



**MURRAY REGION COUNCILS**

**STATE OF THE  
ENVIRONMENT**

**2<sup>nd</sup> SUPPLEMENTARY REPORT  
2005/06**

Prepared for Murray Region Organisation of Councils (MROC) by:

**Habitat Planning**

ALBURY-WODONGA

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## ACRONYMS & ABBREVIATIONS

Bal	Balranald LGA
Ber	Berrigan LGA
Con	Conargo LGA
Cor	Corowa LGA
CMCC	Central Murray County Council
Cul	former Culcairn LGA
GH	Greater Hume LGA
DEC	Department of Environment & Conservation
Den	Deniliquin LGA
EPBC Act	Commonwealth Environment Protection & Biodiversity Conservation Act 1999
ERP	Estimated Resident Population
Hol	former Holbrook LGA
Hum	former Hume LGA
Jer	Jerilderie LGA
LEP	Local Environmental Plan
LGA	Local Government Area
MROC	Murray Region Organisation of Councils
Mur	Murray LGA
NSW	New South Wales
RLPB	Rural Lands Protection Board
SLA	Statistical Local Area
SoE	State of the Environment
TSC Act	NSW Threatened Species Conservation Act 1995
Wak	Wakool LGA
Wen	Wentworth LGA

## TERMS

“the principal report”	the MROC State of the Environment Report 2003/04
“the supplementary report”	the second supplementary SoE report 2005/06
“the area” or “region”	the area addressed by the SoE Report

## KEY REFERENCES

- NSW Department of Local Government (1999) – *Environmental Guidelines: State of the Environment Reporting by Local Government Promoting Ecologically Sustainable Development*

## 1. INTRODUCTION

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This is a Supplementary Report to the principal State of the Environment (SoE) Report prepared for Murray Region Organisation of Councils (MROC). It is the second Supplementary Report to be prepared following the preparation of the 2003/04 principal report in December 2004.

A State of the Environment (SoE) report represents a review and record of the status of the 'environment' over a particular area. More specifically, and within the context of the New South Wales *Local Government Act 1993*, a SoE report provides a summary of the attributes of the environment within which local government functions and the impacts of activities on that environment.

Each Council must prepare a principal SoE report at the end of the year in which a new Council is elected. This report must be comprehensive and address the eight environmental sectors of land, air, water, biodiversity, waste, noise, Aboriginal heritage and non-Aboriginal heritage. For the purposes of the principal SoE report for MROC the environmental sectors of waste, noise, Aboriginal heritage and non-Aboriginal heritage have been collapsed under one heading of 'human settlement' largely due to the lack of data available in each of these categories. Consequently the SoE report addresses five categories and not eight.

Supplementary SoE reports are required to be submitted within five months of each subsequent year (i.e. by November 30<sup>th</sup>) leading to the next local government election. The purpose of supplementary reports is to identify any new environmental impacts since the last principal SoE report and update any trends in environmental indicators that are important to each environmental sector.

Although each Council in NSW is required to prepare and lodge a SoE report, reporting at the regional level is encouraged by the Department of Local Government. Ten councils within the Murray Region of NSW have opted for the regional approach to SoE reporting under the umbrella of its peak body the Murray Region Organisation of Councils (MROC)<sup>1</sup>. The Councils involved in the SoE report are Balranald, Berrigan, Conargo, Corowa, Deniliquin, Greater Hume, Jerilderie, Murray, Wakool and Wentworth.

There are some limitations to the data and information presented in the second supplementary report that need to be acknowledged, including:

- The amalgamation and realignment of boundaries in 2004 involving the LGA's of Albury, Corowa, Hume, Culcairn, Holbrook and Tumbarumba has complicated data gathering as some of it is based on now redundant LGA boundaries. Where data and information is only available for the area of the former LGA's and consolidation is not possible, it is presented as such.
- For the sake of convenience, some data sets referring to the Greater Hume LGA are represented by the amalgamation of former Hume, Culcairn and Holbrook LGA's. This ignores the fact that parts of the former Hume Shire were acquired by the Albury and Corowa LGA's and a small part of the Holbrook LGA by the

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<sup>1</sup> Wentworth is not a member of MROC. Albury and Hay LGA's are also members of MROC but are not participating in this SoE Report.

Tumbarumba Shire. With the passing of time it is expected more data sets will reflect the new LGA boundaries.

- Despite an exhaustive search of databases and information sources across government, non-government and community organisations, there remains a lack of both qualitative and quantitative environmental data for non-metropolitan inland areas of NSW. Data for the purposes of identifying trends (time series) can also be difficult to source.
- A lot of data takes time to be made publicly available and as such even information released during 2005/06 can already be up to three years old. Consequently some of the updates provided in this 2<sup>nd</sup> Supplementary Report are not for the 2005/06 reporting period.
- Although Councils are provided with the same template for the purposes of collecting local data, there are gaps and inconsistencies in the way the data is presented in this report as Councils unintentionally respond in different ways.

