA has recorded the largest number of complaints to the EPA in each of the last four years, accounting for over 90% of the complaints over the last three years and still 80% in the current year. This is probably due to an increase in mining activities.

Odour

Indicator – Number of odour complaints received by Council

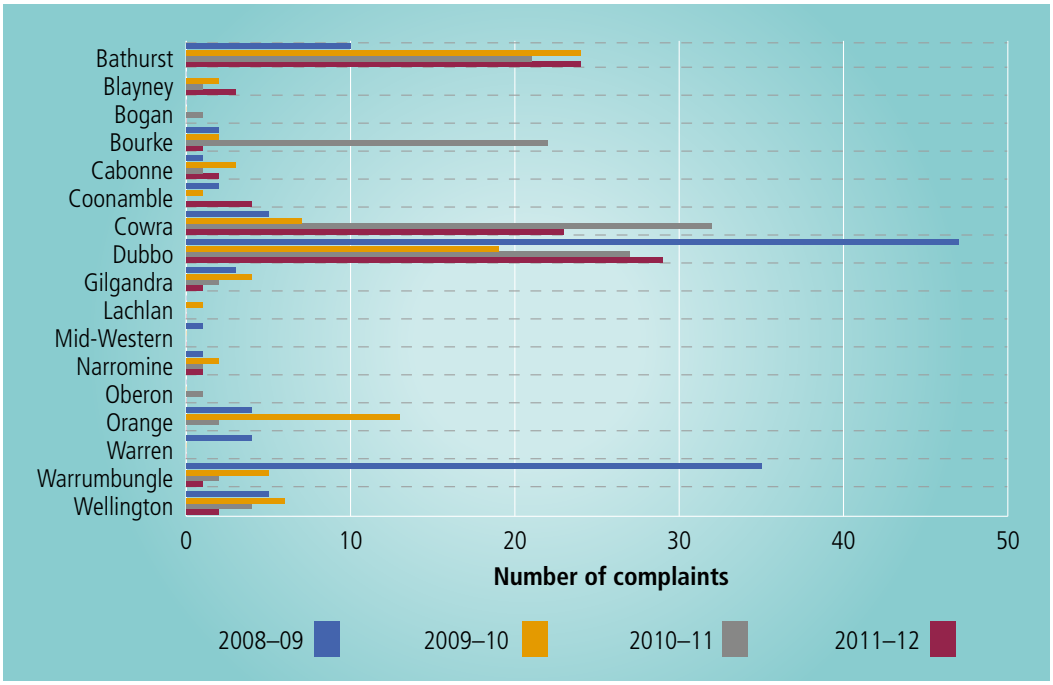
Indicator – Number of odour complaints received by EPA Pollution Line

Some complaints can be related to odour from sources such as food outlets and factories. The 17 participating local Councils reported that there were 91 odour complaints received in 2011–12 across the reporting region which was very similar to the level reported in 2009–10. Figure 9 shows the number of odour complaints reported by each Council.

The higher number of complaints in 2010–11 compared to the current and previous years was almost entirely due to a spike in complaints in the Bourke LGA (due to a large fish kill in the Darling River caused by blackwater from the major flooding event). Apart from Bourke and Warrumbungle, the pattern of complaints across the region in 2011–12 was very similar to the previous years with the vast majority of complaints being recorded in the Bathurst, Cowra and Dubbo LGAs.

There was also a significant reduction in the number of odour complaints received by the EPA Pollution Line: only 29 complaints were received across the region with almost

Figure 9: Number of odour complaints received by each local Council



three quarters of these coming from the Mid-Western, Cabonne and Cowra LGAs. The number of complaints in Cabonne was much lower than reported in the two previous years and along with Bathurst and Blayney, explains most of the reduction seen across the region.

Threat

There are several threats to the air quality of the region including from dust storms, vehicles, solid fuel heaters, backyard burning, bushfires, agricultural activities (e.g. stubble burning, agricultural spray drifts) and commercial and industrial sources.

Solid Fuel Heaters and Backyard Burning

Domestic wood heating, industrial premises and diesel vehicles are the major sources of particulate pollution in urban areas (DECC, 2006). There is little data available relating to the number of wood heaters in use, although some Councils do have complaint records relating to wood smoke. Open burning is also a significant source of particle pollution. It is regulated by the *Protection of the Environment Operations (Clean Air) Regulation 2010*. The Regulation prohibits burning of certain articles and vegetation in urban areas and regulates conditions in which burning can be undertaken in rural areas. The burning of dead and dry vegetation in urban areas of the Central and Western region may be permitted in some circumstances, depending on the policies of the local Council and Rural Fire Service.

Fires

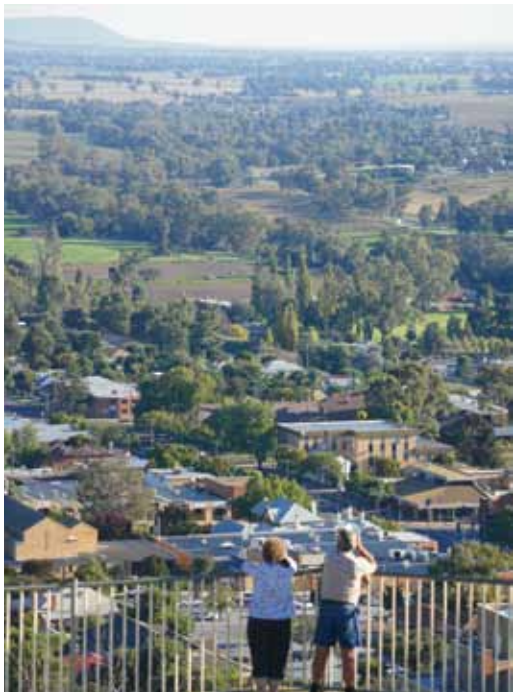
Bushfires emit large quantities of carbon dioxide, other gases, and also significant amounts of particulates. Bushfire management activities involving the prescribed use of fire (for hazard reduction) are highly regulated, both operationally and with regards to potential environmental impacts. The local area Bush Fire Risk Management Plans contain references to smoke management, and the need for operational plans to consider the effects of smoke on nearby residences, and sensitive locations such as hospitals, aged care facilities, schools and tourist centres. These plans state that all burn plans must include measures to reduce the impact of smoke as far as practicable.

The impact of smoke resulting from wildfire is impossible to manage and may have significant implications for local and regional air quality. Given the climate conditions that are conducive to very high and extreme fire danger across the Central and Western Council areas, wildfire will typically result in large quantities of smoke being blown for long distances downwind of the fire. This has the potential to severely impact on air quality within the region, affecting residents, tourists and businesses alike. The composition of smoke from an intense wildfire may be substantially different from that of a low intensity prescribed burn, and exposure may have implications for the health of persons with respiratory illness (DECC, 2006).

Agriculture

Some agricultural activities can impact on the atmosphere, including stubble burning, spray drift and dust caused by tillage. Stubble burning, believed to have returned nutrients to the soil following harvest of a crop, produces smoke and ash across large areas of land as well as releasing large amounts of carbon dioxide. This practice is becoming less favoured as conservation farming techniques promote retention of organic matter. Spray drift from application of herbicides and pesticides, including aerially applied sprays (crop dusting), is penalised under the pollution regulation; however, it still occurs on a regular basis and affects both biodiversity and human health. Ploughing or tilling the soil in dry conditions causes dust, and in dry climatic

ABOVE 'Borrodell' eco friendly accommodation near Orange



RIGHT A view of Cowra and the Lachlan Valley from Bellevue Hill Lookout

conditions dust storms have been recorded across the reporting area. Dust has significant human health impacts.

Motor Vehicles

Although vehicle numbers and kilometres travelled are increasing, improved technologies and tighter regulatory controls are expected to reduce per capita motor vehicle emissions each year. Vehicle emissions contribute to reduced local air quality due to particulate pollutants, volatile organic compounds and nitrous oxides.

Indoor Air Pollution

Indoor air includes air in homes, schools, shopping centres, vehicles, and indoor workplaces. Australians spend approximately 85% of their time indoors, much of it at home (DECC, 2006). The quality of indoor air depends on factors such as the type of building materials used; the types of products used indoors (including paint, electrical appliances, furniture and cleaning products); the proximity to outdoor sources of air pollution; types of indoor heating or cooling used; building ventilation rates; the use of the building (including whether smoking occurs); and diurnal, seasonal and climatic conditions. Many pollutants, such as nitrogen dioxide, carbon monoxide, fine particles and formaldehyde, can be present at higher concentrations indoors than outdoors. Safe Work Australia sets exposure standards for workplaces, but there are no Australian standards for indoor air in other settings.

Industrial Pollution

Indicator – Number of premises on the National Pollutant Inventory

The National Pollution Inventory (NPI) records emissions for 93 compounds, and is a National Environmental Protection Measure implemented by the national environment department. It includes point source and diffuse emissions, some reported directly by industrial sources and some estimated by the relevant State Government.

As shown in the summary table (Table 6), the number of NPI industry pollution emitters in the region has increased slightly in the last year, with 46 in the most recent NPI reporting period compared with 45 in the previous NPI reporting period. The changes in the NPI listings are reflective of the economy of the region with the four new facilities all in the resources sector: quarries in the Bourke, Mid-Western and Orange LGAs, plus the Moolarben coal mine near Ulan. The most significant facility closed in the last period was a manufacturing plant in the Oberon LGA.

Indicator – Number of Environment Protection Licences issued

There are currently 202 active Environment Protection Licences (including air, water pollution discharges) for premises across the reporting area, as issued by OEH under the *Protection of the Environment Operations Act 1997* (PoEO Act). As shown in the summary table (Table 6), this is an increase from the 192 active licences in 20010-11 and a reversion back to the level recorded in the 2008-09 period. This indicator is reported as a worsening trend across the four reporting years.

Many of the licenses do not relate to air and a number are issued to Council's own operational facilities such as sewerage treatment plants which may discharge to waterways. Smaller industries may also cause pollution, and the local Council has regulatory controls over these premises.

Response

Fires

While fires are regulated by both pollution and burning regulations, education plays a key role in the response of local Councils to this issue. OEH has produced a woodsmoke resource kit for Council officers, targeting improvements in residential wood fire use to limit smoke. Council officers have powers under the PoEO Act 1997 to issue notices regarding smoky fires.

Hazard reduction burns and limiting the impact of smoke from these is managed by Bushfire Risk Management Plans, developed by the local Bushfire Management Committee (BFMC). The BFMCs are comprised of local Councils, OEH and the Rural Fire Service (RFS).

Several fire management initiatives are currently underway in the region. The Canobolas Zone of the RFS which incorporates Cabonne, Cowra, Orange and Blayney LGAs is currently completing a comprehensive risk management plan, incorporating environmental values. At Lake Brewster, RFS and Lachlan CMA are conducting an ecological burn which incorporates traditional burning, ecological and hazard reduction purposes.

Emission of Air Pollutants

The majority of air pollutant emissions are regulated by the NSW government under the PoEO Act, however Councils may respond to air quality complaints and issue notices or warnings under the PoEO Act where they are the appropriate regulatory authority.

Several Councils are taking proactive steps to reduce woodsmoke impacts on air quality including direct funding for air quality improvement programs and also educating residents about ways to minimise woodsmoke.

Bathurst Regional Council continued the 2011 Woodheater Rebate Program to help reduce pollution in the region. Bathurst residents could receive financial assistance to replace older style woodheaters with cleaner and more efficient alternatives. The rebate was open for a wide variety of heating alternatives including gas, reverse cycle, central heating, and electric heating. Dubbo City Council continues to run its annual Clean Air/Woodsmoke awareness program for residents.

CASE STUDY: Neutral Drive (Dubbo)

During 2011–12, Dubbo City Council re-examined its commitment to the GreenFleet carbon capture program utilised to offset small vehicle fleet emissions. In examining the program Council decided that the revegetation benefits from this on-going commitment to an environmentally sustainable bottom line could be better focused on the LGA, rather than seeing Dubbo investing in tree plantings in other localities.

Council is a large land holder in the LGA and an opportunity was identified for Council to develop its own carbon sequestration planting program in line with the newly released Carbon Farming Initiative (CFI) guidelines. A unique identity for this program was developed and registered and the "Neutral Drive" program was born. This is the source for new stickers on the rear windows of Council vehicles.

In order to meet with the CFI guidelines, any plantings which aim to become carbon "sinks", or to be accountable under their approved methodologies must comply with the following conditions:

It must be "additional", that is not either a normal part of Council business or something it would otherwise be undertaking. Coal mines for example cannot claim revegetation activities as they are required as part of their mining lease conditions.

- It must be "permanent', in this case permanence is defined as 100 years protection. If part or all of a forest is lost for any reason in that time it must be replanted. This is to ensure carbon is actually captured for a significant period
- It must be measurable, that is it must comply with a defined methodology
- Plantings cannot be "urban", urban revegetation is defined by the CFI as normal business for Councils.

With all of this in mind, Council has identified and planted an area at Redbank Reserve on Burraway Road as its initial Neutral Drive planting site. Over time, this site will host the 1,600 trees estimated by the methodology as required to offset Council's small vehicle fleet emissions. Other planting sites have been and continue to be identified around the LGA and will offer the program opportunities for future development through sale of carbon capture to the private and public sectors beyond the Dubbo LGA.

Eucalyptus in flower

Water

This chapter reports on the quantity and quality of water in the catchments of the reporting area and the consumption of potable water in the reporting region. In this chapter, 'water' refers to the rivers, aquatic habitats, creeks, wetlands, groundwater, dams, stormwater, potable water and the catchment activities which may impact upon them.

There are two main issues in relation to water in the reporting area. Firstly, the quantity of water is often variable within many rivers due to the periodic effects of drought and flood. Many rivers in Australia's south have been dammed to provide a reliable water supply for agriculture and urban use and increasing demand is placing pressure on inland water systems. Secondly, the quality of the water existing within the river and groundwater systems is also important, with threats arising from industrial, urban and agricultural pollution sources, as well as from treated wastewater and stormwater.

Table 7: Summary Table of Indicator Trends – Water Quantity

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Dam Levels	Average dam levels	19.5%	15.2%	60.5%	88.9%	↑
Council water consumption	Area of irrigated Council managed parks, sports grounds, public open space (ha)	793	791	911	932	↓
	Water used by council for irrigation (including treated and untreated) (ML)	1,161	719	716	771	↑
Reticulated filtered water consumption	Total number of serviced properties	73,152	71,965	73,970	74,864	↓
	Total number of unserviced properties	10,369	18,584	17,591	17,306	↑
	Annual metered supply (ML)	24,331	23,662	21,125	21,256	↑
	Annual consumption (Total from WTP) (ML)	26,693	25,806	23,248	22,109	↑
	Average annual household use (kL/household)	290.7	272.9	204.9	195.9	↑
	Average level of water restrictions implemented	1.6	1.5	0.9	0.2	↑
Water extraction	Number of irrigation licences from surface water sources	6,279	5,002	5,087	5,836	↓
	Volume of surface water permissible for extraction under licences (GL)	1,519	1,397	1,595	1,635	↓
	Actual volume extracted through surface water licences (GL)	130	135	173	297	↓
	Number of bore licences from groundwater resources	21,667	26,321	22,987	50,151	↓
	Volume of groundwater permissible for extraction under licences (GL)	404	417	2,859	1,293	↓
	Actual volume extracted through groundwater licences (GL)	*	*	97	42	↑
	Water sharing plans implemented	22	25	45	48	↑

** Data not available for these years*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008–09, 2009–10, 2010–11 and 2011–12 from the same sources. They should be read in terms of the limitations for indicators discussed throughout this chapter. The trend is based on comparing the average of the previous years of reporting with 2011–12. Note also that there were some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils included in the trend data.

ABOVE Somerset Park Wetland, Orange

Waterways across the catchment are important for many reasons:

- They act as a 'barometer' for the whole environment. Most activities that occur on the land are ultimately reflected in the health of waterways.
- They support a diverse range of ecosystems.
- The vast majority of our streams and creeks ultimately enter, and impact upon, the integrity of internationally important wetlands such as the Macquarie Marshes.
- Many waterways are in, or discharge into, drinking water catchments.

Water quantity

Condition

The Macquarie River is regulated between Burrendong Dam and Pilicawarrina in the Marshes which includes Bulgeraga, Duck and Gunningbar Creeks. There are two main dams regulating flows in the Macquarie River Catchment: Windamere Dam on the Cudgegong River upstream of Mudgee has a capacity of 368,120 ML and Burrendong Dam located upstream of Wellington at the junction of the Macquarie and Cudgegong River has a capacity of 1,188,000mL. Other water courses that are augmented by river regulation include the Ewenmar system, lower Bogan River, Marra, Crooked and Marthaguy Creeks and the lower Macquarie River (Central West CMA, 2007).

The upper reaches of the Bogan and the Castlereagh Rivers are largely unregulated rivers. All other streams within the catchment are unregulated with impacts on the natural flow regime largely a result of extractive demand and the construction of town water supply schemes. The level of impact within the catchment will vary according to extractive demand, available flow and groundwater levels.

Within the Lachlan Catchment, the Lachlan River rises near Lake George and terminates in the Great Cumbung Swamp near Oxley, 1450 river kilometres to the west. There are an unusual number of effluent streams along its lower section including Willandra, Merrowie and Middle Creeks. These effluent streams flow intermittently from the Lachlan River, delivering water as far as 160-180 kilometres west of the main channel. The Lachlan River itself is only intermittently connected to the Murrumbidgee River when both rivers are in flood. Major tributaries above the township of Forbes include the Abercrombie, Boorowa, Belubula and Crookwell Rivers. The Bland and Goobang Creeks flow into the Lachlan River upstream of Condobolin. The main dam regulating flows in the Lachlan River is Wyangala Dam which has a capacity of 1,220,000 ML, (Lachlan CMA, 2007).

ABOVE Farm dam at dawn

Almost half of the sub-catchments in the Lachlan Catchment have been identified as having high hydrologic stress and ten of these are considered to have high environmental values. In some areas of the catchment, river flow regulation, instream structures and requirements of water for 'beneficial uses' have altered flow regimes, resulting in both higher and lower flows than the natural state and consequently a reduction in wetland health, area and water quality (Lachlan CMA, 2006).

Regulation of river flow throughout the Central West and Lachlan catchments has altered the character of many of the major waterways. River regulation has been seen to cause a range of impacts, including:

- Introducing barriers to fish (and other species) moving through the habitat.
- Reducing the peak and trough effect of rainfall and minor floods leaving areas without fresh water for longer periods.
- Changing seasonal variation.
- Reducing the amount of water in flood events, limiting the area affected, time affected and depth of water.
- Changing water temperatures through shallow water (usually warmer) or dam releases (usually colder).
- Reducing flows across the floodplain landscape.
- Increased channelisation and isolation of rivers from the floodplains.

The Western Catchment is not a catchment in the traditional sense, as it encompasses a series of river systems. These include the Barwon-Darling, Culgoa, Paroo, Warrego, Narran, Bokhara, Birrie, Bulloo Overflow and part of the Bogan Rivers. Many of these rivers originate in Queensland with the Condamine-Balonne system contributing 20% and the MacIntyre and Border Rivers contributing 35% of tributary flows entering the Barwon-Darling system.

The Great Artesian Basin underlies much of the northern part of the Western Catchment area (Western CMA, 2007). Groundwater is an important natural resource in the Western Catchment, and the volume of water stored in the pores and fractures of rocks below the watertable vastly exceeds the volume of fresh surface water resources (Western CMA, 2007).

Continued demand for surface water and the lack of rainfall (drought) in previous reporting periods has placed significant pressure not only on town water supplies, but also on water licences and allocation

for agriculture and industry. However, the past two years have seen drought conditions lifting across the Central West with the La Ninã weather pattern. The particularly intense weather cycle meant that 2011 was the third wettest year for Australia (since national records began in 1900) with a mean total rainfall of 699mm, well above the average of 465mm.

From December 2011 to March 2012 major floods affected the Lachlan Catchment with moderate and minor flooding experienced in other parts of the region. As reported in the Land chapter, the total estimated flood damage/remediation bill across the region in 2011–12 was $14.2M, bringing the cumulative cost of recent flood events (2010-2012) to $45M.

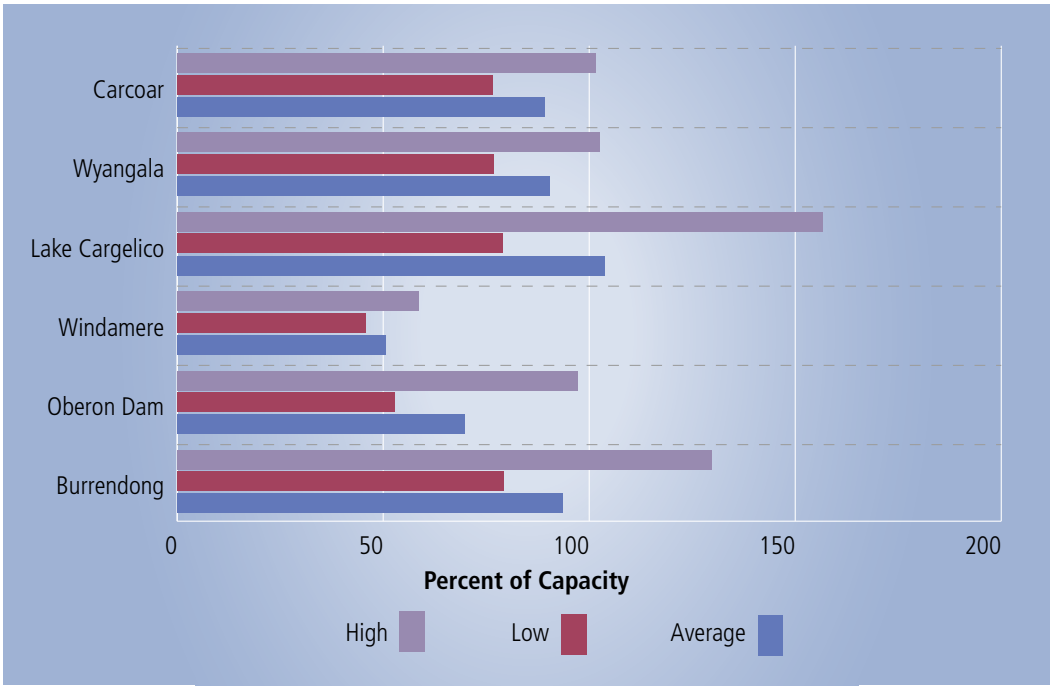


Figure 10: Dam Levels for 2011–12

Indicator – Average dam levels

Dam storage levels indicate both the current rainfall and the pressures that water consumption place on water storages. Six dams in the region – Carcoar, Wyangala, Lake Cargelico, Windamere, Oberon Dam and Burrendong – were used to indicate dam levels. As shown in the summary table (Table 7), the average level for the total storage of these six dams rose from 60.5% capacity in 2010–11 to 88.9% in 2011–12.

Figure 10 illustrates the continuing improvement in storage levels since the drought broke in 2010–11. Storage levels in all the dams were high all year with relatively little difference between the minimum and maximum levels. The two major dams in the region are Burrendong and Wyangala, each with a total storage capacity of approximately 1,200 GL. These two dams both averaged greater than 90% capacity on average over the 2011–12 year.

Threat

Surface and Ground Water Extraction

Irrigation places significant pressure on water resources. While many irrigators have had relatively high levels of water allocation over the past year, 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. The increase in mining operations has the potential to have a severe impact on water resources in the region.

Indicator – Number of irrigation licenses from surface water sources

Indicator – Volume of surface water permissible for extraction under licenses

The number of surface water irrigation licences was reported this year to be 5,836 which is a significant increase on the numbers of between 5,000 and 5,100 reported in the last two years. However, the current figure is still lower than the 6,279

reported in 2008–09. It is hard to draw any reliable conclusions from these numbers due to the variability reported which is possibly more reflective of changes to the NSW Office of Water's licensing systems and processes than to any real change in water allocation.

However, the volume of surface water permissible for extraction under licences in 2011–12 does appear to show a more consistent upward (worsening) trend since 2008–09 (the dip reported in 2009–10 is probably an error in data, as noted last year).

Indicator – Annual volume extracted through surface water licences

The amount of surface water extracted rose significantly from 173 GL in 2010–11 to 297 GL in 2011–12 which likely reflects the easing in drought conditions across the region, resulting in increases in allocations to irrigators.

However, this number is still only around 18% of the volume permissible for extraction under surface water licences and should be set in context against the 232 GL extracted in 2005-06. The high rainfall in the 2010–11 and 2011–12 years has possibly also acted to suppress demand for water extraction due to ample supplies of water in farm dams and in the soil itself. Therefore, it is foreseeable that in future years actual extractions could increase significantly above this year's level.

BELOW Irrigation channels near Mitchell Highway.

Indicator – Number of bore licenses from groundwater resources

The number of licences for extraction of bore water more than doubled to 50,151 compared to the number reported in 2010–11. The scale of this increase does raise some doubt about the reliability of the data, but it is potentially reflective of an increased focus on the licensing regime for groundwater and a desire to better manage the State's groundwater resources.

Indicator – Actual volume extracted through groundwater licences

This indicator was reported for the first time last year. The number reported for 2011–12 fell to 42.2GL from 97.2 GL last year (an improving trend). A plausible explanation for this change is that increased surface water availability has led to reduced demand for bore water which can be more expensive to extract.

There has been a long standing problem in managing actual bore water usage because the large majority of bores have never been metered. Therefore the value reported is unlikely to give an accurate reflection of the percentage of actual compared with licensed extraction. However, it will be interesting to track this number over future years as, contrary to normal expectations, an increasing trend in actual usage reported is likely to be positive, if it reflects increased metering of bores rather than an actual increase in extractions.

Town Water Consumption

Reticulated water consumption is relatively small in comparison to that used for irrigation. In the region it accounts for about four per cent of water consumption compared with 88% used for irrigation and eight per cent 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.

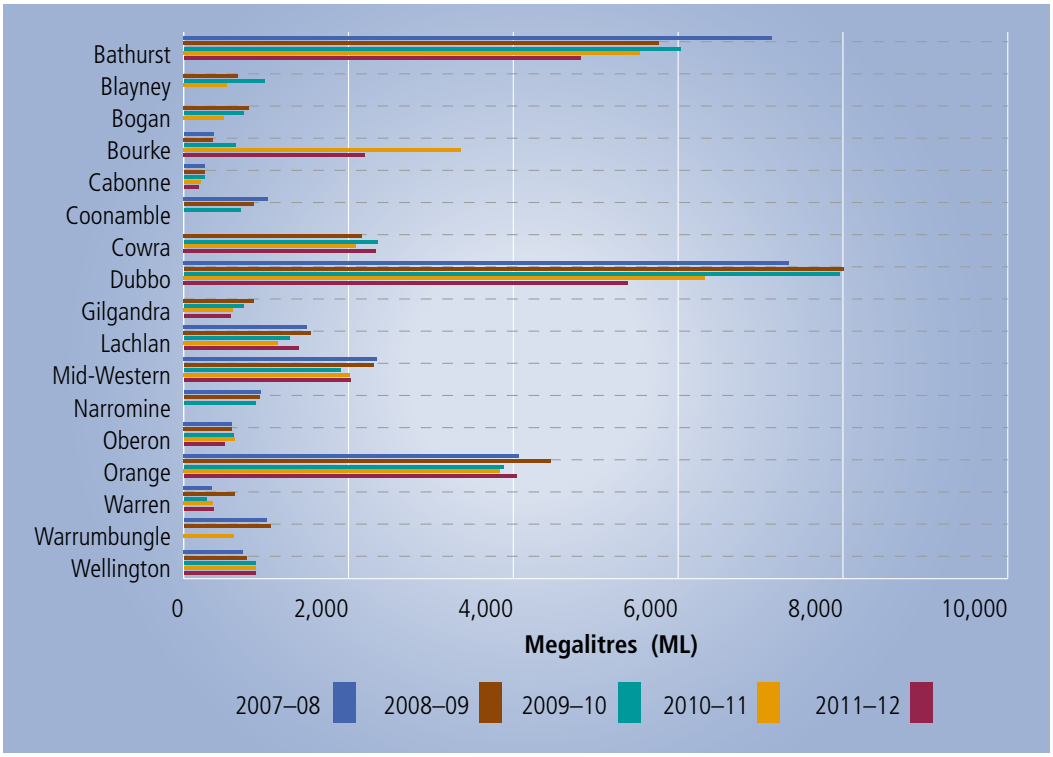


Figure 11: Annual town water consumption

Indicator – Total number of serviced properties

Indicator – Total number of unserviced properties

As shown in the summary table (Table 7), the number of properties serviced by town water has continued the increasing trend reported in previous years. This expansion of the reticulated systems will increase pressure on water supplies and thus is seen as a worsening trend for this indicator, unless more water sensitive urban design practices are adopted in new developments. The gradual increase in this indicator (1.2% this year) is roughly in line with the average rate of population growth in the region over the last few years.

The Councils in the region have also reported a small decrease in the number of un-serviced properties: down from 17,591 in 2010–11 to 17,306 in 2011–12 (for the 14 Councils that reported in both years), with most or all of these having presumably contributed to the increase in the number of services properties. Un-serviced properties represent potential pent-up future demand on the reticulated system which will increase the pressure on water supplies.

Indicator – Annual metered water supply

Indicator – Annual town water consumption (total from WTP)

Household water use is an indicator of the pressure on water resources, particularly in times of declared drought. As shown in the summary table (Table 7), the annual town water consumption as measured from water treatment plants decreased by almost 5% from 2010–11 to 2011–12 for the ten local Councils that have reported this data each year, continuing the trend shown in the last three years. A small increase (0.6%) in the annual metered supply was reported this year but the general trend over the last four years is downward.

Figure 11 provides a breakdown of water consumption across the region in 2011–12 compared with water use in the four previous reporting years. Water consumption has decreased over this period for most LGAs, notably Bathurst and Dubbo. Bourke LGA has reported large changes but last year was the first year in which the Bourke's town water was metered (previous years' data were estimates). Whilst Bourke's consumption would have been reduced during the three previous reporting years due to water restrictions, it

ABOVE Raingarden at Dubbo City Council's public pool (Photo C. McCulloch)

is likely that consumption in these years was significantly underestimated. This would mean that the overall reduction across the region is probably actually larger than reported here.

These reductions in town water consumption are likely to be, at least in part, a response to the increased rainfall which would have decreased the need for water for gardens, filled domestic rainwater tanks and reduced the demand for household water. It remains to be seen how much of the reduction is due to permanent behavioural changes in the community resulting from water saving programs, domestic rainwater harvesting, etc.

Indicator – Average annual household use

As shown in Table 7, average annual water use per household across the reporting region showed a further decrease in 2011–12 to 195.9 kL per household. This followed a sharp decrease reported last year. Councils have generally attributed the lower household water use to the wet conditions.

These reductions may partly be attributable to a change in the method of calculating this indicator which was partially introduced last year and completely replaced Council's individual estimates this year. It will be interesting to see if the downward trend can be maintained once drier conditions return to the region. Long-term predictions are still for tightening of water availability, whilst reductions in household water consumption will be necessary to counteract the overall trend of slowly rising population for the region.

Indicator – Number of residential meters

The number of residential water meters was a new indicator introduced last year. In 2011–12, there were a total of 62,957 meters for the 14 Councils that were able to provide this data in both years. This is an increase of 0.6% over the number reported in 2010–11.

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 – The area of irrigated Council managed parks, sportsground and public open space

Indicator – Treated and untreated water used by Council for irrigation

As a potentially significant use of water, the area of irrigated Council facilities provides an indication of high water demand. As shown in the summary table (Table 7), there was a 2.3% increase (21 ha) in the irrigated area for the 14 Councils who have reported this indicator in each of the last four years, continuing the increasing trend first reported last year. This indicates increasing water demand, with Councils currently able to increase irrigation of parks, sports fields and other public open spaces and hence an increasing environmental pressure. Prior to this, the Council irrigated area was reduced in the drought years due to the non-essential nature of much of this water use.

As shown in the summary table (Table 7), the amount of water used (treated and untreated) for irrigation by the nine local Councils that reported in each of the last four years, increased by 7.7% in 2011–12 compared with 2010–11. Large increases were reported in the Bathurst, Lachlan and Mid-Western LGAs, whilst by contrast Dubbo continued its strong positive trend over the last four years in reducing Council water use, with a further decrease of over 7%. The success in Dubbo, along with similar trends in

the Blayney, Coonamble and Gilgandra LGAs suggest a marked improvement in the water management practices of some local Councils over the past four years and thus there is generally an improving trend for this indicator.

Climate Change and Drought

Enormous strain is being placed on the communities, industries and natural environments of the Murray-Darling Basin by a combination of prolonged drought, floods, emerging changes in climate, population growth and the impact of past water allocation decisions. Available water is currently over-allocated, and this problem is likely to become worse as predicted water availability declines due to climate change.

Whilst wetter than average years are likely to occur from time to time – as seen under the recent La Ninã system – various studies of stream flows in the Murray-Darling Basin indicate that climate change is likely to reduce flows in the future. Results of modelling studies specifically for rivers within the Central West Catchment indicate similar results (CSIRO, 2007a). Stream flows along the Macquarie River Catchment are projected to decline by 11–30% upstream of Burrendong Dam and 14–37% downstream by 2030, reducing inflows to the dam and affecting future storage levels (CSIRO, 2007a).

Likewise in the Western and Lachlan Catchments, less water will be present in streams and rivers generally, which will have downstream consequences for storages and water resources. The main concern within the Western Catchment is a reduction in flows along the Barwon-Darling river system, including its tributaries and associated floodplains and wetlands (Western CMA, 2007). This catchment is also subjected to wider regional issues of water supply, as much of the surface water flows in the Western Catchment originate in neighbouring catchments and/or states (CSIRO, 2007b).

Limitations on surface water will also place greater pressure on groundwater resources associated with the Great Artesian Basin, as reduced run-off and rainfall will lead to less groundwater recharge and sustainable yields (CSIRO, 2007b).

Further assessment is being conducted by the CSIRO (www.csiro.au).

CASE STUDY: Apex Oval Stormwater Harvesting and Reuse Project (Dubbo)

In 2010, Dubbo City Council was successful in applying for a $4.5 million grant under the Federal Government's 'Water for the Future' initiative to fund its Apex Oval Stormwater Harvesting and Reuse Project.

The project will see the installation of a 10 ML underground reservoir that will capture stormwater and store it for irrigation at the East Dubbo Sporting Complex, which features a regional football ground that is heavily utilised by clubs and school groups. This system will have the ability to capture 38.8 ML of stormwater per annum, or 49% of the irrigation demand of the Complex.

The project will also see the installation of an international standard sand base playing field and irrigation system with non-reinforced grass at Apex Oval. It will be equivalent to the likes of AAMI stadium in Melbourne, Suncorp in Brisbane and the major stadiums in Sydney, and be the first of its kind in regional NSW.

The aim of the project is to utilise the existing stormwater system that drains a large section of the City through the oval to capture stormwater runoff and store it for irrigation to help offset demand on the potable (drinkable) water supply. Construction commenced in September 2011 and is on track for completion by the end of September 2012.

The benefits of the project are:

- Provides 49% of the Apex/EDSC irrigation requirements.
- Saves a minimum of 4,200 ML of water saved from the potable and aquifer supplies over the tank life
- Reduces 7.67 tonnes CO_2 equivalent p.a.
- Has a payback period of project ($12 million) of 52 years
- Provides a minimum of 48 years of "free water"
- Is the only sand based field in regional Australia
- Will attract more high profile games
- Provides a facility that can handle increase usage without damage
- Injects more dollars into the Dubbo economy

Apex Oval

ABOVE Flood waters recede in a floodplain channel

Response

The Murray-Darling Basin Plan

The Murray-Darling Basin Authority (the Authority) is currently preparing the Murray-Darling Basin Plan (the Plan), as required by the Water Act 2007. The Basin Plan will provide an agreed Basin-wide framework to manage the water resources of the Murray–Darling Basin. The Basin Plan aims to balance the water needs of the environment and other uses, through the establishment of new limits on the volumes of water available for use. Based on extensive assessment, the Authority is proposing a long-term sustainable diversion limit (SDL) of 10,873 GL/year. This figure would see an additional 2,750 GL/year of water returned to the Basins' rivers.

The draft Murray-Darling Basin Plan was released in November 2011. On 28 May 2012, the Murray-Darling Basin Authority provided a revised draft plan, with comments on the revised draft received by 9 July 2012. Submissions are currently being processed, with the final plan proposed to be released in late 2012/early 2013. Aspects of the plan, such as water trading rules, will take effect from this date while other aspects will only start when new state water resources plans begin.

Surface and Ground Water Extraction

Indicator – Number of water sharing plans implemented

Water management in NSW is largely regulated by the NSW State Government, particularly the use of groundwater and river extraction licenses. The NSW Office of Water in the Department of Primary Industries is responsible for the management of the State's surface water and groundwater resources. The Office of Water reports to the NSW Government for water policy and the administration of key water management legislation, including the *Water Management Act 2000* and *Water Act 1912,* and the regulation of licenses for farm dams, bores and other extractions.

Changes to state legislation commenced in 2004 and have culminated in new river

regulations such as Water Sharing Plans. Water Sharing Plans establish rules for sharing water between the environmental needs of the river or aquifer and water users, and also between different types of water use such as town supply, rural domestic supply, stock watering, industry and irrigation. These plans include environmental flows to help maintain riparian and aquatic health even when flows are low due to extraction and drought.

There were 48 water sharing plans implemented across the region in the 2011–12 year which is a small increase on 2010–11 but approximately double the level recorded in each of the two previous years. There were water sharing plans implemented in all but two of the seventeen LGAs. Narromine LGA (8 plans) and Warrumbungle (six plans) were the largest contributors.

The water sharing plans are either for groundwater, regulated sources or surface water. The largest increases seen in the last two years are in the number of surface water and groundwater plans implemented.

Town Water Consumption

Councils in the region are responding to pressure on water resources by implementing a number of programs. Bathurst Regional Council runs a Water Wise Bathurst campaign that aims to educate residents and businesses on water-saving methods, and through their Wastewater Treatment Works, recycles up to two million litres of water a day. Lachlan Shire and Dubbo City Councils have also continued with their Water Wise education campaigns with information and pamphlets available to residents.

Bourke Shire's Management Plan for 2011–2014 outlines a strategic area of focus to secure a sustainable water supply for all users. The plan describes the intention to further develop the stormwater drainage system to enable Council to harvest and re-use stormwater run-off, and Council staff are currently trialling a SMART water meter for use on all water supply sources.

Indicator – Level of water restrictions implemented

As shown in the summary table (Table 7), the average level of water restrictions implemented across the region has been reduced again in 2011–12, with most Councils now having either no restrictions or having gone to permanent low-level restrictions (e.g. Bathurst Council's voluntary odds and evens watering program). Only Orange and Oberon Councils reported that they were still on high level restrictions.

It should be noted that there are generally standard definitions of restrictions along the Macquarie River through the Lower Macquarie Water Utilities Alliance and the Bathurst-Orange-Dubbo Alliance.

CASE STUDY: Orange City Council's urban storm water wetlands

The town of Orange was under significant pressure to conserve water due to widespread shortages and long periods of dry weather. The Council responded as part of the Inspiring and Integrating Change (I&IC) project by constructing the Somerset Park wetland stormwater harvesting project, allowing precious rainfall and run-off from around the town to be captured, filtered and stored for future requirements.

The Council encouraged community involvement by inviting local residents and others to assist with the planting of native vegetation around the new wetlands. Interpretive signage tells the story of the wetland and how stormwater harvesting works for those using and visiting the area.

The wetland has been a success story with local residents embracing the area for recreation and early monitoring indicating improvements in the quality of water samples taken from the outlet compared to the inlet.

Interpretive signage at Somerset Wetlands

Catchment Action Plan

With the development of the Central West CMA's Catchment Action Plan (2012), there is greater responsibility as well as greater opportunity for local Councils, government agencies and the community to work collaboratively to look after waterways. The Catchment Action Plan identifies four major management targets in relation to water quantity (and water quality) by 2021:

- 1–5% of priority river reaches are actively managed to maintain a good stable state
- 10–35% of priority wetlands are actively managed to maintain a good condition stable state
- an improvement in the ability to manage identified priority groundwater dependent ecosystems
- an increase in projects contributing to use, efficiency, movement, connectivity and water quality.

Table 8: Summary Table of Indicator Trends – Water Quality

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Surface & Ground Water Quality	Total Nitrogen – Percentage samples exceeding ANZECC guidelines for algal growth	3%	0%	0%	0%	↑
	Total Phosphorus – Percentage samples exceeding ANZECC guidelines for algal growth	76%	63%	75%	94%	↓
	E.coli – Percentage samples exceeding ANZECC guidelines for irrigated crops and dairy	55%	34%	43%	59%	↓
	Average salinity levels in selected streams (EC)	444	402	441	499	↓
Town Water Quality	Number of instances drinking water guidelines not met	115	140	116	72	↑
	Number of drinking water complaints	1,021	459	1,029	774	↑
Industrial/ Agricultural Pollution	Load Based Licencing Fees ($)	132,898	189,862	246,503	182,367	↑
	Exceedances of license discharge consent recorded	23	22	26	38	↓
	No. of trade waste approvals	390	392	662	682	↓
	Total volume of trade waste discharged to sewer (ML)	94,048	134,069	193,395	124,654	↑
	Erosion & Sediment Control complaints received by Council	32	129	37	34	↑
	Water pollution complaints	*	*	24	47	↓
Waste water treatment	Number of septic tanks in LGA	19,910	20,486	20,582	22,268	↓
	Number of septic related complaints	37	28	13	22	↑
Stormwater Pollution	Number of gross pollutant traps installed	59	61	62	63	↑
	Volume of litter collected in GPTs (tonnes)	187	917	896	231	↑
	Total catchment area of GPTs (ha)	4,885	4,812	4,812	5,275	↑

** Data not available for these years*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008–09, 2009–10, 2010–11 and 2011–12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011–12.They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils.

Water quality

Condition

Surface water and groundwater quality

The degree and frequency of water quality problems varies enormously throughout the region, but it is safe to say that it is unlikely that any of the streams within the Central West Catchment do not at some time suffer quality issues that render the water unfit to be used for both consumptive and non-consumptive purposes (Central West CMA, 2007). Often it is acknowledged that in most rural and regional areas, it is diffuse pollution, not point source pollution that has the greatest impact on water quality.

The Central West CMA coordinates a program of regional water testing. The intention is to test water quality twice yearly at two locations in each of the LGAs within the Central West CMA area. Unfortunately in the 2011–12 year, only 23 of the planned 28 tests were conducted. The consequent lack of data for several LGAs not only impacts this year's results but it also means that the multi-year comparisons in Table 4 and any conclusions below, can only be drawn for a smaller number of LGAs.

Indicator – E.coli – % of samples exceeding ANZECC guidelines

Escherichia coli (*E.coli*) is found in the intestines of animals and does not originate from other environmental sources. For this reason, *E.coli* is a highly specific indicator of faecal contamination in drinking water. As shown in the summary table (Table 8), for those LGAs where samples were taken in each of the last four years, there was an increase in the percentage of samples that exceeded ANZECC water quality guidelines (and thus a worsening trend in this indicator). Note that the ANZECC guideline used here is for raw human food crops (e.g. lettuces) in direct contact with water or for watering of pasture/fodder for dairy animals with no withholding period.

Figure 12 shows the percentage exceedances of this ANZECC guideline from the reporting Councils. It shows that many of the streams in the region have high *E.coli* readings which have implications for drinking and recreational water. The reasons for these exceedances could include stock watering close to and in streams, poorly treated sewage and discharge from unregulated septic systems. Note that the indicator does not reflect on the quality of drinking water supplied for town water from treatment plants.

Indicator –Total Nitrogen -% of samples exceeding ANZECC guidelines

Indicator –Total Phosphorus -% of samples exceeding ANZECC guidelines

The nutrients nitrogen and phosphorus are essential for plant growth. However, high concentrations indicate potential for excessive weed and algal growth (including noxious blue-green algae).

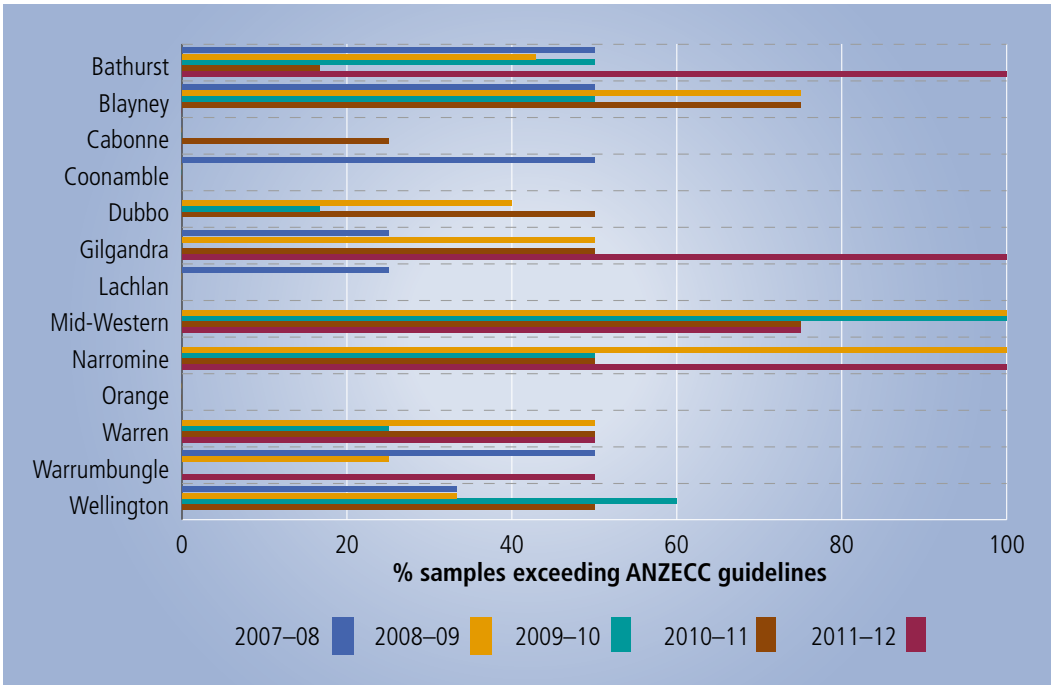


Figure 12: *E.coli* – % samples that exceed ANZECC water quality guidelines for irrigated crops and dairy

CASE STUDY: Manganese Removal Trial – Bathurst Water Filtration Plant

The soils in the catchments upstream from Bathurst are naturally rich in manganese. Subsequent high levels of manganese present in the local water supply have had significant environmental, economic and social implications for Council and the community over a long period.

The existing Bathurst Water Filtration Plant which opened in 1972 is not able to completely remove the manganese. As a consequence the manganese can come out of suspension throughout the distribution pipework. Then during times of high demand the manganese comes out at customers taps resulting in "dirty water" which is often aesthetically displeasing, despite remaining within the parameters set out by the Australian Drinking Water Guidelines.

In September 2011 Council with the assistance of NSW Public Works commenced the first of a two stage trial, designed to test the effectiveness of different chemical dosing combinations at the Water Filtration Plant in order to treat the problem of manganese close to the source.

The trial, which has been funded in part by the Commonwealth Government's Water For The Future Program, has demonstrated very positive results, suggesting that the new dosing strategy may lead to a very high level of manganese removal. This will result in a higher quality of filtered water for customers and will significantly reduce the strain on Council resources and water wasted through the current reactive process of flushing mains to remove "dirty water" (which may unnecessarily use up to 50ML of potable water annually).