## 2. THE MURRAY REGION

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The area addressed in this supplementary report includes most of the member LGA's of Murray Region Organisation of Councils (MROC), namely:

- Balranald
- Berrigan
- Conargo
- Corowa
- Deniliquin
- Greater Hume
- Jerilderie
- Murray
- Wakool
- Wentworth

The area extends along much of the state boundary between NSW and Victoria, being the Murray River from Albury to Wentworth (see Figure 1) and represents a 'strip' along the northern side of the river varying in width between 50 and 150km. The area covers approximately 80,000 square kilometres and contains approximately 60,000 people.

Population density is greater in the east as is the frequency of urban settlements with the largest township in Deniliquin, which is central to the area.

The area is largely rural in character and features a range of both dryland and irrigated agricultural activities including cereal and oil crops, sheep and cattle, viticulture, horticulture and rice growing.

**Figure 1: Local Government Areas included in the SoE report**



Source: NSW Department of Local Government

Rainfall increases from west to east and varies between 300mm and 700mm per annum across the area. Although there is little difference in the temperature profiles between LGA's, Greater Hume would have more than twice the average annual rainfall of Wentworth.

Likewise population density generally increases from west to east across the region. With Corowa picking up the township of Howlong at the expense of Greater Hume in the 2003 LGA boundary adjustments, this municipality is now the largest in the region in terms of population. Only Corowa and Greater Hume have populations in excess of 10,000 in the Murray region.

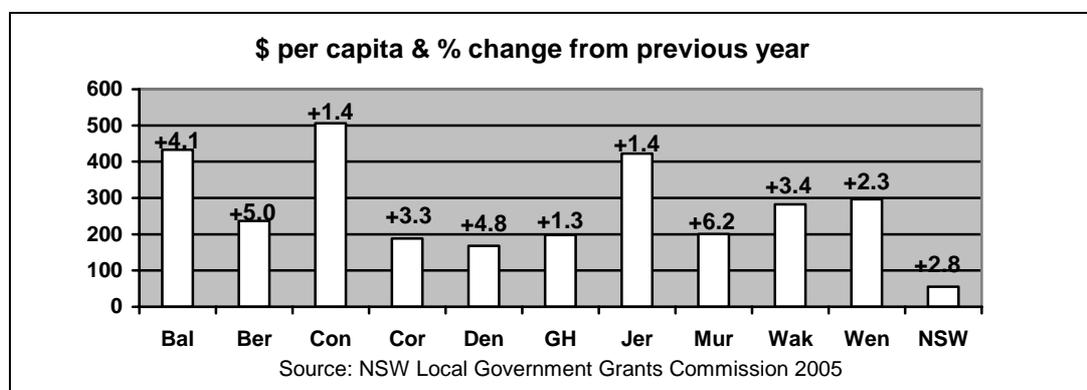
Information was presented in the principal SoE Report relating to the resources available to local government in 2002/03 and the proportion allocated to environment protection and natural resource management. The ABS has not updated this information and subsequently the issue is not addressed in the supplementary report.

However Figure 2 below does show the General Purpose Grants to local government expressed on a per capita basis for 2005/06. These figures reveal the following trends for Councils participating in this SoE report:

- Generally the lower the population density of an LGA the higher the per capita figure. Conargo is the highest at \$506.03 and Deniliquin the lowest at \$168.45. All Councils are well above the State average (\$55.63) for grants on a per capita basis.

- Wentworth received the largest grant in 2005/06 with \$2.1 million and Jerilderie the lowest with \$0.8 million.
- All Councils received a larger grant in 2005/06 than they did in 2004/05.

Figure 2: General Purpose Grants 2005/06



### 3. NEW ENVIRONMENTAL IMPACTS

Council's have advised of the following new environmental impacts affecting their LGA in 2005/06.

Balranald – action taken to remove one heritage listing as the building no longer exists.

Berrigan – new bridge over the Murray River Cobram/Barooga crossing. During this period Berrigan Council in conjunction with NECO gave away 399 packs containing 6 energy efficient light globes and 350 AAA rated shower head.

Deniliquin – In April 2006 Deniliquin Council in conjunction with NECO gave away 500 packs containing 6 energy efficient light globes and 1 AAA rated shower head. In June 2005 Council approved a bio-diesel plant that will eventually produce 120 tonnes of bio-diesel.

Greater Hume – Modification of two cattle feedlots in Culcairn and Henty to expand and improve facilities respectively.

Murray – Moira Station, 80,000 head cattle feedlot as well as the creation of two new chapters for the DCP, Managing Public Lands and Control of River Structures.