Council is currently reviewing the results of Stages 1 and 2 to determine whether Stage 3 – which is a full scale roll out of the methodology - would be feasible in the future.

Bathurst filtration plant

Increased nutrient levels in streams originate from the discharge of raw and treated sewage effluent, from urban and rural runoff and from some industrial discharges. Urban stormwater contains animal faeces and garden fertilisers. The widespread and inefficient use of agricultural fertilisers, increasing stock access to creeks and rivers and watering stock in and near streams can result in high nutrient levels in rural runoff and an increase in nutrient levels in receiving waters.

As shown in the summary table (Table 8), for those Councils where water quality has been sampled in all four years, 94% of samples exceeded the total phosphorus ANZECC water quality guidelines for algal growth in 2011–12, which is an increase from the 75% reported in 2010–11.

No samples in the current reporting period exceeded the total nitrogen ANZECC water quality guidelines for algal growth.

Town Water Quality

Indicator – Number of instances drinking guidelines not met

Indicator – Number of drinking water complaints

As shown in the summary table (Table 8), the number of drinking water complaints (for the 16 Councils reporting in both years) decreased significantly from 1,029 in 2010–11 to 774 in 2011–12. For the Councils that reported in all of the last four years, the number of complaints is well below the 2008–09 level, after the large increase to over 1,000 complaints last year. Bathurst Council reported the biggest reduction in the number of complaints but still accounted for over 60% of all complaints across the region. Bathurst receives high numbers of complaints for drinking water which is caused by manganese discolouration of the water supply (see case study).

The quality of drinking water is very important to the community and the decrease in the number of complaints made regarding water quality was echoed by a proportionately similar decrease in the number of instances where drinking water guidelines were not down from 116 in 2010–11 to 72 in 2011–12.

Bourke, Dubbo, Mid-Western and Warrumbungle Councils all reported significant decreases. The strong improvement in this indicator over the last four years is in large part due to the new Mendooran water supply system in Warrumbungle Shire which is now fully operational.

Threat

Industrial/Agricultural Pollution

Indicator – Number of trade waste approvals

Indicator – Total volume of trade waste discharged to sewer

Indicator – Trade waste licenses in force currently

Councils have a number of statutory responsibilities for the approval of liquid trade waste discharged to the sewerage system under the *Local Government Act 1993*. Liquid trade waste means all liquid waste, other than sewage of a domestic nature. As shown in the summary table (Table 8), there was a large increase (69%) in the total number of trade waste approvals in 2010–11 reported from all of the participating Councils, followed by a further increase of 3% this year. This year's increases primarily came from the Bathurst and Orange LGAs. Cabonne Council reported data for the first time this year and its 72 trade waste approvals is now the third highest in the region, after Bathurst and Dubbo. Lachlan Shire Council also reported that they have now adopted a trade waste policy which will start to be implemented in the year ahead.

Indicator – Erosion and 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 local Councils. Complaints can range from sediment spilling out of construction sites to obvious plumes of sediment flowing into streams.

As shown in the summary table (Table 8), the number of complaints fell slightly for those

CASE STUDY: Kings Stockyard Creek Rehabilitation/ De-Contamination Project CSR (Oberon)

The Kings Stockyard Creek Remediation project in Oberon LGA involved the excavation and removal of contaminated soil and sediment from previous operations at the CSR operations in Oberon. The contaminated areas included the drainage channel flowing from the former CSR factory and approximately 800m of Kings Stockyard Creek. The soil and sediment in the channel beds, banks and some floodplain areas had been contaminated with Aldrin and Dieldrin as a result of a past spill incident associated with the upstream Medium Density Fibre (MDF) manufacturing plant. This contamination occurred in the early 1980's.

The purpose of the remediation (which was undertaken under the direction of a site auditor) sought to establish a system that was free of contaminant.

Over a period of 12 months, the entire 800m of the Kings Stockyard Creek was rehabilitated and remediated to a level that allowed sign-off from the site auditor, making the system pollutant free. Additional benefits of the remediation included the removal of many willow trees that had lined the existing creek, together with hydraulic design that can cater for flash flooding within the Kings Stockyard Creek below the manufacturing plant.

It is considered that the remediation has had very successful outcomes to both the land and the creek itself.

King Stockyard Creek prior to (top) and after (bottom) rehabilitation

Councils that reported in the last four years, and is similar to the level reported in 2008–09, resulting mostly from building works. The much higher 2009–10 numbers were heavily influenced by complaints regarding erosion/ sediment control for roads reported by Gilgandra Council (64) and Mid-Western Regional Council (14).

Indicator – Load based licensing volume and fees paid

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.

For the nine Councils reporting this data over the last four years, the LBL fees paid decreased by approximately 26% to $182,367 in 2011–12, which follows large increases reported in the two prior years. Increased pollutant loads pose a threat to the environment and a degree of caution is necessary when reading these figures, as over 60% of the reduction came just from the Orange LGA where a dramatic fall of 88% in LBL fees was reported.

The data on LBL volume is not readily comparable across the last four years due to a combination of some questionable data in previous years plus a change to the data collection last year whereby Councils have been asked to provide volumes split by pollutant type. Figure 13 shows this breakdown for 2011–12.

Indicator – Exceedances of license discharge consent recorded

As shown in the summary table (Table 8), the number of exceedances of licence discharge consent increased from 26 cases in 2010–11 to 38 cases in 2011–12. All of this increase was due to a spike in the Cowra LGA which accounted for 74% of the exceedances for the eight Councils reporting this data in each of the last four years and for 57% of the number this year across all 17 LGAs.

Septic tanks

Indicator – Number of septic tanks in LGA

If poorly maintained, septic systems can be a source of nutrients to local streams and potentially cause problems such as blue-green algae blooms and issues for public health. There are an estimated 29,921 septic systems in use across the region (see Figure 14) and as shown in the summary table (Table 8) the number for the 13 Councils reporting in each of the last four years is continuing to increase. Almost all of the increase in the 2011–12 reporting period was from Cabonne LGA where the number jumped from 2,000 to 3,600, following on from increases of approxi-mately 300 in each of the two prior years.

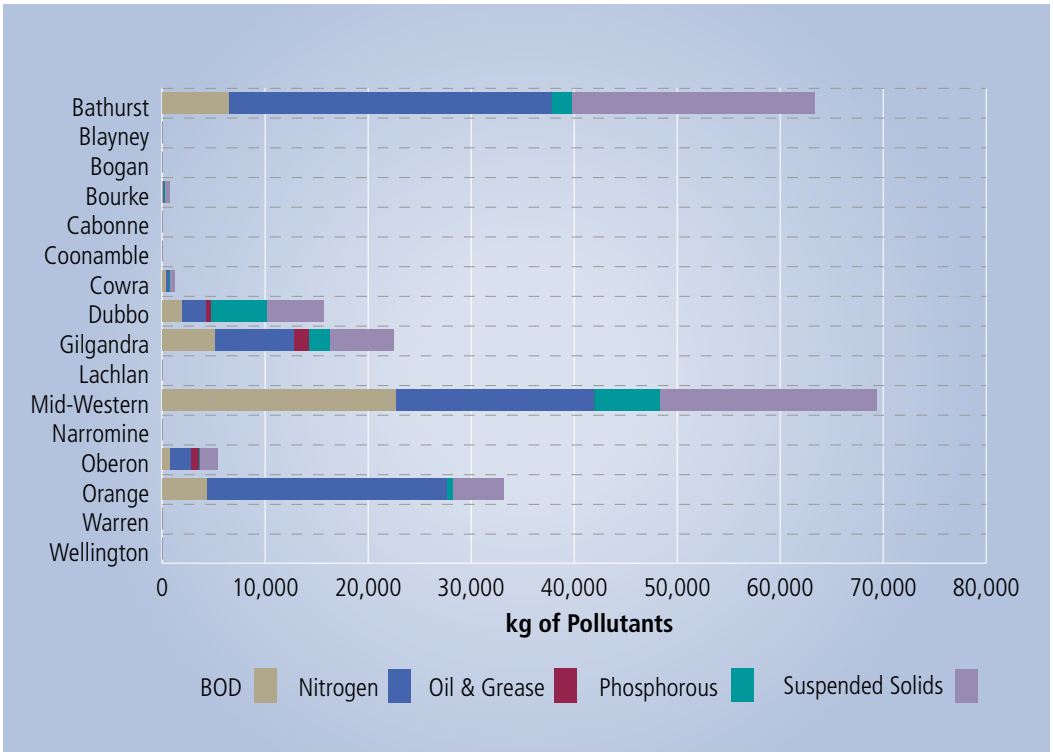


Figure 13: Load based licensing volume by pollutant type 2011–12

This is likely to be a change in reporting mechanisms rather than actual growth.

Indicator – Septic related complaints

One way to gauge problems related to the management of septic systems is through the number of septic related complaints to Councils. As shown in the summary table (Table 8), the number of septic related complaints increased for the 14 Councils that reported in each year. However, this year's number is still showing a downward (improving) trend over the last four years.

Some Councils, such as Dubbo City and Bathurst Regional Councils, have strategies to monitor and educate users in the management of septic systems.

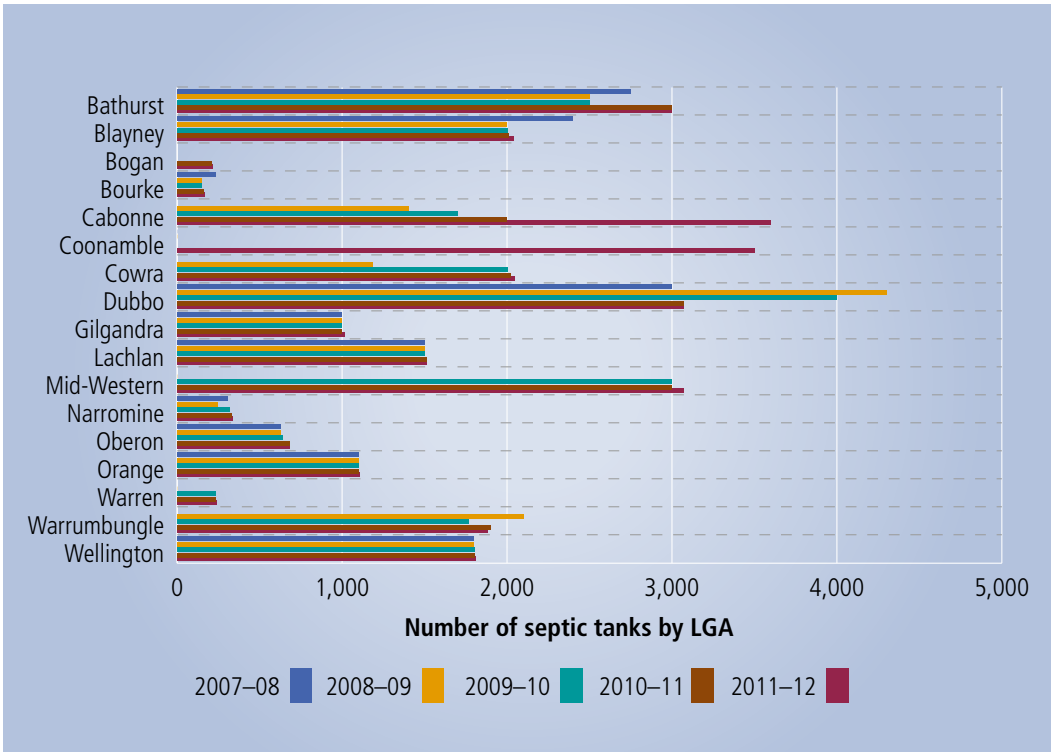


Figure 14: Number of septic tanks by LGA

Indicator – Proportion of annual failed wastewater treatment plant (WTP) inspections

None of the 17 Councils in the region reported any failed WTP inspections in the 2011–12 year which is an improving trend.

Salinity

Land use has a significant impact on the level of salinity in streams through removal of vegetation, irrigation and discharges of saline water. While geology, topography and prevailing weather conditions also affect salinity, land use is a primary factor that affects mobilisation of salts into waterways and through soils. Salt generally degrades aquatic habitats as well as adversely impacting on soils and the crops and vegetation utilising those soils.

Due to the nature of the Macquarie River, most salt generated in the uplands and slopes is deposited back into the landscape through irrigation, floodplain entrapment or deposition within the wetlands and effluent systems of the lower catchment areas.

A proportion of the salt is also discharged into the Barwon-Darling River system. Salinity in the Barwon-Darling is highly variable and can range from 200 EC to more than 3,000 EC, although the median is generally around 500 EC (Western CMA, 2007).

The levels of salt load in the Macquarie River are expected to rise by 2.33% by 2020 and by 2.88% by 2050. The Lachlan River salt loads are predicted to rise by lower levels: 1.11% by 2020 and 1.81% by 2050 (DECCW, 2009b).

Indicator – Average salinity levels in selected streams

The average salinity level of the five streams monitored for the four year period increased in 2011–12 as shown in the summary table (Table 8). Salinity levels were the highest they have been in the last four years for the Bogan River at Gongolgan, the Castlereagh River at Gungalman and the Macquarie River at Carinda (Figure 15). The annual averages for the latter two streams may have been skewed or at least exaggerated due to missing data for the second half of the 2011–12 reporting period.

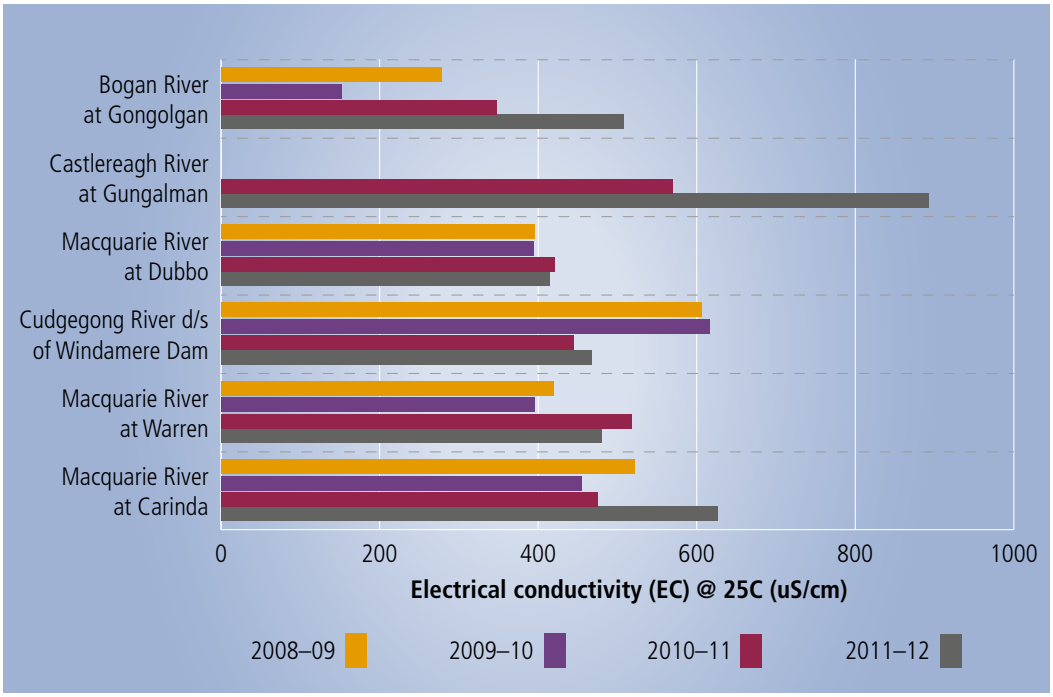


Figure 15: Average salinity levels in selected streams

Response

The NSW Diffuse Source Water Pollution Strategy provides a framework for coordinating efforts in reducing diffuse source water pollution across NSW. The Strategy promotes partnerships, provides a guide for investment, and provides a means to share information on projects and their outcomes across the State.

Developing and implementing this Strategy is a joint initiative by the State's natural resource managers (at State, regional and local government levels). It builds on, and supports, a range of existing diffuse source water pollution management actions. The main aim of the Strategy is to reduce diffuse source water pollution inputs into all NSW surface and ground water and contribute towards the community agreed NSW water quality objectives and state wide Natural Resource Management targets.

RIGHT Jetty, Macquarie River, Cabonne LGA

A Priority Action Plan has been developed as part of the NSW Diffuse Source Water Pollution Strategy. It identifies agreed projects that will be progressed across NSW (including the reporting region) to help improve management of priority diffuse source water pollution problems. It will be updated from time to time to incorporate new projects.

The Salinity and Water Quality Alliance is a working group of Councils across the catchment sharing knowledge, ideas and engaging in cooperative projects. It is implementing its 2009-14 action plan which defines its goals and activities during this period.

Effluent reuse

Indicator- Percentage effluent reuse by local Councils

Effluent discharge contributes nutrients and can deoxygenate receiving waters. Reuse of effluent not only reduces the impact of effluent on receiving waters, but also reduces the demand for potable water and therefore dam storages.

Eight Councils in the region reported reusing effluent during the 2011–12 period. Bathurst, Blayney, Dubbo and Orange Councils reused both biosolids and effluent, whilst Cabonne, Coonamble and Mid-Western Councils reused effluent and Lachlan reused biosolids. Examples of re-use were:

- biosolids for contracted agricultural land application (Bathurst)
- biosolids and effluent for soil improvement at effluent irrigation facility (Dubbo)
- biosolids for soil improvement program at old Condobolin abattoir (Lachlan)

Stormwater pollution

Indicator – Number of gross pollutant traps installed

Indicator – Total catchment area of gross pollutant traps

Indicator – Amount of litter collected in gross pollutant traps

Litter collections in gross pollutant traps (GPTs) provide an indication of potential water quality impacts. Installation of 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 improvement of waterways is important to awareness of Council environmental programs.

As shown in the summary table (Table 8), the number of GPTs installed increased to 63 across the 14 Councils that reported in all four years. The only changes were two new GPTs in the Dubbo LGA and one less in Orange LGA.

The total catchment area that drained to the GPTs increased due to a large increase from 737 to 1,200 hectares in the Dubbo LGA.

The volume of litter collected in the GPTs in the reporting LGAs decreased dramatically to 231 tonnes from the 896 tonnes reported last year. The major difference is a large reduction from 800 tonnes in 2010–11 to 149 tonnes this year for the Orange LGA which suggests that the Orange figures for the period 2009-11 may have been unreliable.

Indicator – Number of Erosion and Sediment Policies implemented

Sixteen of the seventeen Councils in the region reported in 2011–12 that they have implemented an erosion and sediment control policy. This compares with only four who reported that they had a policy in place in 2010–11. The only LGA in the region that has not started to implement a policy is Narromine, whilst Lachlan Shire Council's is not fully implemented yet.

CASE STUDY: Nyngan Effluent Reuse Scheme

Bogan Shire Council has recently upgraded the way in which effluent is treated at its Nyngan Sewage Treatment Plant (STP).

- After passing through the STP treatment ponds the treated effluent is directed to a 40 ML effluent storage dam located on Council owned land.
- The effluent is conveyed through poly pipeline to an adjacent property, "Laravoulta"
- Effluent is irrigated via a pivot onto a 20 ha plot containing a permanent lucerne based pasture.

The system has a capacity to apply 2.4 ML of treated effluent per day and has been modelled to achieve 100% reuse in 50% of all years.

The irrigation system was set up in the summer of 2010 with the pivot put into operation in February 2011. Lucerne variety *Aurora* was sown under the pivot at a rate of 10 kg/ha in May 2011. Liquid fertiliser was applied to the Lucerne in February 2012 to aid growth. The cultivated area was also spayed once at the end of July 2012 for broadleaf weed control.

The Lucerne was cut seven times during the first year of operation with the initial cut achieved in late October 2011. The first three cuts were made into small square bales averaging 1,500 bales with a total of 4500. The remaining cuts were baled into large bales with an average of 75 bales per cut totalling 300 giving a combined total of around 200 tonnes of lucerne produced. Lucerne is now cut approximately every 28 days, however this period does vary dependent on rainfall and time of year.

Soil, groundwater and effluent are monitored to assess any potential impact the scheme may have on its surrounding environment and to ensure compliance against its Environmental Protection Licence.

The new scheme has proven to be a great water management asset for Council, ensuring valuable water is not wasted in such a dry climate.

Bogan effluent reuse

Biodiversity

Biodiversity is essential to functioning ecosystems which maintain important processes on which all life depends. Many species of plants and animals rely on specific habitats in order to survive. The value of biodiversity extends beyond the catchment boundaries, providing national and international benefits.

Biodiversity, as with land and air, provide important resources that people need to survive, such as oxygen and water cycles, growing foods and forests (timber) and even bacteria keeping the soil healthy. Most of these resources are at scales that people cannot see and may extend around the world (such as water cycles) or be limited to a single place or event (such as regeneration after bushfires). The value of biodiversity extends beyond the catchment boundaries, providing national and international benefits.

There are a wide variety of ecosystems across the reporting region, formed by interactions across a range of factors including soils, local climate, vegetation types, and

Table 9: Summary Table of Indicator Trends - Biodiversity

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Habitat Loss	Vegetation protected and rehabilitated through CMA incentive funding (ha)	*	7,583	4,175	12,961	↑
	Addition to National Park estate (ha)	711	22,605	115,289	540	↓
	Proportion of Council reserves that is bushland/remnant vegetation	51%	51%	51%	51%	→
	Total area protected in conservation reserves & under voluntary conservation agreements (ha)	*	*	7,510	7,669	↑
	Total area protected in Wildlife Refuges (,000 ha)	*	118	259	259	↑
	Habitat areas revegetated	244	294	615	311	↓
	Environmental volunteers working on public open space (hours)	13,211	14,520	15,591	12,186	↓
	CMA Project Agreements with Landholders	*	73	278	194	↑
Threatened Species	State Threatened species listed for Central West and Lachlan catchments	117	128	129	146	↓
	Fish restocking activities: native species (,000)	252	378	277	206	↓
	Fish restocking activities: non-native species (,000)	*	311	297	271	↑
Invasive Species	Number of declared noxious weeds	112	116	114	122	↑
	Invasive species (listed noxious or WONS) under active management	39	152	128	138	↑
Land Clearing	Clearing complaints	*	47	26	36	→
Riparian	Riparian vegetation recovery actions	36	11	25	32	↑
	Riparian vegetation recovery area (ha)	1,626	1,793	156	179	↓
Roadside	Roadside vegetation management plans	5	6	6	6	→

** Data not available for these years*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008–09, 2009–10, 2010–11 and 2011–12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011–12.They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils

disturbance by activities such as farming and water availability. Habitat loss and degradation is an issue in the region, particularly through activities such as poor land use planning and management practices, inappropriate fire regimes, development and pest and weed invasion. This can result in a loss of species or changes in species composition, such as threatened ecological communities.

Biodiversity provides a range of services and values, including biological control, seed dispersal and pollination; food, medicines and industrial products; ecotourism; carbon sink and greenhouse gas absorption; nutrient cycling; clean air and water; visually pleasing aesthetics, nature-based recreation; science and education; and spiritual and cultural values.

The decline in biodiversity values and loss of ecosystem services is increasingly being recognised by farmers and others in the community, and is being incorporated into the evolving natural resource management response such as CAPs.

Loss of Biodiversity

Condition

Loss of Biodiversity

A study by Goldney, Kerle and Fleming (2007) examined the condition of flora and fauna in the Central West Catchment. According to the study there is diverse habitat across the region. In the east of the region there are mainly dry eucalypt forests but these change to poplar box, woody shrublands and mallee in the west. This study estimates that there is only 38% of native vegetation/animal habitat remaining in the Central West Catchment but this is not evenly distributed – 62% has no remaining vegetation.

The amount of remaining vegetation / habitat varies from six per cent in the Tullamore area to 89% in the west. This does not necessarily reflect the condition of the remaining vegetation – some of the highly vegetated land in the west of the catchment represents the dense growth of woody shrubs. In the more highly cleared landscapes remaining vegetation tends to be concentrated in the hills and ranges, along watercourses and road reserves. In areas with more vegetation it is possible that the size of the patches of vegetation is too small for populations of animals and plants to survive.

ABOVE Old ironbark tree with a number of hollows that provide vital habitat

Biological diversity, or biodiversity, is defined as:
'The variety of life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. Biodiversity includes genetic diversity, species diversity and ecosystem diversity'

NSW Government, 2008

ABOVE Blue Silver Mine exploration activities, Mid-Western LGA

By combining information about remnant vegetation and its condition and the status of the fauna with a range of landscape indicators about the health of the land, the study developed an indication of landscape condition across the catchment. The study found that the eastern half to two-thirds of the Central West Catchment is in poor condition and most of the remainder is in moderate condition. Some areas have a high level of remnant vegetation but the condition of that vegetation, much of which is heavily grazed, reduces the condition value.

Indicator – Addition to National Parks estate

Indicator – Area of State Forest in the LGAs

The area of land that is placed under protection, or reserved, may be considered an indicator of the amount of protected habitat available in a Council area. However, it is noted that that many types of habitat are not well represented in the reserve system, as reserves tend to be on land that has low economic value rather than land that has representative (ecological) value.

In 2011–12, 540 ha were added to the National Parks estate within the reporting region. This is a large decrease from 2010–11 when 115,289 ha were added. The 2011–12 additions consisted of one new gazetted nature reserve (Carrabear Nature Reserve) and one addition to an existing park (Goulburn River National Park).

The reserved land under State Forests in the 2010–11 reporting year was 273,562 hectares which includes both native forests and plantations. Although managed in a variety of different ways across the region, they do provide larger areas of habitat in what is otherwise a highly cleared landscape. There was no data available for this indicator for 2011–12 as reporting mechanisms have changed.

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

In 2011–12, 51.5% of the 5,543 ha of Council reserves were bushland or remnant vegetation, across the 13 Councils which provided reliable data for this indicator. This indicator measures the amount of habitat available in those reserves managed by local Councils and is essentially unchanged from last year.

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 (National Parks and Wildlife Service fact sheet, 2003) and is listed on both State and National registers. It was widely found across the Central West and Lachlan regions, however the high level of clearing linked to agricultural land use in the reporting region has caused significant decline.

Indicator – Locally sensitive ecological communities and species list

Indicator – Number of State threatened species recorded in LGA

Threatened Species, Populations and EECs are listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Figure 16 shows the breakdown of threatened species,

CASE STUDY: Threatened Orchid (Mid-Western)

Over the past five years, a native grasses conservation project established conservation areas in four rural cemeteries within the Mid-Western Regional LGA. Following this project, a local rural cemeteries committee was established with the aim to conserve native flora found in these cemeteries. This committee includes representatives from Watershed Landcare, Central West CMA, and Council and is now attempting to manage a number of rural cemeteries.

One of these cemeteries is located at Ilford, a small rural village located about half way between Mudgee and Lithgow. Within the cemetery conservation area, there exists a small native orchid, initially thought to be an endangered Tarengo Leek Orchid (*Prasophyllum petilum*). However it may actually be Prasophyllum sp. Wybong, which is a terrestrial orchid listed as critically endangered under the EPBC Act.

There are seven known populations in eastern NSW, with an estimated total population size based on surveys in 2006 of 460 mature individuals. The last survey of the cemetery in 2010 found the Ilford population to comprise 68 individuals of this orchid.

The key threat to the Ilford population is inappropriate disturbance regimes, such as a change in the frequency or intensity of mowing regimes, and fire regimes. *Prasophyllum* species generally favour some disturbance through their dormant period as it reduces competition from other species. However, slashing at the wrong time of year can damage plants and prevent seed from being produced. Furthermore, it is thought that this species may require fire to reduce the competition from grasses thus providing more resources for increased germination. Anecdotal evidence suggests that the cemetery was burnt at least every ten years in the past, however due to changes in legislation the cemetery has not been burnt for about twenty years.

In May 2012, a field day with all stakeholders was held at Ilford to discuss the possibility of carrying out a controlled burn in the cemetery. It was agreed that with the assistance of the local Rural Fire Service a slow mosaic burn will be planned to take place next autumn.

The cemetery was surveyed a number of years ago and many orchids have been tagged and mapped, however a more comprehensive survey will be undertaken in Spring 2012 to map and count the entire population. The burn will aim to target half of the orchids, after which a survey will be conducted annually each spring to determine the effects of the fire on both the burnt and un-burnt populations within the cemetery.

Further management needed includes fencing the large section of the cemetery containing the orchids, liaising with Council staff regarding the slashing schedule and conducting further community field days to educate and promote the importance of conserving the native vegetation of the cemetery.

Threatened *Prasophyllum* orchid

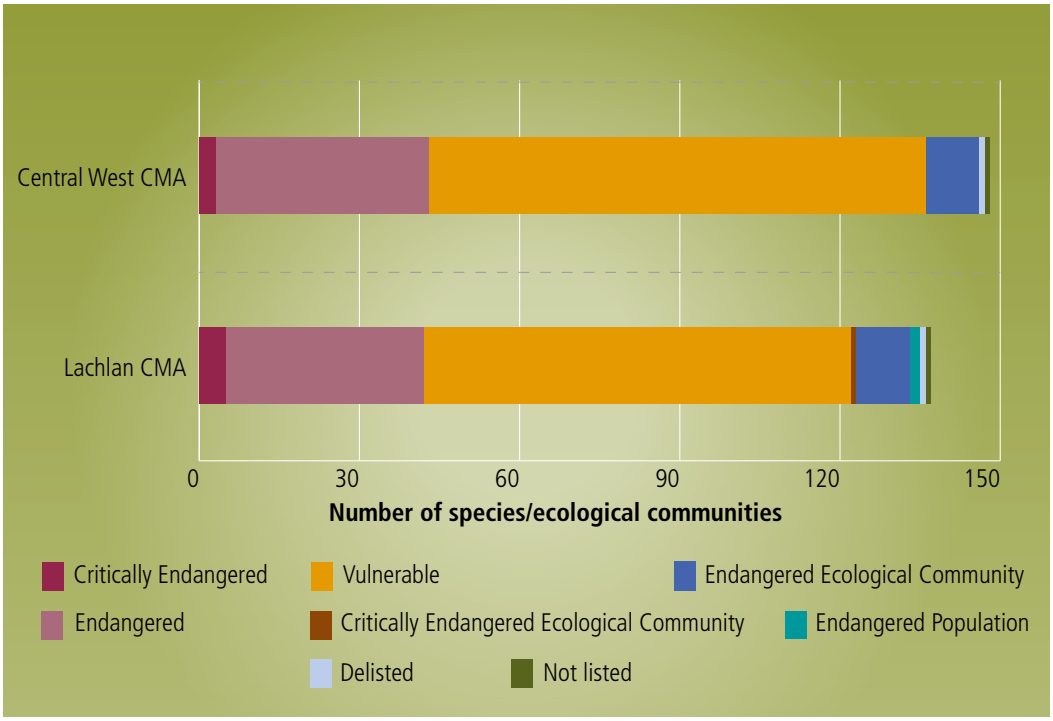


Figure 16: Number of threatened species, EECs and populations listed under the NSW TSC Act by CMA

EECs and Endangered Populations listed under the NSW TSC Act across the Central West and Lachlan CMA areas. The number of threatened species listed in the Central West CMA area increased to 136 in 2011–12, from 117 last year and to 122 in the Lachlan CMA from 111 last year. The number of Endangered Populations remained constant but there was one additional Critically Endangered Ecological Community (Mallee and Mallee-Broombush dominated woodland and shrubland, lacking Triodia, in the NSW South Western Slopes Bioregion) listed in the Lachlan CMA area.

In addition to the species listed under State and Commonwealth legislation, a number of the local Councils in the region are monitoring locally sensitive species. A full list of threatened species, populations and EECs for the CMAs in the region can be found at http: //www.threatenedspecies.environment.nsw.gov.au.

BELOW Large areas in the region have been cleared for agricultural production (photo C.McCulloch)

Threat

Land Clearing

Indicator – Number of complaints regarding clearing rates of native vegetation

The Central West region has undergone extensive clearing since settlement for agricultural purposes. The remnants of native vegetation that exist in small patches within reserves, state forests, or along the ridgeline and travelling stock routes are at significant risk of further fragmentation. The same threats facing vegetation such as drought, disease, clearing and land development, grazing and fire are also threatening native fauna species (BOD, 2007).

The removal of vegetation, whether individual trees or large scale (broad acre) land clearing on private property contributes to the changing character and viability of remnant vegetation and can dramatically affect

the health of the landscape and local amenity. Information on the number or area of trees removed is not recorded by local Councils. The Central West CMA has approved a number of clearing Property Vegetation Plans (PVPs), which require vegetation offsets, unless they are for Invasive Native Species. During 2011–12, the Central West CMA approved 13 Clearing PVPs and three incentive PVPs. This was a decrease from the 23 Clearing PVPs and two incentive PVPs approved in 2010–11 and the 21 Clearing PVPs approved in 2009–10.

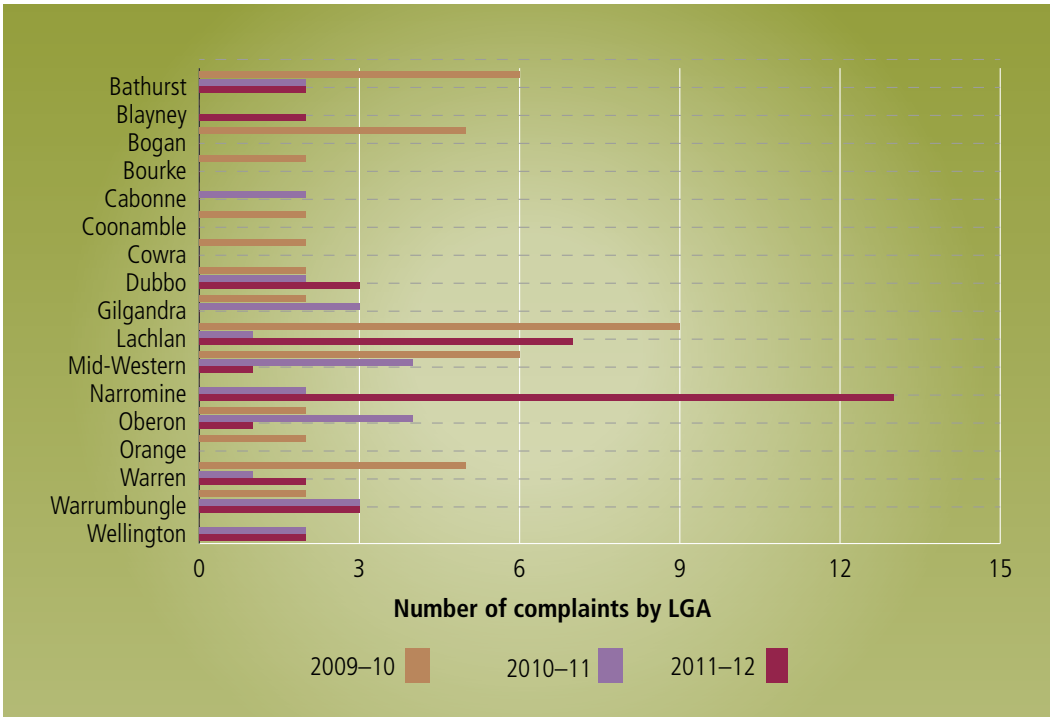


Figure 17: Number of complaints regarding clearing of native vegetation

Within the category of land clearing, other threats such as excessive firewood collection and inappropriate development and land use also threaten native habitat. Areas that are used for agriculture can suffer through stock grazing on remnant vegetation and also a loss of connectivity as development expands and fences and other barriers are put in place.

The removal of dead wood can have a range of environmental consequences such as loss of habitat (for animals that use hollows for shelter), disruption of ecosystem processes and soil erosion. The forests of the Western Slopes and Tablelands are the ecological communities most threatened by timber removal as they contain popular firewood species.

In 2011–12 there were 36 land clearing complaints recorded by OEH which was an increase from the 26 complaints recorded in the previous year. Figure 17 shows the land clearing complaints received by OEH across the LGAs in the reporting region for the last three reporting periods. The number of land clearing complaints is an indicator of the stress being placed on the environment by land clearing.

Invasive Species

Weeds are plants whose growth and habit results in the loss of environmental, economic or social values. In the natural environment, weeds can out-compete the native flora for resources including water, nutrients and sunlight, and can displace a range of species. Weeds vary in their impact upon the environment and are broadly grouped into two categories – environmental or noxious weeds. Environmental weeds are those plants that have or may have established self-propagating populations in areas of native vegetation, outside of their natural range. Noxious weeds are those that are declared under the *NSW Noxious Weeds Act 1993* and may be declared for the whole State or a local control area only.

Indicator – Number of declared noxious weeds

The reporting area has 122 declared noxious weeds (NSW Department of Primary Industries, 2012), and a significant number of environmental weeds present. This number has increased from 114 in the previous reporting year of 2010–11 and is the highest level in the four years of reporting since 2008–09. Noxious weeds declared for the reporting Councils can be found at www.dpi. nsw.gov.au/agriculture/pests-weeds/weeds/noxweed

ABOVE The Purple Spotted Gudgeon is a threatened native fish which occurs in the Macquarie catchment (Photo: Gunther Schmida)

Indicator – Number of non-native fish restocked

Restocking with non-native fish (particularly for recreational fishing) is a threatening process for some native aquatic species. The NSW Department of Primary Industries reported that 271,000 non-native fish were restocked in 2011-2012 comprising approximately 60% rainbow trout and 40% brown trout. This was a reduction of 8.6% on the restocking total for last year and is reported as an improving trend (Table 9).

Fire regimes

Bushfires, whether naturally occurring (lightning, weather events) or started by people, have a significant impact on biodiversity. This may be a negative or positive impact depending on the local species or community as they all have an optimal fire regime. A too frequent fire regime may cause species and habitat loss as some native vegetation is not adapted to frequent fire. On the other hand, too infrequent fire can also have a negative impact on species as many native Australian trees and shrubs require fire to germinate. Inappropriate fire regimes also encourage the spread of noxious weeds that can quickly colonise land following a fire. These weed communities may then out-compete native vegetation for space and resources.

All land managers in the central and western regions, including the Councils, have a responsibility under the *Rural Fires Act 1997* to manage bush fire hazards on land under their care, control and management. This results in vegetative cover and density being reduced through prescribed burning and mechanical means. Such programs may be undertaken by Councils in co-operation with fire management agencies such as NSW Rural Fire Service and OEH.

Climate Change

Climate change will also place added pressure on biodiversity with the impacts of increasing drought and heat, more extreme weather conditions and declining water availability altering the natural environment. It will also lead to changes in land use and prompt native and exotic species to move into new areas. Ecosystem services such as water filtration, soil quality and shelter will also be affected. Aquatic biodiversity, in particular, is likely to suffer from the poor condition of rivers and floodplains under extended low flow periods in the catchments. Reductions in stream flows are likely to have a negative impact on aquatic biodiversity and wetland ecosystems such as the Macquarie Marshes and its associated waterbirds (CSIRO, 2007a).

A report into the effects of climate change on biodiversity has found that habitats are at significant risk from even moderate climate change and are already under stress from other threats such as those mentioned above (DCC, 2009). As well as a loss of habitat, other ecosystem functions that are expected to be affected include desynchronisation of migration and dispersal events, uncoupling of predator-prey and parasite-host relationships, interactions with new pathogens and invasives, and changes in species distribution ranges (European Communities, 2008).

The geographic distribution of a species is often defined by its 'climate envelope,' reflecting species-specific tolerances to extremes of temperature and moisture (CSIRO, 2007a). The Purple Copper Butterfly which is found within the reporting region is at a particularly high risk of climate change impacts. The species has a specific 'climate envelope' and only lives at elevations above 900m. As is, there is relatively little available habitat in the reporting region, but as temperatures increase and environmental gradients are altered, the small available habitat may not have a suitable climate to support the species in the future.

Feral and Pest Animals

Introduced species such as rabbits have been shown to have a significant impact on biodiversity through competition for resources or predation. Rabbits are responsible for concentrated overgrazing causing loss of groundcover; they also cause localised erosion through burrowing.

Another key predator is the introduced European (red) fox. The fox has predatory characteristics of both cats and dogs and has, along with rabbits, been declared a key threatening process across NSW under the NSW *Threatened Species Conservation Act 1995* (TSC Act 1995). The fox is highly adaptable and is widespread in both rural and urban areas where it preys on a wide range of fauna including mammals, birds and reptiles.

Other predators such as feral cats and dogs found throughout the reporting area, create many problems for the natural environment. Cats hunt at all hours, especially at dusk and night. Their prey commonly consists of bats, possums, bandicoots, native rats and mice, birds, lizards and snakes. Cats also compete with native predators, such as the threatened Spotted-tailed Quoll and can carry bacteria and blood parasites which can be passed on to wildlife that have no resistance.

Dogs also have a direct impact on native fauna by preying on and harassing wildlife as well as disturbing burrowing fauna. Dogs regularly urinate on trees to mark out territory, sending out warning signals to native animals to keep away, and faeces are very high in phosphorus, promoting growth of exotic weeds and creating a health hazard.

Wild dogs also interbreed with the native dingo, reducing the viability of the native species. Dogs are responsible for attacks on stock including sheep.

Other pests listed as Key Threatening Processes include pigs, deer and goats. The impacts of these may range from the spread of weeds, competition for resources with livestock and native species, spread of exotic disease, through to fence and crop damage and vehicle accidents.

Pigs cause direct disturbance to habitat through wallowing and rooting and are widespread across NSW. They also prey on plants and animals and have contributed directly to the decline of several species of frogs and birds. While goats are also widespread, they are more prevalent in the western, more arid areas of the reporting area.

ABOVE The introduced Common Carp (photo Gunther Schmida)

Goats browse heavily on some species of native plants (including threatened species), compete with native fauna including the threatened Brush Tailed Rock Wallaby, and also cause erosion, particularly on steeper slopes.

Competition with native species and land degradation caused by feral rabbits, pigs and goats have also been declared as a key threatening process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Response

Agreements with landholders

Indicator – Total area of conservation agreements

Indicator – Total area of wildlife refuges

The NSW Government is committed to the protection and conservation of high conservation value lands. Parks and reserves already protect around 8% of the state's area (NSW Parliament, 2010). However, many valuable landscapes and habitats fall on land that is either privately owned or required for public amenity.

OEH has developed major programs to encourage broad involvement in land conservation across NSW, regardless of tenure. OEH

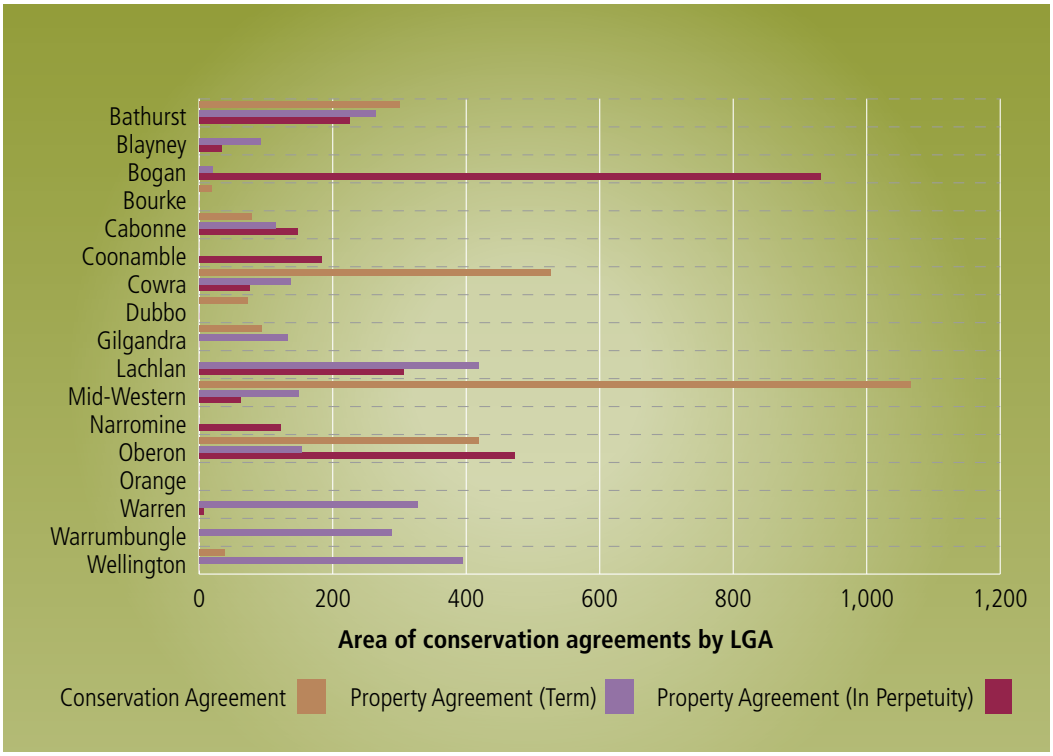


Figure 18: Area of Conservation Agreements by LGA 2011–12

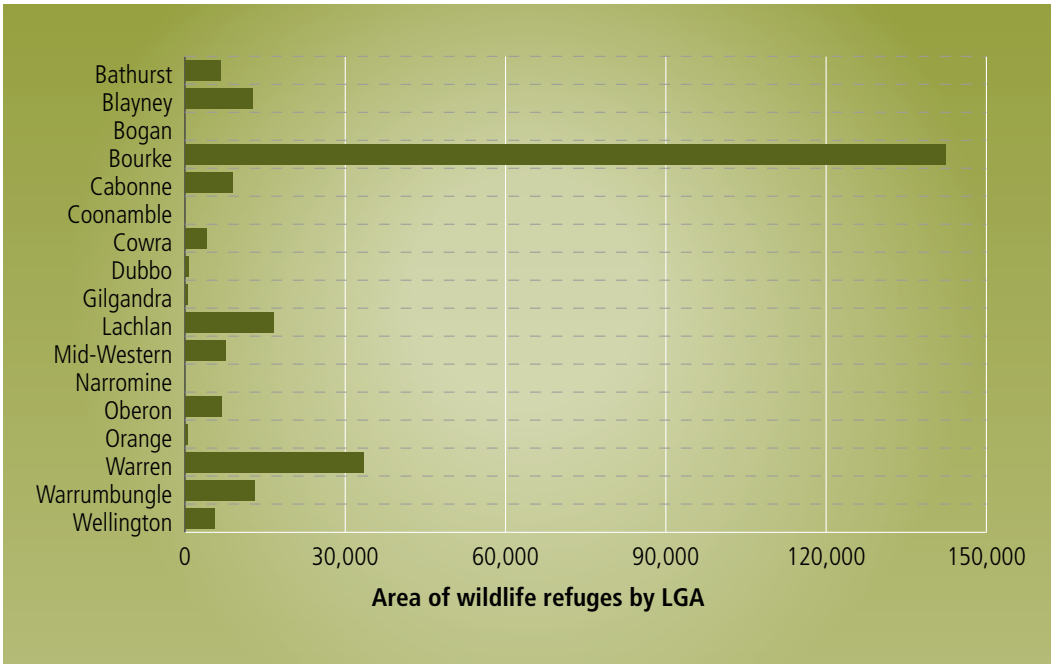


Figure 19: Area of Wildlife Refuges by LGA 2011–12

also works in partnership with other organisations to support non-statutory community programs which promote conservation on private lands.

The Conservation Partners Program provides the opportunity to protect and conserve significant natural and cultural heritage values on private and non-reserved public lands through Conservation Agreements and Wildlife Refuges under the *National Parks and Wildlife Act 1974*. These long-term legal commitments are entered into voluntarily and complement the public national park reserve system. These lands play a critical role in connecting conservation areas by acting as a buffer to threats, including the potential impacts of climate change.

At the end of the 2011–12 reporting period there were 7,669 ha of land across the 17 LGAs in the region covered by Conservation

Agreements and Property Agreements. The area covered by Conservation Agreements was 2612 ha, with Property Agreements covering a total of 5,057 ha, split almost equally between term and in-perpetuity agreements (Figure 18).

At the end of 2011–12, there were 111 Wildlife Refuges totalling 259,367 ha across the 17 LGAs in the region. Bathurst LGA had the most Wildlife Refuges with 17, followed by Cabonne and Oberon each with 14. Fifty-five percent of the total area of Wildlife Refuges in the region is in one large Wildlife Refuge in Bourke LGA which covers 142,294 ha (Figure 19).

Land clearing

There have been significant changes to native vegetation legislation at the State level over the past decade, with Native Vegetation Reforms enacted in 2005 addressing vegetation management from clearing approvals to PVPs. A review of native vegetation legislation in NSW is currently underway.

Councils also control clearing of vegetation in urban areas, where the *Native Vegetation Act 2003* does not apply. Development consents allow for minor clearing for housing, business and industrial development as well as fire protection zones. This is regulated by environmental impact assessment requirements of legislation such as the *Rural Fires Act 1997* and the *Environmental Planning and Assessment Act 1979*, which outline information addressing environmental impacts (Statements of Environmental Effects or Environmental Impact Assessments) to be provided with development applications and burning permits. Development consents may include conditions to mitigate land clearing impacts.

At the State level, the BioBanking Scheme, administered by OEH, was introduced in 2008. This scheme allows for biodiversity offsets of clearing for development. No data on the area of vegetation affected is available for the reporting period. However, a discussion paper released in May 2012 shows one BioBanking agreement has been implemented within the reporting area – this covers 143 ha at Tricketts Arch in the Oberon LGA (OEH 2012). A review of the Biobanking Scheme was initiated in May 2012 and was underway at the time of writing.

ABOVE Galah in flight on the banks of the Castlereagh River in Coonabarabran (Photo C. McCulloch)

Rehabilitation

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

Indicator – Vegetation protected and rehabilitated through CMA incentive funding

The Central West CMA reported that the area of vegetation protected and rehabilitated throughout its area as a result of its funding incentives for landholders, was 12,961 ha in 2011–12, comprising 10,391 ha terrestrial vegetation, 2,476 ha of wetland vegetation and 95 ha of riparian vegetation. This is slightly more than the total area rehabilitated over the two previous years and hence it appears as an improving trend in the summary table (Table 9). Note that the 2008–09 total probably included work conducted over three years due to issues with the CMA reporting system at the time and hence it is ignored in determining the trend.

CASE STUDY: High School Students create Habitat for Coonabarabran Bird Life (Warrumbungle)

A joint project with Warrumbungle Shire Council and Coonabarabran High School students is creating an interest in carpentry that will benefit the local bird population. Funded by the Central West CMA Small Grants Program, a number of bird nesting boxes have been designed and constructed by students and staff. Eighteen boxes have been completed, with Council staff installing the boxes in the tree canopy along the banks of the Castlereagh River within the township of Coonabarabran.

The nesting boxes will be located in Nelson Park, east of the Newell Highway bridge which crosses the Castlereagh River. This project complements the ongoing improvements to the Castlereagh River riparian zone within Coonabarabran township. For years to come, residents and visitors will be able to enjoy the pleasures of bird watching whilst indulging in the serenity found along the banks of the Castlereagh River in the centre of Coonabarabran. Local students have the satisfaction of being part of a project that will benefit the area's biodiversity, and enjoy for themselves the magic of the Castlereagh.

Nestboxes built by the students

RIGHT Shireen Murphy, Environment Manager at Mid-Western Regional Council, with the trophy for the overall winner of the 2011 NSW Roadside Environmental Management Award

Indicator – Habitat areas revegetated

In 2011–12, 311 ha of Council land were revegetated, which is very similar to the area reported in 2010–11. However, only 8 of the 17 LGAs undertook revegetation work during the last year. The most significant contribution came from the Bathurst LGA whose 82 ha of revegetation included the Urban Drains Revegetation Link Project.

Cowra Council is currently promoting an, as yet unpublished, Futures 30 NRM Group publication called Right Plant Right Place Manual which shows how biodiversity and eventually environmental sustainability can be achieved through correct planting. The manual describes popular planting species that are indigenous to the Central West region and the role they play in contributing to biodiversity. It also explains effective planting techniques, has suggestions for monitoring and contains easy-to-use botanical identification notes. Bathurst Regional Council has also developed a local 'Backyards for Wildlife' booklet.

Indicator – Environmental volunteers working on public open space

Several Councils reported high levels of volunteer participation in environmental initiatives which improve habitat for native species with contributions from a range of Council co-ordinated and local community groups. As shown in the summary table (Table 9), the total number of volunteer hours recorded decreased from 15,591 in 2010–11 to 12,186 in 2011–12, reversing the positive trend reported over the last two years. Eight local Councils reported volunteer hours, with the largest contributions being in the Bathurst, Dubbo and Orange LGAs - all of which have an appropriately qualified officer employed specifically to recruit and engage volunteers. The fall in hours this year largely came from Dubbo City Council which reported a 37% fall to 6,524 hours, whilst Bathurst Regional Council reported a 34% increase to 2,830 hours. It should be noted that the lower volunteer hours for Dubbo were due to staff resourcing issues at the time and thus should not be necessarily viewed as a trend for this Council.

Indicator – Project agreements with landholders

The Central West CMA reported a total of 194 new project agreements with landholders during 2011–12. This is down from the 278 new agreements reported last year, but is still showing an improving trend compared to the average of the previous two years.

Riparian Restoration

Indicator – Riparian vegetation recovery actions

Indicator – Riparian vegetation recovery area

Local Councils and the Central West CMA reported a total of 41 riparian recovery actions in 2011–12 with a total riparian vegetation recovery area of 328.6 ha.

The number of recovery actions is trending upwards from the 11 recorded in 2009–10 by the same group of Councils and the Central West CMA, although the area covered by these actions has contracted markedly from 1,944 ha in 2009–10. The majority of this decline was from the Central West CMA which reported a recovery area of 90 ha this year compared with 1,532 ha in 2009–10.

Roadside vegetation management

Indicator – Number of roadside vegetation management plans

In large sections of the region, especially those where broad acre farming is prevalent, roadside reserves and Travelling Stock Reserves provide the only habitat corridors. The management of these roadside verges and other linear reserves is critical for the conservation of remnant vegetation corridors and the fauna dependent on them.

The NSW Roadside Environment Committee (REC), an umbrella NSW Government committee, has encouraged and supported Councils across NSW to develop Roadside Vegetation Management Plans (RVMPs) to better manage roadside environments under their jurisdiction.

RVMPs are firstly developed through assessment of the roadside vegetation, especially threatened species. The plan then identifies processes to best manage the assessed vegetation and to further monitor and evaluate the impact of the strategies that have been put in place. The strategies in the plan can also include those related to fire management, weed management, preservation of critical habitat and provision of clear zones for driver safety.

In 2011–12, there was no change in the number of completed RVMPs across the region, with 13 Councils reporting that they had some type of plan in place.

To encourage the implementation of actions identified in RVMPs, the NSW Environment Trust funded the Roadside Vegetation Implementation Project (RVIP). In 2012, Bathurst, Mid-Western, Orange and Wellington Councils applied for and received funding under the RVIP to implement roadside environmental management works. The total value of this funding was $136,000.

In 2011 Mid-Western Regional Council was the inaugural winner of the Roadside Environmental Management section of the prestigious NSW Local Government Excellence in the

BELOW Grassy Box Woodland on the slopes of Mount Panorama in Bathurst (Photo C.McCulloch)

Environment Awards. It received this award for its Roadside Corridor Management Project which has:

- Assessed, ranked and mapped roadside corridor conditions within the LGA
- Prioritised areas for actions and provided management guidelines aimed at improving habitat values and remnant vegetation condition, particularly in identified high conservation value areas
- Identified Threatened Species (or potential habitat) and communities and regionally significant species and communities.

More details about Mid-Western Regional Council's Roadside Corridor Management Project can be found at http://www.midwestern.nsw.gov.au/Environmental-Services/Environmental-Projects-1/.

Threatened species

OEH has prepared a Priorities Action Statement (PAS) to promote the recovery of threatened species and the abatement of key threatening processes in New South Wales. The PAS identifies a number of broad strategies to help threatened plants and animals recover in New South Wales.

BELOW Shrubby Grey Box Woodland (Photo A. Knop)

A total of 761 priority actions have been identified in the Central West Catchment to help threatened species recover and tackle threatening processes (these are grouped into 25 recovery strategies and seven threat abatement strategies). This is an increase from 750 reported in 2009–10. Of the 761 actions, 748 are focused on the recovery of threatened species, populations and endangered ecological communities.

Indicator – Threatened species actions implemented

Five local Councils (Bathurst, Cabonne, Dubbo, Mid-Western and Wellington) reported in the 2011–12 year that they had implemented a total of 17 threatened species actions (e.g. PAS, recovery plans). This was an increase from the 16 reported in the 201-11 year. Orange City Council reported that it had no actions implemented (compared to 1 in the 2010–11 year) but they did report that it had two Species Impact Statements (SISs) under assessment and three EECs retained and protected by agreement with the property owners (Development Consent conditions).

Fish numbers

Indicator – Number of fish restocking activities

The NSW Department of Primary Industries - Fisheries, in conjunction with local Councils and recreational fishers, has restocked several streams in the region with a total of 206,415 native fish during the 2011–12 reporting period. This indicator is showing a sharply declining trend as this year's number is approximately 70,000 less than were restocked in 2010–11 which was already 100,000 less than were restocked in 2009–10.

Invasive Species

Weeds

Indicator – Invasive weed species under active management

Twelve local Councils reported that they had programs in place to actively manage invasive

ABOVE Eucalyptus regeneration

species and had specific lists of species being actively managed. Cabonne, Cowra, Mid-Western, Narromine and Warrumbungle Councils all reported a significant increase in active management of weeds this year.

Several Councils had active management plans in place during 2011–12 that were targeting Serrated Tussock, Blackberry, Chilean Needle Grass and Gorse, all Weeds of National Significance (WONS). The issues concerned with managing these WONS are of such magnitude that they need coordination among all levels of government, organisations and individuals with weed management responsibilities.

Pests

The Livestock Health and Pest Authorities (LHPAs) carry out annual pest animal programs, including wild dog and fox baiting, plague locust control, rabbit control and various other programs, in conjunction with private landholders.

Councils may support or cooperate with these programs and promote them through education. For example, Bourke Shire has an eradication program across its reserves; Cabonne Shire targets rabbit control and Dubbo City undertakes starling control in the city and fox baiting across its reserves.

Carp Musters

The European Carp is a native of Asia, but extensive introductions have helped to make it the world's most widely distributed freshwater fish. This species is now a major pest in many inland streams in New South Wales with potential to negatively affect water quality, habitat structure and native fish populations.

Very little data was available on results of Carp Musters. The only events in the region in the last three years tracked by the NSW Department of Primary Industries - Fisheries, were:

- 32 carp caught in the November 2010 Bourke Carp Muster (high water levels contributed to low catch rates)
- 334 fish caught in the March 2010 Warren Carp Muster
- 873 fish caught in the March 2011 Warren Carp Muster.

It should be noted that Carp Musters were also known to have occurred in 2011–12 in other locations in the region such as Sofala, Bathurst, Nyngan, Mudgee and in Lachlan LGA.

There was a flood event between the 2010 and 2011 Warren Carp Musters which is likely to have led to large recruitment of carp and the resulting higher total catch. Other carp catch events have been run across the region but no data was available for these.

Human Settlement

This chapter reports on human settlement issues including development, cultural heritage and noise. Human settlements form part of the landscape, but as populations increase, they also become a source of pressure on the environment. Councils are responsible for urban planning, infrastructure, some aspects of environmental and heritage restoration, protection and conservation of resources, provision of community facilities, and community services.

As settlements grow, environmental issues may also increase concurrently with increases in conflicting land uses and increased levels of various types of pollution. Cultural heritage incorporates both Indigenous and non-Indigenous heritage and both are threatened by increased development and a lack of management and awareness.

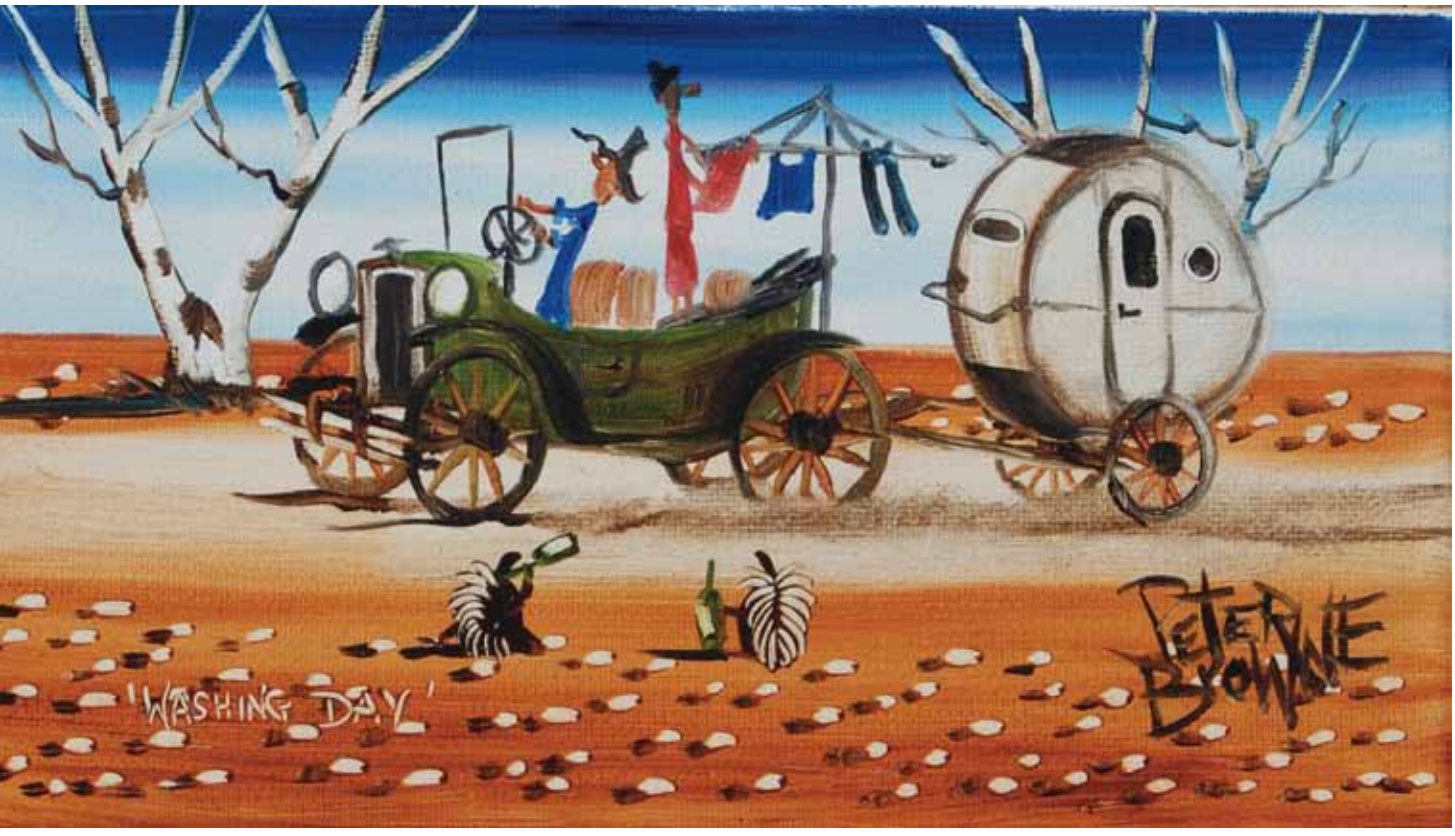
Changing and Increasing Human Settlements

Condition

Land use

As a population grows, the demands for infrastructure such as housing, energy, water, transport and waste disposal also increases. The supply of such infrastructure results in land use changes that can have negative impacts on the environment. Increasing the density of existing urban areas ('brownfield' development) can have advantages over new 'greenfield' sites, with economies of scale, lower impacts on surrounding native vegetation and agricultural lands and increased access to facilities such as recreation areas. It is important for Councils to ensure responsible and appropriate decisions are made relating to land use, in accordance with Local Environmental Plans (LEPs), rural/urban strategies and State Environmental Planning Policies (SEPPs). A significant potential impact is from the urban fringe, where housing and associated infrastructure cannot only affect the land but also other land uses such as agriculture. This area is also known as 'peri-urban', and is often typified by conflict over land use where the zones interface.

BELOW 'Washday' by Peter Browne (courtesy Cabonne Council)



Indicator – Land use conflict complaints

One way to measure the impact of changing land use patterns and Council zonings is through complaints about land use matters to Council. Sixteen of the participating Councils reported that there were 101 land use conflict complaints received in 2011–12. As shown in the summary table (Table 10), complaints increased in 2011–12 from 61 in 2010–11. The 2011–12 figure was the highest for the four year period from 2008–09 for Councils reporting in each of the last four years.

Indigenous heritage

The major Aboriginal groups in the Central West Catchment are the Wiradjuri, Kawambarai, Weilwan and Wongaibon. Small groups include the Dharuk, Darkinung and the Gamilaroi which has sections that extend into the boundaries of the Central West Catchment (Central West CMA, 2007).

The Western Catchment includes the Aboriginal language groups of Ngemba, Wilyali, Nawalgu, Ngiyampaa, Gurnu, Barundji, Garanggaba, Baranbinya, Walywan, Yuwalari, Murrawari, Wanywalgu, Wadigali,

Table 10: Summary Table of Indicator Trends – Human Settlement

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Urban/ Industrial Expansion	Number of development consents and building approvals	3,909	4,303	3,391	4,168	↓
	Land use conflict complaints	67	50	61	101	↓
	New road construction (km)	43	19	45	15	↑
	Road upgrades (km)	1,081	1,124	349	257	↑
Indigenous Heritage	Inclusion in DCPs & rural strategies	8	7	8	12	↑
	Extent of liaison with Aboriginal communities (self-assessed from 0 = none to 3 = High)	1.3	1.8	2.0	1.9	↑
	Development approvals on listed Aboriginal sites	5	3	5	6	↓
Non-Indigenous Heritage	Number of NSW Heritage Items	98	101	108	109	↑
	Number of Locally listed heritage items	1,309	1,250	1,525	1,999	↑
	Actions to protect non-Aboriginal heritage (including management plans)	21	22	19	37	↑
	Number of Heritage buildings on statutory heritage lists renovated/improved in past year	62	34	55	73	↑
	Number of Heritage buildings on statutory heritage lists demolished/degraded in past year	2	2	4	0	↑
Noise Pollution	Urban noise complaints received by Council	833	777	1,066	1,101	↓
	Industrial noise complaints received by Council	65	97	98	72	↑
	Noise complaints received by EPA	334	162	246	426	↓

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008–09, 2009–10, 2010–11 and 2011–12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011–12.They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils

ABOVE Bank Street, Molong

Wangkumara, Malyangaba, Bandjigali, Yawaalaraay, Gamilarray and Barkintji (Western CMA, 2007).

The Lachlan catchment is comprised of 13 Local Aboriginal land councils and eight different Aboriginal nations including Wiradjuri, Ngunawal, Wongaibon, Yitha Yitha, Dharug, Madi Madi, Gundungurra and Barindji (Lachlan CMA, 2007).

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

In NSW, the inland rivers and surrounding areas supported the largest Aboriginal communities, had the most innovative societies and were the most active traders of material goods and intellectual property (Central West CMA, 2007).

Until recently, Aboriginal objects ('sites') were narrowly defined. However, there is an increasing move to record locations that are important to Aboriginal people, recognising linkages to the post-European settlement period and the importance of contemporary places to them.

Non-Indigenous heritage

Indicator – National heritage items

Indicator – NSW heritage register items

Indicator – Locally listed heritage items

The State Heritage Register contains items listed by the heritage council under the NSW *Heritage Act*. Note that some heritage places are listed on both national and State heritage registers.

As shown in the summary table (Table 10), the number of items listed under the NSW *Heritage Act* across the 17 Councils in the region is showing an upward trend, increasing to 109 in 2011–12 from 108 and 101 in the two prior years. The two new listings this year were Black's Camp and the John Fowler 7 nominal horse power Steam Road Locomotive, both in the Wellington LGA.

The number of locally listed items also increased to 1,999 for the 15 Councils reporting this data in each of the last four years, continuing the improving trend reported last year. There were sizeable increases reported this year by Blayney, Cabonne and Coonamble Councils.

It should be noted that there is some inconsistency in the reporting of this data with some Councils including state listed items and others only reporting LEP listed items.

Noise Pollution

Noise is a type of pollution that can have direct physiological and psychological effects on people. Noise can have a range of impacts from minor annoyance to more serious damage to hearing. It can cause impacts on sensitive land uses including natural areas, residential areas, schools, hospitals and parks.

Noise also affects the habitat of some native fauna species. This may include impacts on breeding cycles and a reduction in the number of species in a locality (moving to avoid noise). Some types of fauna are more susceptible to noise and vibration than others. For example, reptiles that rely on vibration as a primary sense will avoid areas of particular noise wave patterns or vibrations as they disrupt the ability to hunt and avoid predation.

Indicator – Urban noise complaints received by Council

As shown in the summary table (Table 10), from those Councils reporting in each of the last four years there was an increase in the number of urban noise complaints from 1,066 in 2010–11 to 1,101 in 2011–12. Over the four year period this indicator showed an overall increasing trend.

As reported in previous years, the majority of the complaints related to barking dogs which comprised 85% of all complaints.

Indicator – Industrial noise complaints received by Council

As shown in Table 10, the number of industrial noise complaints decreased for those Councils reporting in each of the last four years and were well below the level of complaints reported in the 2009-11 period. It is hard to

CASE STUDY: Coonamble's Grand 1930's Plaza Theatre

The Plaza Theatre was constructed by Charlie Wall in 1930 to replace the Monarch Picture Theatre that was destroyed in the 1929 fire. The building served as Coonamble's cinema until 1982. It is an interesting example of the blending of the Inter-War Free Classical and Inter-War Arts and Crafts styles of architecture.

The building is representative of the redevelopment of Coonamble after the 1929 fire. It has local historical and aesthetic significance, representativeness and a high degree of integrity. The two-tiered theatre was built to house 900 people - 400 upstairs and 500 downstairs, the grand foyer leads to an open space of high ceilings and wooden floorboards with a risen stage. It had been dilapidated and closed for over 25 years.

Thanks to local businessman and owner, Chris Gray, this has changed with the theatre now being under refurbishment for the last 12 years. The restoration is being carried out in a way that honours the heritage of the building and is consistent with the original architecture, while providing the functionality of a modern professional performing arts facility

Major structural work and new foundations have secured the building. Plumbing, wiring and paint work have also been renewed. Many of the architectural and decorative components have been personally restored by Mr. Gray, affording him much personal satisfaction and frustration along the way.

Mr Gray has been funding the restoration of the theatre with money from his own pocket as well as support from community fundraisers. He has been doing work when he can, but it is been a long process. Although the restoration is still a work in progress it has already been the venue for a number of concerts, plays and movie nights.

It is an important for any small town to have somewhere where people can go and be together and have a sense of community and heritage.

Coonamble's Grand Plaza Theatre, 1931 (Source: Carl White)

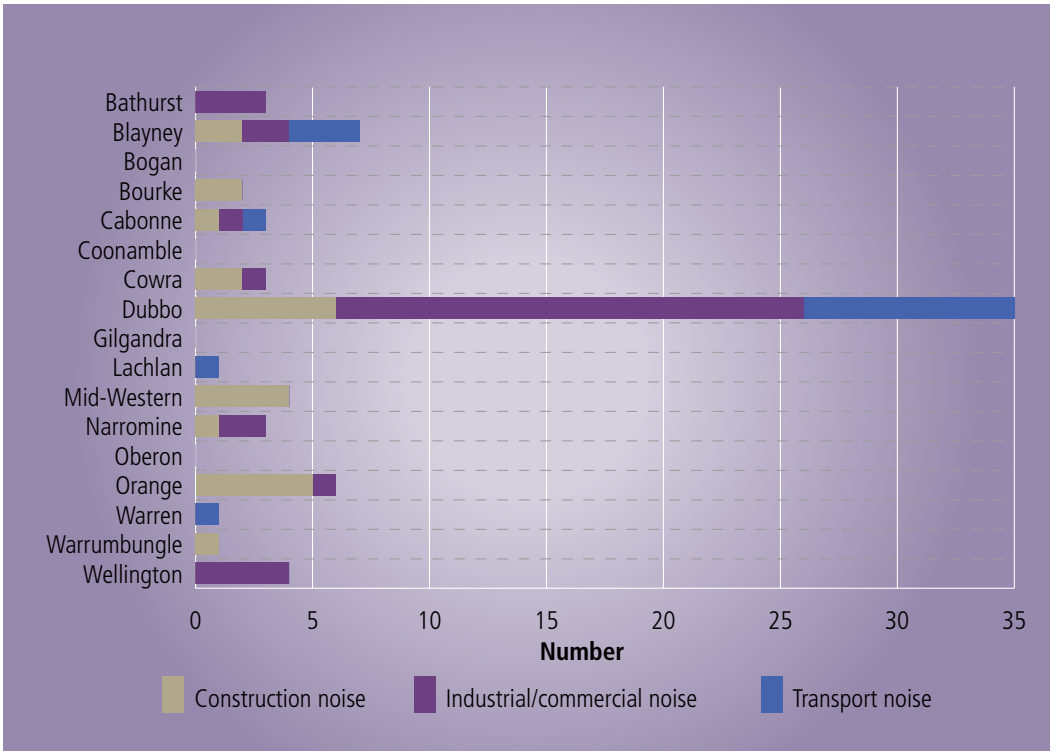


Figure 20: Types of industrial noise complaints received by Council 2011–12

draw any conclusion from a one year decline, but it is possibly a signal of reduced urban building activity in-line with the subdued construction activity across the State. A breakdown of the type of noise complaints is provided in Figure 20, clearly illustrating that, as in the two previous years, Dubbo is the LGA with the largest number of complaints to Council.

BELOW Helicopter commemorating the 1990 Nyngan flood

Indicator – Noise complaints received by OEH

Noise issues may also be reported to OEH and as shown in the summary table (Table 10), the number of noise complaints across the region received by OEH rose sharply in 2011–12 to 426 complaints which was a 73% increase on the level reported in 2010–11 (50% higher than the level in 2009–10). However, as in each of the last four years, the vast majority of noise complaints were reported from the Mid-Western LGA which accounted for all but two of the 426 complaints this year. These complaints mainly relate to new mining operations in rural areas.

Threat

Development

Key areas where environmental impacts of development may occur include residential, mining/heavy industry and rural/residential developments.

In the reporting region, a particular pressure is that of the rural small holding, where existing agricultural land is sub-divided to meet demand for two or 25 hectare residential lots in an otherwise rural landscape, reducing the available areas of primary production and therefore increasing pressure on agricultural land and the environment. This also requires provision of services such as waste collection and infrastructure such as water (tank or town), sewer/septic, fences and roads.

There may also be noise, odour and air pollution at the interface between these areas, which can become a source of complaint.

Indicator – Extent of new road construction

Indicator – Extent of road upgrades

These indicators can be used to gauge the extent of development experienced across the region. As shown in the summary table (Table 10), new road construction (local Council roads) decreased in 2010–11 to the lowest level recorded in the last four years. Road upgrades also decreased significantly, falling to approximately a quarter of the annual levels reported in the 2008-10 period. This could be due to Councils focusing on repair of flood-damaged infrastructure and therefore unable to carry out other works. A significant proportion of the road upgrades reported are essential maintenance, particularly grading and reshaping of gravel roads and resealing of bitumen roads (69% in 2011–12).

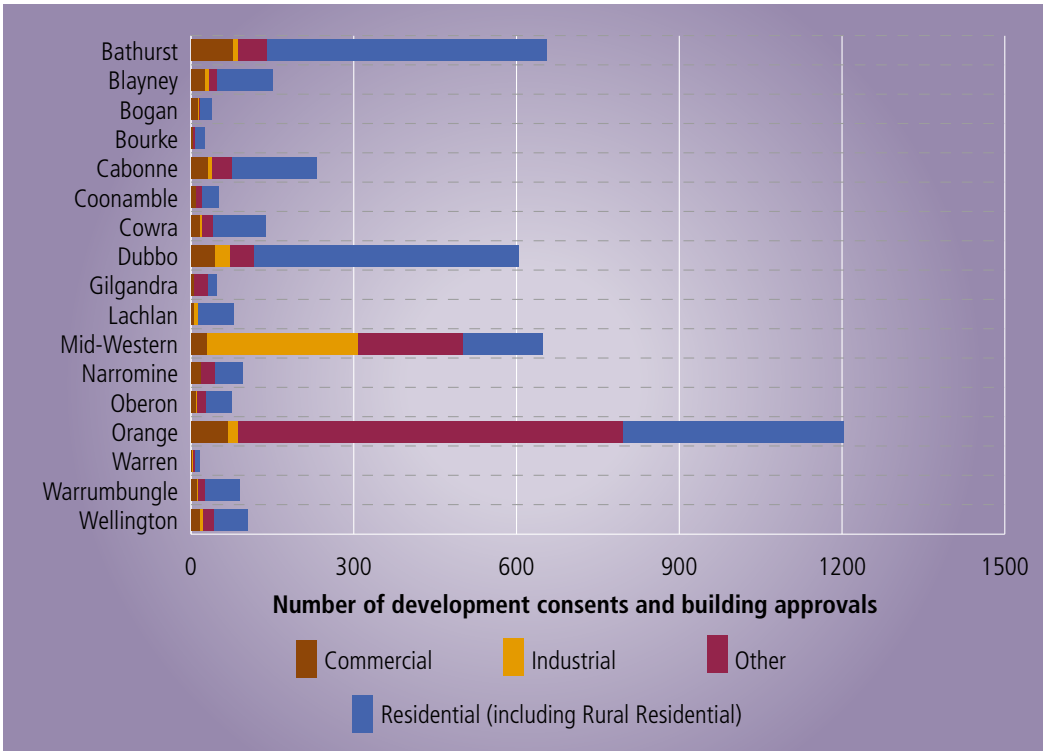


Figure 21: Types of development consents and building approvals across the region in 2011–12

Indicator – Number of development consents and building approvals

The number, type and location of development applications can provide some information on the potential level of development impacts on both the built and natural environment. While the number of development applications lodged with Councils fluctuate with economic cycles and other factors such as the size of population and presence of industries; as a general trend they reflect the likely levels of development impacts on the LGA.

As shown in the summary table (Table 10), there was a sharp increase in the number of development consents and building approvals from 2010–11 to 2010-12 for the 15 local Councils that reported in each of the last four years. The largest change was in the Orange LGA where consents and approvals increased to 1,203, the highest number in the region.

Fifty-four per cent of the 4,258 development consents and building approvals given in 2011–12 were for residential development, compared to 71% for residential in 2009–10. Figure 21 shows the breakdown by LGA and highlights not only the exceptional growth in Orange but also the continuing strong growth in the Mid-Western LGA which had 74% of all industrial approvals for the region and a similar total number of development approvals as Dubbo and Bathurst LGAs, both of which have a population almost twice that of Mid-Western LGA.

Development may also be a threat to Indigenous and non-Indigenous heritage. This may take the form of physical and aesthetic impacts from road works and road realignment, land clearing, unsympathetic alterations and additions and adjacent development. Further impacts may occur from increased demand for tourism and recreation, particularly affecting natural area heritage; impacts may also occur on built heritage from the increase in smoke and vehicle emissions. Changes to land ownership can also affect heritage, as new landowners may not recognise heritage significance, and may also change land use affecting heritage.

CASE STUDY: Mechanics Hall Institute (Warrumbungle)

The Mendooran Mechanics Institute was constructed in 1935 and has been in continuous operation as a vital community hall for the residents of Mendooran. As a purpose built cinema and auditorium, it exhibits aspects of the design and operation of cinemas in the inter war period of the twentieth century. The distinctive Inter-War Spanish Mission architectural elements are clearly visible, providing a rare example of an intact Art Deco cinema Proscenium with original decorative paint finishes.

The Proscenium was restored as a community project with father and daughter conservation experts, Ian and Stella Rufus. The specialist conservators worked throughout a week in early June 2012, with members of the community able to walk in and observe their progressive efforts. Volunteers were able to participate in a restoration workshop as part of the week's activities, adding further ownership and cultural interest by the Mendooran community into the preservation of the historical Proscenium.

Warrumbungle Shire Council was able to assist with maintenance of the Mendooran Mechanics Institute building, and provide support to the Mendooran & District Development Group to encourage the community to take ownership of the restoration of the unique Proscenium. The restoration has revived an important focal feature of a cherished building, and the restoration in itself has been a cultural activity that continues to engage and bring together the Mendooran community.

Mendooran Mechanics Institute Proscenium

For example, clearing of land for cropping may impact on sites of significance or change the local character of a place. Environmental impacts from fire, natural weathering and salinity can result in detrimental physical impacts on heritage places and items and may cause permanent loss or damage. Likewise, vandalism and wilful destruction or ignorance of location/significance can also result in permanent damage or loss.

Indicator – Development on listed Aboriginal sites

There were twelve developments on listed Aboriginal sites across the region in 2011–12, spread across the Cowra, Dubbo, Mid-Western and Oberon LGAs. For the twelve Councils which have reported this data in each of the last four years, there was a small increase in the number of developments (see Table 10). Whilst the number of developments per year is small it should be remembered that these heritage sites are finite and any development which degrades them is potentially permanently deteriorating the Indigenous heritage in the region.

Lack of Knowledge, Appreciation and Recognition

We have lost a great deal of knowledge about Aboriginal heritage, and this may cause a lack of appreciation and recognition of the importance of heritage items and places. There is often a reluctance to acknowledge potential heritage sites as it is felt this may impact on future land use. Restrictions on Aboriginal people to practise their rituals and ceremonies also have a significant impact on Aboriginal heritage. This may include loss of access to significant sites or places or lack of ability to carry out ceremonies and cultural activities.

Non-Aboriginal heritage has not undergone the same level of depletion that Aboriginal heritage has, however the same problems still exist with a lack of appreciation and recognition of the importance of heritage items and places. Similarly to Aboriginal heritage there is often a reluctance to acknowledge potential heritage sites as it is felt this may impact on future land use, although this is slowly improving as developers and property owners realise the aesthetic and economic value in owning, maintaining or utilising a heritage listed property or site.

Indicator – Heritage buildings on statutory heritage lists demolished/degraded

There were no heritage buildings on the Statutory Heritage lists demolished or degraded in 2011–12 according to the 14 Councils that reported on this indicator this year.

Response

Planning

There is a suite of planning tools that Councils in the reporting region can use to ensure that development is as sensitive as possible to both the natural and built environment.

State Environmental Planning Policies (SEPPs) deal with issues significant to the state and people of New South Wales. They are made by the Minister for Planning and Infrastructure and may be exhibited in draft form for public comment before being gazetted as a legal document.

Local environmental plans (LEPs) guide planning decisions for local government areas. Through zoning and development controls, they allow councils and other consent authorities to manage the ways in which land is used. LEPs are the primary planning tool to shape the future of communities and also oversee the estimated $20 billion worth of local development that is determined each year.

In 2006, the NSW Government gazetted a standard instrument for preparing new LEPs, also known as the LEP template. The aim is to have local plans across NSW that will now use the same planning language, making it easier for communities to understand what is proposed for their local area. Councils are able to include localised planning objectives and provisions specific to their area, as well as determine zoning, additional land uses, heritage items, and development standards, such as height and minimum lot sizes. Whilst some Councils in the reporting area have implemented LEPs under the new format, others will be required to do so during their next LEP revision.

ABOVE Cotton growing on the Mitchell Highway at Trangie

ABOVE Gaskill Street, Canowindra

BELOW Sharing traditional resources through food at the Year of the Farmer Central West CMA stand at the Food Affair

Noise Regulation

The PoEO Act is administered by OEH which is therefore responsible for regulating noise from activities scheduled under the PoEO Act which includes premises occupied by public authorities. Local Councils are largely responsible for the management of noise in relation to non-scheduled activities, with local police also involved in neighbourhood noise matters.

Premises conducting scheduled activities are required to hold an Environment Protection Licence through which EPA can apply appropriate noise control conditions. Councils can control noise through conditions determined by Council as part of development consent, issued under the planning legislation, and through Notices or Directions issued under the PoEO Act.

The *PoEO (Noise Control) Regulation 2008* addresses common noisy activities that occur in residential situations. It limits the time of day that noisy articles (such as lawn mowers, stereos and leaf blowers etc) are permitted to be heard in neighbouring residences. It also has provisions regarding motor vehicles (including noise limits) and addresses noise from marine vessels.

Most Council-regulated potentially noisy activities are not the subject of specific limits or controls. It is an offence under the PoEO Act if noise is emitted from premises because of the occupier's failure to maintain or operate plant, or to deal with materials in a proper and efficient manner. Noise Control Notices or Noise Abatement Directions may also require emissions to be reduced or cease in certain circumstances (e.g. if offensive noise is emitted from certain premises). It is an offence not to comply with the Notice or Direction.

The *Companion Animals Act 1998* is administered by the Minister for Local Government and deals with issues associated with nuisance dogs and cats.

Transportation noise is handled by various agencies, with aircraft noise exclusively a Commonwealth Government responsibility, with the exception of aircraft on the ground at private or local Council-operated airports. Rail noise and noise from the construction of freeways and tollways is generally regulated by licences issued by OEH. Noise from general traffic on roads is managed by the Roads and Maritime Services (RMS) and councils. Noise from individual vehicles is regulated by the RMS, police and OEH.

The *Noise Guide for Local Government* provides practical advice to Council officers in the day-to-day management of local noise problems and the interpretation of existing policy and legislation.

ABOVE Peak Hill Youth Empowerment participants

Development

Underpinning planning legislation in NSW is the concept of ecologically sustainable development (ESD). In brief, ESD aims to provide for the needs of present generations without compromising the ability of future generations to meet their own needs. ESD seeks to integrate environmental, economic and social considerations in decision making.

The EP&A Act is the main form of environmental assessment legislation in NSW. The Act requires a robust system of environmental impact assessment that provides a mechanism for identifying and assessing all potential impacts of a development in determining development applications.

In order to list sites, heritage studies need to be conducted to determine the location, significance and value of the site or item. Many of the Councils in the reporting area have heritage officers appointed to coordinate studies and listing of sites, as well as providing advice on individual development impacts. These officers also identify key areas that require protection and seek funding for rehabilitation projects to improve long term management of the place.

Councils also have the authority to implement Development Control Plans (DCPs) which apply to areas or sites and provide an additional level of protection for those areas. These are often applied to heritage towns and villages. For example, Blayney Shire Council implemented a development control plan for the historic village of Millthorpe. This DCP requires new buildings to reflect the look and character of the village (including materials, roof lines and colours).

LEPs can also be used to provide statutory protection. For example, Mid-Western Regional Council has listed heritage conservation zones in Gulgong (also a National Trust listed town), Mudgee, Rylstone and Hargraves. The LEP provides some statutory protection to complement listing on Local, State or Federal registers.

BELOW Orange Wine selection at Borrodell

CASE STUDY – Community Heritage Study (Orange)

In May 2012, Orange City Council adopted the Orange Community-based Heritage Study which proposes an additional heritage conservation area and 205 items of environmental heritage to be listed in the LEP. Combined with the existing 105 heritage items and five heritage conservation areas identified in the 1986 Heritage Study, the Study provides a sound basis for the identification, conservation and management of heritage places and items in the Orange Local Government Area.

The process was managed by a community working party which included a heritage consultant and historian, who considered a total of 1,151 places identified by the community and working party.

All sites have been listed on the NSW Heritage Office State Heritage Inventory database, complete with statements of significance and photographic records.

The proposed Duration Cottage heritage conservation area aims to preserve the rare and significant establishment of workers cottages overlooking the 1942 Small Arms Factory (now utilised by Electrolux). The Duration Cottages mark the historic post war period for the construction of houses based on a standard design on a small subdivision of land. The standard designs consisted of simple suspended timber floors, timber framed walls and carpentry roofs. The buildings were clad in the new material of the time, asbestos sheeting or fibro. Owners often constructed the cottages with the help of friends on their own time after work and on weekends. While most houses have been altered many remain intact in so far as their character can be easily interpreted.

A range of guidelines have been developed to support and encourage sympathetic upgrading of the cottages.

Indigenous Heritage

Indicator – Current licences to access AHIMS register

The Aboriginal Heritage Information Management System (AHIMS) register of Aboriginal sites is managed by OEH. Each local Council was asked this year whether they have a licence to access the AHIMS register. This information has been requested as an indicator of the level of awareness and active management of Aboriginal sites in each LGA. In sharp contrast to last year, all but one of the local Councils reported that they currently have AHIMS access.

Indicator – Extent of liaison with Aboriginal communities

Councils were asked to self-rate the extent of their liaison with Aboriginal communities. All 17 Councils reported this indicator in 2011–12 and gave themselves an average rating of 1.8 on a scale of 0 (none) to 3 (high). As shown in the summary table (Table 10), the 12 councils that have reported this indicator over the last four years had shown a steady improvement since 2008–09, but

RIGHT Scar Tree on the banks of the Bogan River (Photo C.McCulloch)

ABOVE Sheep along Peabody Road, near Molong, Cabonne LGA

there has been a slight dip this year. However, the fact that every Council has reported this year plus the generally positive progress of this indicator over the four years, suggests that there is an increasing awareness of the importance of consultation, particularly in development processes.

Indicator – Inclusion of Indigenous Heritage in DCPs and rural strategies

All 17 Councils reported on this indicator in 2011–12 for the first time and moreover, they all reported that they had included Indigenous community consultation in development of DCPs (Development Control Plans) and rural strategies. This is a significant improvement as less than half these Councils gave the same response in 2009–10 and 2010–11.

Indicator – Management plan/strategy in place

This year, 16 of the 17 Councils reported that they had an Aboriginal heritage management plan or strategy in place. This includes Blayney, Dubbo and Warren which noted that theirs were in draft form. This is a dramatic improvement from 2010–11 when only Wellington Council reported having a plan or strategy in place.

Non-Indigenous heritage

Indicator – Actions to protect non-Indigenous heritage items

Indicator – Heritage buildings on statutory heritage lists that are renovated or improved

These indicators, introduced in 2008–09, provide a gauge of the level of protection through management of non-Indigenous heritage items. As shown in the summary table (Table 10), there was a marked increase in 2011–12 in the number of reported actions to protect non-Indigenous heritage (including management plans).

The 73 heritage buildings on statutory lists which were renovated or improved during the year represented a further significant increase from the activity reported for this indicator in the three previous years.

Bathurst Regional Council has a heritage fund by which it assists owners of heritage buildings with the costs of maintenance and repairs.

Waste

This chapter focuses on the generation, treatment and disposal of waste within the reporting area. Waste is caused by the disposal of products at the perceived end of their life, or simply when the user has no further need for them.

With the expansion of human settlements, environmental pressure is being increased through the consumption of products that are dependent on natural resources and the inappropriate disposal of by-products. A sustainable human environment requires greater attention to urban design and a reduction in net consumption.

Within the reporting region, efforts are being made to increase the sustainability of waste management systems through reducing, reusing and recycling waste products.

Waste generation and disposal

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).

Table 11: Summary Table of Indicator Trends - Waste

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Waste Generation	Total waste entombed at primary landfill (tonnes)	155,000	139,000	147,000	174,000	↓
	Total waste entombed at other landfills (excl recyclables) (tonnes)	6,650	8,499	6,585	7,144	↑
	Average total waste generated per person (tonnes/person)	0.9	0.94	0.95	1.09	↓
	Average cost of waste service per residential household	$195	$186	$235	$237	↓
Hazardous/ Liquid Waste	DrumMuster collections (number of drums)	95,953	65,325	90,527	122,807	↑
	Household Hazardous Wastes collected (kg)	*	*	7,748	12,800	↑
Reduce	Office paper used by Council (A4 reams)	23,331	19,876	20,403	22,065	↓
	E-Waste collected (diverted from landfill)	21	18	23	58	↑
	Garden organics collected (diverted from landfill) (tonnes)	16,356	21,274	18,910	23,351	↑
Recycle	Volume of material recycled (tonnes)	25,201	16,846	21,010	22,583	↑
	Volume of material recycled per person (kg)	122	84	103	135	↑
Littering and illegal dumping	Annual Volume of litter collected by streetsweeper (tonnes)	4,366	5,927	4,795	7,308	↓
	Number of illegal waste disposal complaints to Council	360	312	398	498	↓

** Data not available for these years*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008–09, 2009–10, 2010–11 and 2011–12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011–12.They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils

- Construction and Demolition: includes waste from construction and demolition activities generally associated with development.
- 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 – Average total waste generated per person per annum

Indicator – Average cost of waste service per person per annum

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

Total waste indicates consumption patterns and the pressures placed on rural tips and primary landfills.

As shown in the summary table (Table 11), for the ten Councils that reported in each of the last four years, the average total waste generated per person for 2011–12 was 1.09 tonnes. This was a significant increase from the figures reported in each of the previous three years. However, Dubbo reported an exceptional event (see below) during the year and if their figures are removed from the comparison, there is effectively no change in the average waste per person across the rest of the region.

The increase in waste per person reflects increases in the volume of total waste received at both primary and other landfills for the thirteen Councils that reported in all three years. However, the Dubbo LGA was responsible for almost all of the 18.8% increase in waste to primary landfill tonnage across the region. Dubbo City Council reported that this relates to a stormwater upgrade completed at Apex Oval - an old landfill site.

ABOVE A stormwater drain on outskirts of Bathurst. Image shows large amounts of sediment being transported by stormwater to the natural environment. Source of this sediment is adjoining residential development with poor sediment controls in place during construction. (photo: C.McCulloch)

Contaminated material and water from the old landfill site had to be transported to Council's current landfill site in order to complete the stormwater works and remove any risk of contaminants. This was a one off event and it is anticipated that total waste to landfill will revert to a more normal level next year.

It should be noted that prior to 2010–11, the total waste for Orange LGA included some of neighbouring Cabonne Council's C Riding (Ward) waste and contamination from the recycling collections processed through the Materials Recovery Facility from Orange, Cabonne, Parkes, Forbes, Blayney and Bathurst LGAs. Therefore, in the summary table (Table 11), the total waste entombed at primary landfill excludes Orange's data to enable a more valid comparison across the four years. A full breakdown for the 2010–11 year by LGA, including Orange LGA is provided in Figure 22.

The volume of total waste (excluding recyclables) taken to other landfills was 7,217 tonnes for the 14 Councils reporting in 2011–12. A comparison with the three previous years is provided in the summary table (Table 11) but it should be noted that the basis of reporting this indicator was changed for the 2009–10 report so the comparison should be regarded as indicative only.

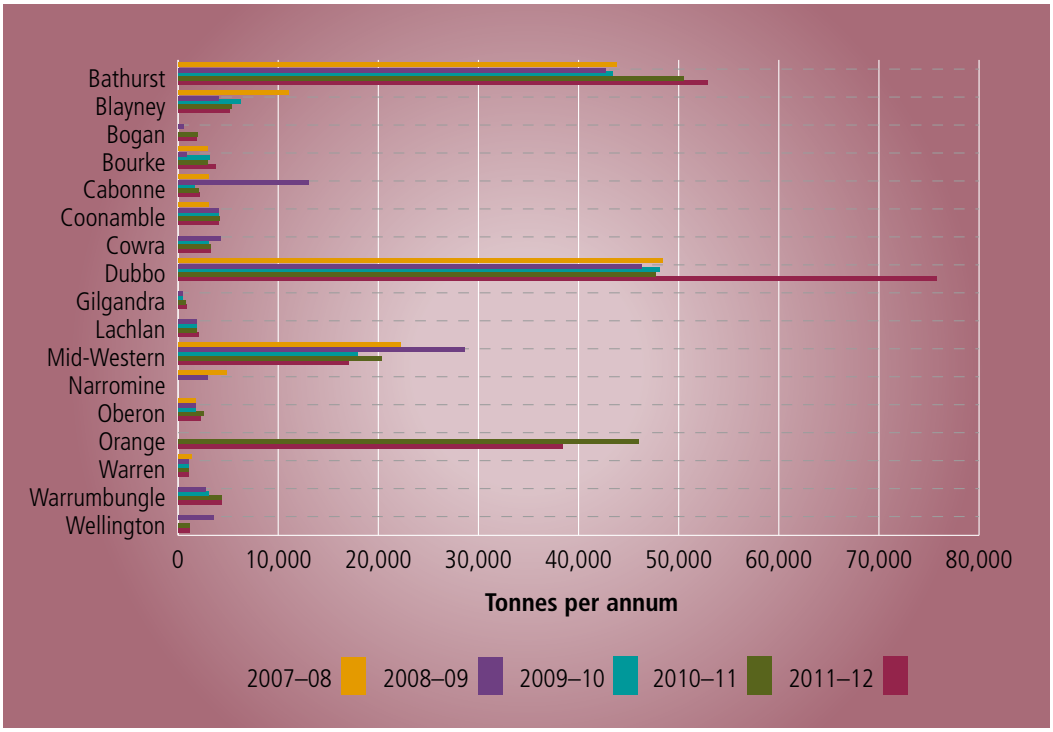


Figure 22: Total waste entombed at primary landfill by LGA

A small increase to $237 for the average cost of waste services to people across the region was reported this year (based on 12 Councils reporting in all four years). This continues a slight worsening trend across the region over the past four years.

Indicator – Emissions from landfill

This is a new indicator which is being reported for the 17 Councils for the first time. The emissions calculation is based on the reported volume of waste entombed over the last three to four years at landfills in each LGA. The calculated total emissions for the region in 2011–12, was 127 kt CO_{2e} (equivalent carbon dioxide). The primary emission from landfills is methane (an important greenhouse gas), so the CO_{2e} measure is used to give the concentration of CO_2 that would cause the same level of radiative forcing as methane.

It is worth noting that only three LGAs (Bathurst, Dubbo and Orange) were close to or marginally above the National Greenhouse and Energy Reporting (NGER) threshold of 25 kt CO_{2e} for a single facility (landfill).

BELOW Wastewater Treatment Works, Bathurst

Hazardous Chemicals

Hazardous chemicals include common household and agricultural materials such as pesticides, herbicides, paints, cleaning products, oils, car batteries and pharmaceuticals. Chemicals have the potential to cause significant local or regional impacts on both human health and the environment. There are currently limited disposal options available in the region, however irresponsible disposal of such chemicals can cause acute and devastating impacts upon the natural environment, particularly ingestion by animals and contamination of aquatic systems.

Liquid Waste

There are currently a significant number of domestic and commercial premises throughout the reporting area that rely on a septic tank arrangement for their effluent disposal. These premises are located where, due to the unavailability of sewer mains, or for other site-specific reasons, a normal sewerage service cannot be provided. These often occur in small villages, remote communities and on farms. Trade wastes are liquid wastes produced by industry which are discharged to sewers and may contain pollutants that require treatment prior to discharge. This action is licensed under the PoEO Act and Councils have a role in monitoring and compliance of these discharges.

Waste Management Facilities

The various sources and types of waste described above are the reason Councils operate landfills and waste management facilities. Waste management facilities can result in environmental impacts such as noise, odours, windblown litter, methane gas emissions, groundwater contamination, and erosion, sedimentation and weed infestation of adjacent waterways. Closed landfill sites can pose similar environmental risks and land instability. There are both operating landfills and closed landfills across the reporting Councils.

Threat

Littering

One of the most obvious forms of pollution is litter. Apart from being unsightly and taking a long time to breakdown, litter can be washed into waterways through stormwater systems where it poses a risk to aquatic life. A significant form of littering is illegal dumping which occurs across all LGAs in the region.

Indicator – Amount of litter collected by Council streetsweepers

From the 13 Councils that reported each of the last four years, there was a large increase in the volume of litter collected by Council streetsweepers (see Table 11). The reliability of some of the data is questionable though, as the total movement hides large changes for individual LGAs, with Cowra and Oberon reporting big drops in tonnage, whilst for the second successive year, Warrumbungle reported a very large increase.

The amount of litter collected should be considered in relation to that collected in GPTs (see Water chapter).

Illegal dumping

Indicator – Number of illegal waste disposal complaints to Councils

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 the potential impact that it may have on the environment.

ABOVE Illegal dumping

As shown in the summary table (Table 11), the number of illegal dumping complaints showed a substantial increase compared to 2010–11 for the 14 Councils reporting in each of the last four years. The majority of the increase came from one LGA - Warrumbungle reporting a five-fold increase in complaints. However, even if Warrumbungle's numbers are removed, the trend over the four years is still upwards, suggesting that illegal dumping is a growing issue for the region, with residents becoming more aware of the problem.

Population and consumerism

Human consumption of natural resources lies at the root of many of our global environmental problems. Current consumption patterns stress limited natural resources, contribute to global warming, and create waste and in some cases toxic by-products that affect natural systems and potentially human health. Population growth and higher standards of living both add to consumption levels and associated increases in waste generation.

Climate Change

As Australia grapples with its response to climate change, there is a major concern with waste placed in landfill sites. Every tonne of degradable waste dumped in Australia's landfill sites today will still be a greenhouse gas liability in 2050. The reason for this is waste materials with degradable organic carbon (e.g. food, paper, garden and wood wastes) decompose and emit gas when buried in landfill. This landfill gas contains methane, which has a global warming potential 25 times that of carbon dioxide.

Packaging

The increasing use of packaging by producers, particularly in the last 30 years, means that consumers are left with waste that may, if they do not recycle, end up in landfill.

Australians generate more than 32 million tonnes of waste each year (Hyder, 2006). Of this, 42 per cent is construction and demolition waste, 29 per cent is commercial and industrial waste and 29 per cent is municipal or household waste. Total packaging waste generated in Australia is just over 4.3 million tonnes (National Packaging Covenant Annual Report, 2011) from commercial, industrial and household sources. Packaging waste generated represents around 13 per cent of the total waste stream within Australia, with beverage packaging comprising less than 3 per cent.

Lack of awareness

Lack of awareness of waste minimisation strategies can be a major hurdle in minimising the amount of waste going to landfill. Ongoing education programs and other initiatives are required to raise awareness levels and encourage behaviours related to waste avoidance and minimisation.

Response

Education

Education programs are an integral component of waste reduction and recycling. NetWaste implements several education programs across the Councils and employs an Environmental Learning Advisor to design and implement programs targeting specific issues.

Figure 23 outlines the hierarchy of avoid, reuse and recycle as a method of improving sustainability. The first step is to reduce the amount of waste you need to dispose of or recycle by avoiding it in the first place. The second step is to reuse any materials before discarding or recycling. The third step is to recycle any material that you can so it can be transformed into another useable material. Only after the first three steps are completed, should any leftover waste be deposed of to landfill.

Education of local communities promotes the importance of avoiding the creation of waste in the first place, through activities such as purchasing items in bulk as opposed to single serve items and composting food scraps at home. It is however, equally important that appropriate services are in place to manage waste that is generated in the region such as kerbside recycling services and efficient waste management facilities.

Reducing waste disposal

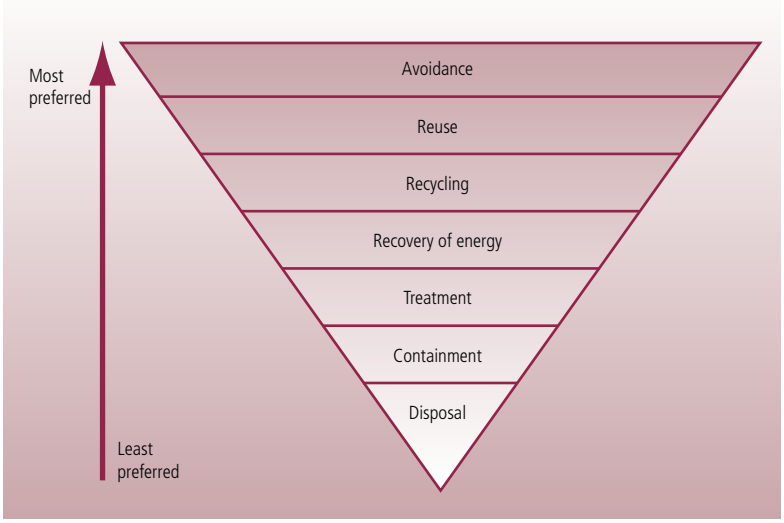
Avoiding the creation of waste is generally seen as the best strategy for dealing with the problems it creates. Key responses to deal with waste include reducing the volume of waste reaching landfills, minimising the environmental impacts of waste facilities, and encouraging the development of new waste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

Indicator – Office paper used by Councils

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 the summary table (Table 11), the 13 Councils that reported in each of the last four years have increased their use of A4 office paper in the last year, but are still using a little less than in 2008–09. The mix of papers used has changed over the four years with an increasing use of coloured paper and substantially lower use of 100% recycled paper, albeit that partially recycled paper has been substituted for some of this. Overall the trend in this indicator appears to be in the wrong

Figure 23: Waste Hierarchy



Source: DSE, Victoria

LEFT Lue Waste Transfer Station at full capacity, Mid-Western LGA

direction, with Councils using more paper and less recycled paper.

Indicator – Garden Organics Collected

An increase in the volume of garden waste collected was reported this year, for the nine councils who reported in each of the last four years (Table 11). This year's figures reversed the decline reported last year and is shown as an improving trend based on the assumption that this waste would have gone to landfill.

Recycle

Indicator – Amount of material recycled

Indicator – Amount of material recycled per person

As shown in the summary table (Table 11), the volume of material recycled increased by 7.5% for the twelve Councils that reported this data in each of the last four years to 22,583 tonnes, compared with 2010–11. This figure is equivalent to an average of 112kg per person across the entire region, continuing the improving trend reported last year. Improved reporting of this data is the likely explanation for the large swings in the data in the two previous years.

Recycling is now at the highest level reported over the last four years across the region suggesting that an increased focus on recycling programs is having a positive impact, not just in increasing recycling but also in slowing the growth of waste to landfill.

Many Councils such as Mid-Western, Orange, Blayney and Bathurst have had kerbside recycling programs in place for a number of years. In more recent years, Dubbo City and Narromine Shire Councils have joined this group. The majority of Councils provide recycling collection points in smaller villages and localities to encourage recycling, however the viability of offering such services is greatly affected by volumes of material and distance from major centres.

A breakdown of the type of materials recycled in 2011–12 is provided in Figure 24. This shows a large proportion of the material recycled is paper and cardboard. The large 'other' category for Dubbo LGA relates to construction and demolition waste which is crushed and re-used.

Indicator – E-Waste diverted from landfill

In 2011–12, E-waste was collected separately in eleven LGAs across the region, which is two more than reported last year. As shown in the summary table (Table 11), the amount

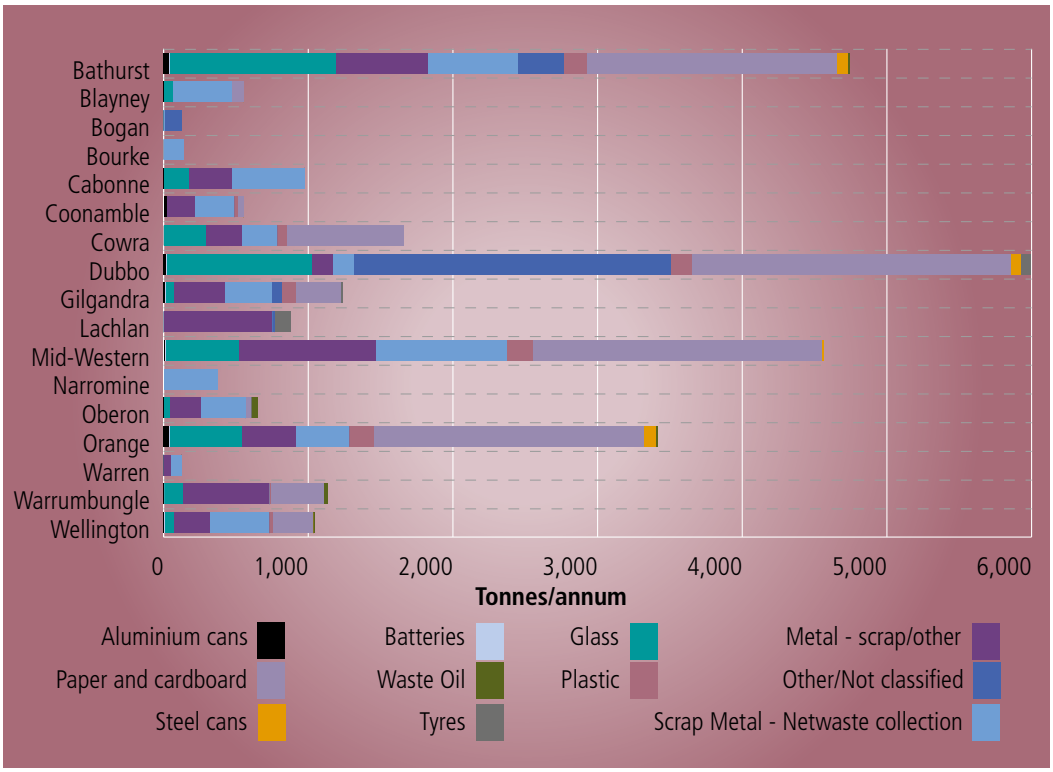


Figure 24: Type of materials recycled 2011–12

of E-waste collected also increased for the five Councils who reported this data in each of the last four years. The improving trend in this indicator demonstrates an increased participation in E-waste collection programmes by Councils and local residents.

A number of regional waste management programs are also implemented across the region through NetWaste, such as the e-waste recycling program, to improve collection and recycling of electronic waste such as computers. Eleven of the Councils reporting through the Regional SoE offered a collection service to their communities, with Bathurst Regional Council now offering an ongoing service to residents for the full range of e-waste material such as televisions, DVDs, power tools etc. Annual collection campaigns will continue to be held throughout the region.

While there have been no large new landfills built over the reporting year, many Councils are improving the technologies at the local landfill to minimise the impacts of those sites. For example, methane gas collection has been implemented at bigger landfills servicing the larger cities within the reporting area such as Bathurst. Smaller Councils who do not have the population base to support high cost technology are also making changes, such as establishing Recovery Shops. Bourke and Gilgandra are two examples of where this has occurred, with these facilities providing an opportunity for people to drop-off items that they may no longer want, but are still in working order and be available for other people to purchase. It is a great way to reuse items and reduce the amount of waste going to landfill.

RIGHT Gross pollutant trap, Dubbo LGA

NetWaste has regional and sub-regional waste management plans which work towards provision of services across several Councils to ensure continuity and access to resources in more remote areas. Further details of these plans are found at the NetWaste website, www.netwaste.org.au.

Hazardous Chemicals

Indicator- Number of farm chemical drums collected through DrumMuster collections

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 catchment.

As shown in the summary table (Table 11), the number of drums collected through the DrumMuster program rose significantly for the second successive year, bringing it to the highest level reported in the last four years.

Large increases were reported in the Coonamble, Gilgandra, Lachlan and Narromine LGAs, whilst the only significant decline was in Warren. These increases probably reflect improved cropping conditions across the region, leading to higher on-farm chemical use.

The large variability in seasonal conditions over the last four years is likely to be masking any longer-term trends, such as changes in agricultural practices, which could lead to lower chemical use over the long-run.

Hazardous Waste Collection

Indicator – Household Hazardous Wastes collected

During the 2011–12 year, NetWaste collected 13,886 kg of Household Hazardous Wastes (HHW) across 11 of the 17 LGAs within the reporting region.

There was a strong improvement in this indicator in comparison to 2010–11 with a sizeable increase in waste collected in 10 of the 11 LGAs. Only Dubbo reported a small decline, but they still had the largest collection in the region.

NetWaste and participating Councils have been working towards viable options for collecting and handling household hazardous waste items as there are currently limited alternative services available.

There are waste facilities where gas cylinders, fluorescent light globes and tubes, smoke detectors and household batteries can be dropped off at NetWaste facilities in major centres of 14 of the participating LGAs.

CASE STUDY: NetWaste Mobile Glass Crusher

In 2011, NetWaste and five member Councils in partnership with the Australian Food & Grocery Council (AFGC) were successful in securing a grant from the Australian Packaging Covenant (APC) to purchase a Mobile Glass Crusher (MGC) to increase recovery of glass beverage containers in the NetWaste region. It is the first time NetWaste has explored the option of shared infrastructure between the Councils and also the use of a mobile plant, reducing the need to transport material out of the region to realise its potential value.

Between the participating Councils - Cabonne, Cowra, Mid-Western, Oberon and Wellington - an estimated 1,000 tonnes of glass will be processed annually, with the crushed product to be used in civil applications such as for road base, in footpaths etc. Currently, Cowra and MidWestern Councils operate local Material Recovery Facilities (MRF) where kerbside and domestic recyclables are separated for market, with the 3 remaining Councils having limited existing recycling opportunities (with the exception of Cabonne who are looking to increase recovery from their landfill sites).

The MGC is the first of its kind in NSW and offers a great opportunity for regional areas to improve diversion of material from landfill and use the product in local applications, which also becomes a replacement product for virgin sand material. The machine is maintained by Wellington Council where it is based between uses, and was launched in February 2012.

The group is currently working to ensure the crushed glass sample meets the necessary requirements of the Environment Protection Authority, with preliminary sampling indicating a good quality product suitable for the intended uses.

Glass being tipped into the crusher, output from the glass crusher

Towards Sustainability

Sustainability is a relatively new, yet extremely important, emerging issue that is particularly relevant to local Councils in the face of climate change. In the best definition for local Councils, sustainability can be seen as meeting the needs of the present without compromising the ability of future generations to meet their needs. It is essential that it operates across the three spheres of the community; environmental, social and economic, and combine with governance, in a quadruple bottom line approach. Environmental sustainability can be defined as conserving natural resources so that the ecological processes upon which we depend are maintained both now and in the future. This Regional SoE report provides a platform for measuring sustainability initiatives across the region, while also providing a snapshot of current and future trends.

Climate change and greenhouse gas emissions will play a significant role in the future. Councils are faced with growing community concern and awareness of this issue. Also there is concern about increasing energy costs. Legislation and market forces are predicted to be drivers of change, as Councils are affected by the National Greenhouse and Energy Reporting System (NGERS) and the recently introduced Clean Energy Future Package which includes a price on carbon.

Local authorities, who play a key role in 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.

Key sustainability issues for all Councils include;

- Adapting to, and mitigating the effects of, climate change
- Sustainable waste and resource management

Table 12: Summary Table of Indicator Trends - Sustainability

Issue	Indicator	2008–09	2009–10	2010–11	2011–12	Trend
Sustainable agriculture	Number of certified organic producers	42	23	52	*	↑
	Sustainable farming initiatives undertaken with CMA funding (ha)	85704.5	7,996	29,717	30,360	↓
Climate Change Mitigation	Number of Council controlled facilities consuming electricity	961	973	989	996	↓
	Annual electricity consumption for Council controlled facilities (MWh)	51,674	55,173	52,638	51,061	↑
	No. of Council controlled facilities consuming gas	102	105	125	162	↑
	Annual natural gas consumption for Council controlled facilities (Gj)	26,789	24,280	24,263	24,694	↑
	Annual bottled gas consumption for Council controlled facilities (L)	*	*	41,645	39,678	↑
	Total fuel consumption (KL)	4,308	4,754	5,480	6,938	↓

** Data not available for these years*

↑ improvement
→ no or little change
↓ worsening trend

Note – the above trends are for data in 2008–09, 2009–10, 2010–11 and 2011–12 from the same sources. The trend is based on comparing the average of the previous years of reporting with 2011–12.They should be read in terms of the limitations for indicators discussed throughout this chapter. Note also that there are some new indicators for 2011–12 for which no comparison can be made with previous years. Refer to the Appendix for a list of Councils

- Sustainable procurement
- Ensuring land use planning and development controls deliver sustainable development locally
- Sustainable energy generation.

Community involvement is also a key component of sustainability. Councils regularly seek the input and involvement of their local communities by formal and informal means. Formal means include Council committees, surveys, responses to development applications and other documents on public exhibition. Informal means are participation rates in education programs and workshops, discussions with Council staff and responses in local media. The CMAs also gain regular community feedback by similar means.

A Sustainable Future

Condition

Sustainable agriculture

According to the NSW Government's Policy for Sustainable Agriculture in NSW, 'agriculture, as with all human activity, must operate within the capacity of available resources to better secure the sector's long-term viability. High quality products meet consumer demands for healthy food and help NSW farmers to compete in the market place'.

To be sustainable, the Policy states agriculture must:

- respond to consumer needs for food and fibre products that are healthy and of high quality
- take full account of the costs of production, including environmental costs, and ensure its pricing reflects these costs
- protect and restore the natural resource base on which agriculture depends
- prevent adverse on-site and off-site impacts on the environment and any other sector of the community
- be flexible in order to accommodate regional differences and changing economic, environmental and social circumstances such as drought or terms of trade
- be financially viable.

Furthermore, according to the Policy, 'agriculture's positive economic and social contribution to the State relies on the establishment and maintenance of agricultural management systems that are economically viable both now and in the future, and take into account the environmental and social impacts of production upon present and future generations. These features of sustainable agriculture should be considered as a package, and no single feature should predominate over the others'.

ABOVE Fenced out dam and revegetation underway on an Orange farm.

CASE STUDY: Green-Day at Mid-Western Regional Council

Green Day is an environmental education event launched by Watershed Landcare and run annually. In 2011, 643 primary school students from 17 local schools attended the event to participate in a variety of hands on activities with the theme being "*Habitat in our Trees, Trees in our Habitat*". The theme for 2012 will be "*The year of the Sustainable Farmer*". Mid-Western Regional Council (MWRC) has been involved as both a sponsor and presenter for the last 3 years.

Seventeen small workshops in total were run in 2011 during the event by various groups and organisations in the region including the Central West CMA, Department of Industry and Investment, MWRC, Livestock Health Protection Authority, National Parks and Wildlife Service, Watershed Landcare, Essential Energy, Thiess, Mudgee Compost Services, Department of Fisheries, and Red Hill Environmental Education Centre (EEC). Students were placed in small groups and rotated, attending five workshops throughout the day. There was also one large 'feature' presentation attended by all of the students throughout the day. In 2011 the guest presenter for this main workshop was Dr Deane Hutton who presented '*Going Green with Dr Deane*'.

MWRC ran three workshops at the 2011 event: 'Creating a no-dig vegetable garden', 'Building a roadside environment' (in partnership with Red Hill EEC) and a "Recycling your waste" workshop. Approximately 150 students attended each of the Council run workshops during the event.

For some students this is the only excursion they are able to go on all year. The excursion is fully subsidised so that all children have the opportunity to attend. Through sponsorship, Watershed Landcare subsidises the travel, and Thiess have supplied a sausage sizzle lunch for the students each year.

In addition to the actual 'Green Day' event a competition is held which is judged at the event. In 2011 the winners won a virtual excursion to the Great Barrier Reef and the runners up won a worm farm. There is also an online questionnaire answered after the event. The winner of the questionnaire won an excursion to Wilpinjong mine.

Learning about the importance of roadside habitats

Indicator – Number of certified organic producers

Organic farming can be more sustainable than traditional agriculture and thus provide an indicator of the move towards sustainable agriculture in the region. As shown in the summary table (Table 12) there has been a significant increase in the number of certified organic producers in the region with the 2010–11 total of 52 being the highest number yet recorded for this indicator. Improved cropping conditions may have encouraged more producers to either commence of restart organic farming operations. There was no data available for 2011–12.

Indicator – Extent of sustainable farming initiatives undertaken with CMA funding

The Central West CMA reports that as a result of its incentive funding, sustainable farming initiatives have been undertaken across 30,360 hectares of the region in 2011–12, comprising 2,064 ha of water ponding, 21,928 ha of sustainable grazing and 6,368 ha of other soil health initiatives. This is a small increase from the 29,717 hectares reported in 2010–11, although it is still a substantially lower level of activity than the annual rate of 85,705 hectares reported in the 2005-09 period. This is due to the reduced amount of funding available to CMAs.

The Lachlan CMA is working with major industry groups including dryland graziers, farmers and silviculture, irrigation industries such as farming, grazing, dairying and horticulture, to coordinate and accelerate the adoption and implementation of sustainable land management practices. There are currently partnerships with Grain and Graze, Central West Farming Systems, and Central West Conservation Farming Association. These groups collaborate with organisations such as the Grains Research and Development Corporation (GRDC) and Meat and Livestock Australia (MLA).

The Western CMA currently has a sustainable agriculture management target of 50% of landholders practising sustainable agriculture management by 2016 and has released a series of fact sheets about sustainable farming.

Threat

Greenhouse Gas Emissions

Indicator – Number of Council controlled facilities using electricity

Indicator – Annual electricity consumption for Council controlled facilities

The region is a large producer of black coal and there is a heavy reliance on coal for electricity which is one of the highest sources of greenhouse gases. Councils can limit their impact by reducing their electricity consumption. This is a priority area for most Councils.

As shown in the summary table (Table 12), the amount of electricity consumed by the seven Councils that reported in each of the last four years, decreased from 2010–11 to 2011–12, accompanied by a small increase in the number of Council owned facilities using electricity. Electricity consumption for these Councils has now decreased by 1.2% compared to 2008–09 and so is reported as an improving trend. Another encouraging sign is that electricity consumption increased for only three of the ten Councils reporting this year.

A comparison of the electricity used by each Council in their facilities over the past five years is provided in Figure 25.

Indicator – Annual bottled gas consumption for Council controlled facilities

This was a new indicator in the 2010–11 report. Six Councils reported using a total of 39,678 litres of bottled gas which is a 4.7% reduction on last year's consumption.

Indicator – Number of Council controlled facilities consuming natural gas

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.

As shown in the summary table (Table 12), there was a 30% increase in the number of Council facilities in the region using gas in 2011–12 for the eleven Councils reporting this data over the last four years.

This follows on from a 20% increase last year. This is shown as an improving trend because 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.

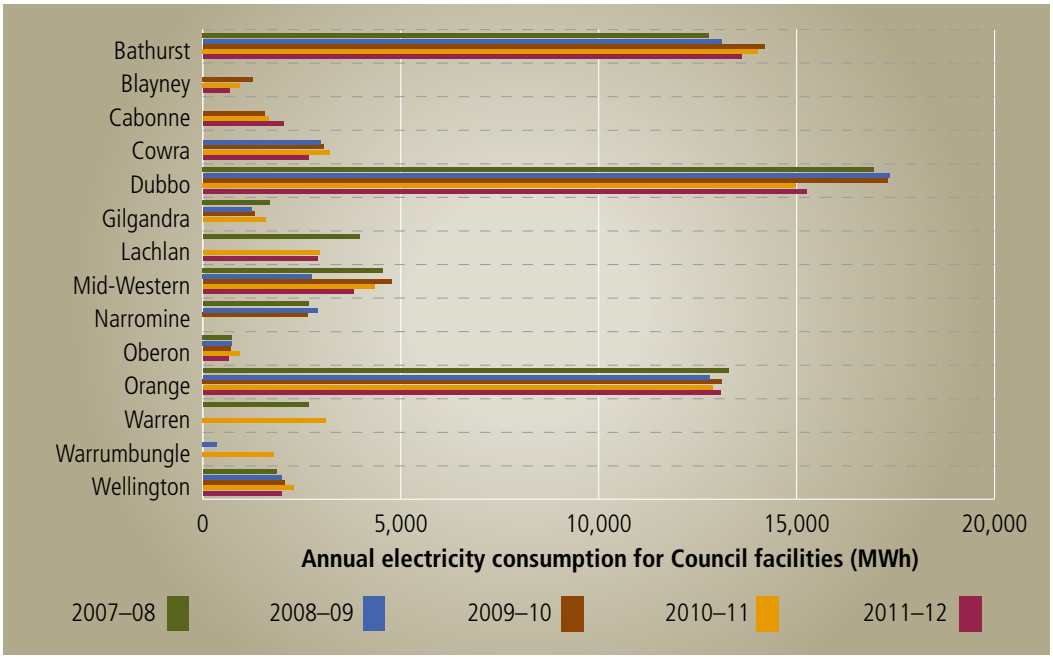


Figure 25: Annual electricity consumption for Council facilities

CASE STUDY: Inspiring and Integrating Change (Bathurst, Orange and Dubbo)

Of the various issues that affect the Central West of NSW, biodiversity decline, water resource availability and energy use are of greatest concern. Bathurst Regional Council, Orange City Council and Dubbo City Council are jointly implementing *Inspiring and Integrating Change (I&IC),* a sustainability project funded by the NSW Environmental Trust, that has a strong focus on community engagement and capacity building for long-term outcomes.

I&IC developed four innovative projects supported by a significant community engagement and Council cultural change program, thereby recognising the need to move beyond simply raising awareness. Central is the establishment of a comprehensive Greenhouse Gas (GHG) Inventory and the carbon accounting (measurement) of project progress. In addition, the Alliance councils have developed an on-ground project focused on one of the priority management areas outlined in the Bathurst, Orange and Dubbo Environmental Sustainability Action Plan (ESAP). The I&IC project's broad objectives are:

Inspire an understanding of and commitment to sustainability through innovative on-ground works and community engagement;

Institute cultural shift across the councils and enhance sustainability within planning, budgeting and activities;

Engage in inclusive community collaboration and build long-term community capacity;

Develop adaptable management packages and mentor other Alliance members and smaller councils in the region to develop projects that exemplify best practice.

Whilst the number of facilities consuming gas increased sharply, the actual consumption of gas by Council controlled facilities only increased by 1.8%. It should be noted that almost all of the new facilities using gas were in the Blayney LGA.

Indicator – Total fuel consumption

As with electricity and gas consumption, fuel use is a significant source of greenhouse gas emissions from Councils. As shown in the summary table (Table 12) there was a significant increase in the amount of fuel consumed by Councils that reported in each of the last four years, with the total consumption rising by almost 27% to 6,938 kilolitres of fuel for the 2011–12 year. This indicator is showing a strongly worsening trend with this year's sharp rise following increases of 10% and 15% in the previous two years.

Councils were asked to provide a breakdown of fuel type used, with the predominant fuel being diesel (82.2%), followed by unleaded petrol at 11.5% and then small amounts of biodiesel (1.7%), E10 petrol (4.3%) and LPG.

Response

There are a broad range of sustainability initiatives across the reporting region. Several of these are outlined in the case studies in this section of the report.

Sustainable agriculture

There are several ways that landholders in the reporting region can make agriculture more sustainable. A well-managed perennial pasture has deeper roots and can survive in poorer seasons by utilising soil moisture at greater depth than one based on annual species. Provided adequate ground cover is maintained, the potential for various forms of soil degradation (rising water tables, salinity and soil acidification) are also reduced.

Perennial pastures can also limit nutrient run-off into streams, be more competitive against weed invasion, increase soil carbon and improve soil structure, pasture composition and fertility. Perennial pastures have the potential to sustainably support high levels of livestock production, provided they are well managed and well matched to soils, aspect, topography, climate and livestock enterprise (Central West CMA, 2008c).

OPPOSITE Central West CMA display trailer at Biodiversity Conference in Dubbo 2011 (Photo: L. Hawkes)

Council sustainability plans

Indicator – Council sustainability plans

Indicator – Council sustainability initiatives

Sixteen of the seventeen local Councils reported that they now have sustainability plans in place, which is a big improvement from only eight last year. Seven councils were able to itemise a total of 46 specific Council sustainability initiatives. These are shown in Table 13.

NetWaste together with eight of its Councils from the Central Sub-Region is leading the way in working towards a more sustainable community. In 2011, Blayney, Cabonne, Cowra, Forbes, Lachlan, Parkes, Weddin and Wellington Shire Councils adopted a Regional Environmental Sustainability Action Plan.

Council sustainability initiatives support NSW State Government plans such as the new Home Power Savings Program which offers free help for low income earners to save up to 20% off their energy consumption by receiving a visit from an energy expert, a Power Savings Kit and a personal action plan. Warrumbungle led the way in the region with this initiative, promoting it to communities across the LGA.

Bathurst Regional Council completed its Sustainable Lifestyle House in September 2011. The Sustainable Lifestyle House is an

CASE STUDY: Dubbo City Council's Victoria Park precinct renewable energy program

Following a feasibility study, Dubbo City Council installed a 70kW photovoltaic system on the roof of the Western Plains Cultural Centre, one of the largest in NSW. In addition, energy efficient lighting, insulation and solar panels were installed at the Family Daycare Centre and solar energy is now used to heat the leisure pool at the Dubbo Aquatic and Leisure Centre. Visible signage explaining these initiatives will promote the benefits of renewable energy to the community. This project forms part of the BOD Alliance Inspiring and Integrating Change grant program assisted by the NSW Environmental Trust.

Dubbo Western Plains Cultural Centre solar panels

CASE STUDY: Bathurst Regional Council's urban vegetation link and biodiversity management plan

Bathurst Regional Council engaged in a thorough consultation process guided by a steering group to develop their Biodiversity Management Plan (BMP). Blayney Road Common was identified to contain a Box Gum woodland remnant (classified an Endangered Ecological Community) and work on removing exotic woody weeds and noxious grass species is well underway.

The Council is also working on five Urban Drainage Reserves, planting native species of trees and understorey along the reserves in order to link isolated pockets of native bushland and to assist with reducing sediment run-off and erosion. The community were invited to help with planting days including an Indigenous planting day. Planting days were well attended with a total of 25,000 seedlings planted across the five reserves. This project was funded with the assistance of the NSW Environmental Trust.

Urban drainage plantings Bathurst

Table 13: Examples of Council sustainability initiatives

Local Council	Council sustainability initiatives
Bathurst	Sustainable schools grant program, Enviromentors education program, Clean-up Australia Day, Sustainable Living Expo, Community tree plantings days and working bees, Implementation projects urban waterways management plan, Biodiversity Management Plan, Recycling and waste avoidance programs, Household hazardous collections, Development of Backyards for Wildlife Book, In house sustainability initiatives, eg, double sided printing etc, Development of Rural Living Handbook, Pest Bird Management Plan, Kindy Kits Program, Woodsmoke Reduction Program, Making a Difference Sustainability Newsletter, Nest Box Program, distribution of the Easy Septic Guide.
Cabonne	Waste to Art; Free E-waste collection; Household Haxardous Waste Collection; Inhouse sustainability initiatives such as double sided printing, turing off computers/lights/monitors/printers/servers; Develop Council energy efficiency and sustainability committee; involvement with Centroc & Netwaste sustainability initiatives.
Dubbo	Ongoing implementation of actions under Dubbo ALIVE 2009-2013, implementation of the Bathurst Orange Dubbo Alliance 'Inspiring and Integrating Change' project
Gilgandra	Tree replacement policy
Lachlan	Sustainability committee implemented measures such as default double sided printing on all PCs, composting of all council shredded paper, promoting practices such as turning off computers after hours/sleep mode, reuse of council kitchen waste for chook food etc.
Orange	Stormwater harvesting scheme
Warrumbungle	Promoted Home Power Savings Program to communities across the LGA

educational project that showcases a range of construction techniques, materials, design features, fittings and fixtures which are more sustainable than those found in a standard building. The project aimed to educate both the community and the local building industry, and provide inspiration for members of the community who wish to build or renovate a home.

Construction of the Sustainable Lifestyle House was completed in August 2011. Open days are held monthly with over 600 people visiting in the reporting period.

Climate Change Adaptation/ Mitigation Initiatives

Indicator – Council plan focused on climate change adaptation/mitigation

Indicator – Council projects with climate change adaptation/mitigation objectives

All seventeen Councils reported that they now have a plan that focuses attention on the issues of climate change mitigation and/or adaptation, which is a big improvement from

ABOVE Narromine Streetscape

OPPOSITE Wind farm at Blayney

only eight last year. The Regional Sustainability Action Plan (ReSAP) referred to above, includes strategies for climate change adaptation.

Fifteen Councils reported that they had undertaken works or activities that have positive climate change impacts integrated in the projects objectives or outcomes, although only two Councils (Bathurst and Mid-Western) itemised any specific projects. For example, Bathurst Council has initiated a Revolving Energy Fund which will fund future energy savings projects and one new project was undertaken in the reporting period under this program. Bathurst also reported that a number of energy savings projects have been implemented in the financial year at various Council facilities.

Indicator – Council facilities using GreenPower/renewable energy

The conversion to GreenPower is one way that Councils can reduce greenhouse gas emissions at their facilities. Even allowing for the fact that several Councils were unable to provide the data this year, it is clear that uptake of GreenPower by Councils is very low across the region.

However, some Councils have their own solar systems to harness renewable energy. For example, Dubbo City Council used solar energy systems to contribute to 0.7% of its total electricity requirements. Bathurst Regional Council has 30 kW of solar generation across five of its facilities.

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. It does this by legislating demand for Small-scale Technology Certificates (STCs). STCs are created for these installations according to the amount of electricity they produce or displace.

During 2011–12, 2,129 small generation units (SGUs) were installed across the region through the Small-scale Renewable Energy Scheme. This contributed 4,394 kW of renewable energy.

The majority of the SGUs installed were solar panels and solar water heaters. Dubbo LGA accounted for approximately 30% of the solar water heater installations.

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Appendix – Data contributed by and sourced for Councils

Issue	Sub-Issue	Indicator	Unit of Measure
Land			
Land Degradation	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
		Flood damage	Dollars
	Salinity	Salinity affected land rehabilitated	Location & sq km
	Mining	Number and type of operating mines and quarries, licenced under EPA PO& EO Act	Number
		Area covered by mining and mining exploration projects	Hectares
Air			
Industrial Pollution		Premises reporting to National Pollutant Inventory (NPI)	No. of facilities reporting
		Number of Environment Protection Licences issued	No of licences
Odour		Odour complaints received by Council	Number
		Odour complaints received by EPA	Number
Air Pollution Complaints		Air quality complaints to EPA Pollution Line	Number of complaints
		Air quality complaints to Council	Number of complaints
Regional Air Quality		Air pollution maximum goals for particulate matter exceeded	days
Water			
Declining Water Quantity		Dam levels	Volume %
	Council Water Consumption	Council managed parks, sportsgrounds, public open	Hectares
		Irrigated council managed parks, sportsgrounds, public o	Hectares
		Water used by council for irrigation (including treated and	Megalitres (ML)
	Environmental Flows	River flow (discharge)	ML/day
		Annual volume released to rivers for environmental flows	GL
	Town Water Consumption	Total number of serviced properties	Raw number
		Total number of unserviced properties	Raw number
		Annual metered supply	Megalitres
		Annual consumption (Total from WTP)	Megalitres
		Average annual household use	Kilolitres per household
		Average water usage per connection type	Megalitres per annum

	Bathurst	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo	Gilgandra	Lachlan	Mid-Western	Narromine	Oberon	Orange	Warren	Warrumbungle	Wellington	Central West CMA
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Appendix – Data contributed by and sourced for Councils

Issue	Sub-Issue	Indicator	Unit of Measure
		Water restrictions implemented	Level (1-5)
		Water conservation programs	List of Programs
		Number of residential meters	Number
	Surface & Ground Water Extraction	Number of irrigation licences 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 bore licences from groundwater resources	Kilolitres (kL)
		Volume of groundwater permissible for extraction under licences	Gigalitres (GL)
		Actual volume extracted through groundwater licences	Gigalitres (GL)
		Water sharing plans implemented	Number
Declining Water Quality	Industrial/Agricultural Pollution	% Effluent reuse & location of reuse	%
		Load Based Licensing fees	Total paid in fees
		Exceedances of license discharge consent recorded	Raw number
		No. of trade waste approvals	Total in place
		Total volume of trade waste discharged to sewer	ML
		Erosion & Sediment Control complaints received by Council	Number
		Trade waste licences in force currently	Number
		Load Based Licencing volume	Total kg of pollutants
	Stormwater Pollution	Number of gross pollutant traps installed	Total number of GPTs currently
		Amount of litter collected in GPTs	Tonnes
		Total catchment area of GPTs	Hectares
		Erosion & sediment control policy implemented?	Yes/No
		Water pollution complaints	Number and type
	Town Water Quality	Drinking water guidelines not met	Number of instances
		Drinking water complaints	Number & Type
	Surface & Ground Water Quality	Total Nitrogen	% samples exceeding ANZECC
		Total Phosphorus	% samples exceeding ANZECC
		E.coli	% samples exceeding ANZECC
		Average salinity levels in selected streams	EC
	Waste water treatment	Septic tanks in LGA	Number
		Septic related complaints	Number
		Proportion of annual failed wastewater treatment plant inspections	%

	Bathurst	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo	Gilgandra	Lachlan	Mid-Western	Narromine	Oberon	Orange	Warren	Warrumbingle	Wellington	Central West CMA
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Appendix – Data contributed by and sourced for Councils

Issue	Sub-Issue	Indicator	Unit of Measure
Biodiversity			
Invasive Species		Invasive species (listed noxious or WONS) under active management	Number of species
		Number of declared noxious weeds	Number of species
Threatened species	Threatened Species	Locally significant species and ecological communities	List
		State Threatened species listed in LGA	Number & list of species
		Threatened species actions implemented (e.g. PAS, recovery plans)	Number
		Fish restocking activities: native species	Number
		Fish restocking activities: non-native species	Number
		Carp Musters	Number of fish caught
Key threatening processes	Fire Regimes	No. of uncontrolled fire incidents	Number & area
		Hazard reduction burns	Number & area
Habitat Loss		Vegetation protected and rehabilitated through CMA incentive funding	Hectares
		Council Reserves - total area	Hectares
		Council Reserves - bushland/remnant vegetation	Hectares
		Addition to National Park estate	Hectares
		Area of State Forest in LGA	Hectares
		Habitat areas revegetated	Hectares
		Environmental volunteers working on public open space	Person Hours
		Voluntary Conservation Agreements, Property Vegetation Plans & biobanking	Number
		Extent (area) of native vegetation	Hectares
		Area protected in conservation reserves & under voluntary conservation agreements	Hectares
		Project agreements with landholders	Number
		Extent of Crown Reserves in LGA	Hectares
		Extent of Travelling Stock Reserves in LGA	Hectares
		Area Protected in Wildlife Refuges	Hectares
	Land Clearing	Clearing complaints	Number
	Riparian	Riparian vegetation recovery actions	Number
		Riparian vegetation recovery area	Hectares
	Roadside	Roadside vegetation management plan	Yes/No

	Bathurst	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo	Gilgandra	Lachlan	Mid-Western	Narromine	Oberon	Orange	Warren	Warrumbingle	Wellington	Central West CMA
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Appendix – Data contributed by and sourced for Councils

Issue	Sub-Issue	Indicator	Unit of Measure
Human Settlement			
Indigenous Heritage	Identification	Number of Aboriginal sites on AHIMS register	Number & Type
		Do you have a current licence to access AHIMS register within your Council?	Yes/No
	Construction & Development	Inclusion in DCPs & rural strategies	Yes/No
		Extent of liaison with indigenous communities	Rank (0 = none, 3 = High)
		Development on listed aboriginal sites	Number approvals
	Maintenance	Management plan/ strategy in place	Yes/No
		Management actions/ responses	Number
Non-Indigenous Heritage	Identification	National Heritage Items	Number and type
		NSW Heritage Inventory items	Number and type
		National Trust listed items	Number and type
		Locally listed heritage items	Number and type
	Management	Actions to protect non-aboriginal heritage (including management plans)	Number
		Heritage buildings on statutory heritage lists renovated/improved in past year	Number
	Construction & Development	Heritage buildings on statutory heritage lists demolished/degraded in past year	Number
Noise Pollution	Urban noise	Noise complaints received by Council	Type & Number
	Industrial Noise	Noise complaints received by Council	Number
		Noise complaints received by EPA	Number
Population & Settlement Patterns	Ageing Populations	Median age	Years
Urban/Industrial Expansion		Number of development consents and building approvals	Number
		Landuse conflict complaints	Number
		New road construction	km
		Road upgrades	km
Waste			
Waste Generation & Disposal		Total waste entombed at primary landfill	Tonnes/annum
		Total waste entombed at other landfills (exc recyclables)	Tonnes/annum
		Average total waste generated per person	Tonnes pa (Compare to national
		Average cost of waste service per residential household	$ per household
		Emissions from landfill	kt CO_2e
	Hazardous/Liquid Waste	Drummuster collections	Number of drums
		Household Hazardous Wastes collected	kg

	Bathurst	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo	Gilgandra	Lachlan	Mid-Western	Narromine	Oberon	Orange	Warren	Warrumbingle	Wellington	Central West CMA
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Issue	Sub-Issue	Indicator	Unit of Measure
Waste Pollution	Littering & Illegal Dumping	Annual amount of litter collected by streetsweeper	Tonnes
		Illegal waste disposal complaints to Council	Number & tonnes
		Clean Up Australia sites	No. of sites registered in LGA
	Reduce	Office paper used by Council	No. of reams ordered per annum
		Garden organics collected (diverted from landfill)	Tonnes
		E-Waste diverted from landfill	Tonnes
	Recycle	Amount of material recycled	Tonnes
		Volume of material recycled per person	kg / person
Toward Sustainability			
Climate Change	Adaptation to future impact of climate change	Council adaptation initiatives	Yes/No
	Mitigation of climate change	Council plan focused on Climate Change mitigation?	Yes/No
		Council projects with Climate Change adaptation/mitigation objectives?	Yes/No
		Council mitigation initiatives	List
		Number of Council controlled facilities consuming electricity	Number
		Annual electricity consumption for Council controlled facilities	MWh
		Council facilities consuming Greenpower (relate to State Govt goal of Greenpower uptake)	%
		No. of Council controlled facilities consuming gas	Number
		Annual natural gas consumption for Council controlled facilities	Gigajoules
		Total fuel consumption	Total Kilolitres per annum
		Annual bottled gas consumption for Council controlled facilities	Litres
Sustainable Practices	Sustainable agriculture	Sustainable farming initiatives undertaken with CMA funding	Hectares
		Certified organic producers	Number
	Council & community sustainability	Council sustainability initiatives	List
		Council sustainability plan?	Yes/No
		Small scale renewable energy uptake	kW installed by LGA

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

● *Data contributed in 2011–12 but not compared in summary tables*

	Bathurst	Blayney	Bogan	Bourke	Cabonne	Coonamble	Cowra	Dubbo	Gilgandra	Lachlan	Mid-Western	Narromine	Oberon	Orange	Warren	Warrumbingle	Wellington	Central West CMA
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