In addition to these trends, any environmental data that was not previously presented in the principal or first supplementary SoE Report has been sourced for the purposes of the second supplementary report. This data and information is detailed in the following section.

### 4. TRENDS IN ENVIRONMENTAL INDICATORS

This section of the report is structured along the same lines as that presented in the principal and first supplementary SoE report in that data and information is presented under one of the five environmental categories being land, atmosphere, water, biodiversity and human settlement.

It is not the purpose of this supplementary report to reiterate data and information on the environment that has already been presented in the principal and first supplementary SoE report. Consequently, where information and/or data presented in the principal and first supplementary SoE report cannot be updated, it has not been included in this supplementary report. Therefore the trends in environmental indicators detailed below are based on either:

- updated information and data provided in the principal and first supplementary SoE report (i.e. information and data that is available on an annual or regular basis); or
- new data and information that was either not available or not obtained for the purposes of the principal or first supplementary SoE report.

## 4.1 LAND

The land supports us and all terrestrial plant and animal life. The importance of the land to society is perhaps most potently expressed by our reliance on the soil as a medium for production of food, fibre and timber.

Soil, biota and water together comprise a dynamic system, changing with what is put into it and what is taken out. The condition of aspects of these three components can often be a good indication of the overall 'health' of the land.

### Soil salinity

Soil salinity is a form of land degradation characterised by increasing concentrations of salt in the soil. It is often first noticed as isolated waterlogged areas, patches of dying trees or other vegetation, crop failure, or changes in the types of plants growing in an area.

The proportion of dryland and irrigation salinity is of interest to SoE reporting because it can indicate a significant decline in the health of the land.

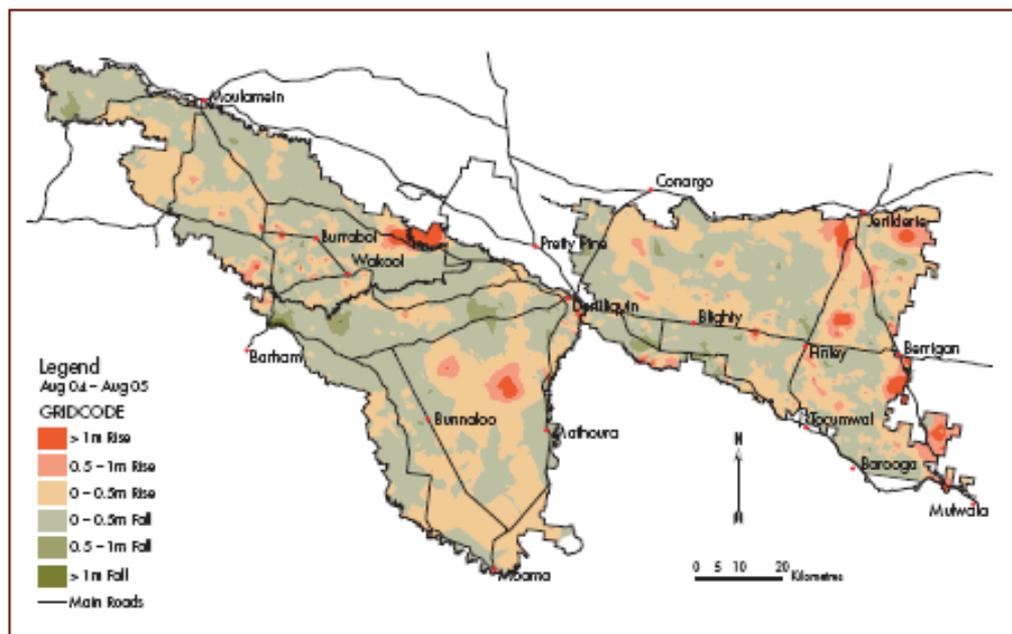
LGA	Land affected by soil salinity during 2005/06	Degree of salinity hazard	Further comment
Balranald	No Land affected.	Low	No salinity measuring sites currently within council boundaries. Council has however signed a Project Service Agreement with Murrumbidgee CMA for urban salinity measurement in Henty township.
Berrigan	Land affected		No new data
Conargo	No land affected		
Corowa	No new data		
Deniliquin	0.2km <sup>2</sup>	Low	No changes or further action from last report.
Greater Hume	Land affected		No new data
Jerilderie	Land affected	No details	
Murray	0	No details	No changes or further action from last report.

LGA	Land affected by soil salinity during 2005/06	Degree of salinity hazard	Further comment
Wakool	Land affected	No details	Salinity measuring sites in the Wakool Shire are managed by Murray Irrigation Ltd.
Wentworth	Land affected	Moderate	The work in MD 113.05 does not report on area of land affected by salinity. Reporting can be made on the proportion of sites that have soil salinity by depth. Data shows that 62% of sites are non-saline or have low salinity for the 0-50 cm depths. 19% of sites are moderately saline. 19% are highly saline. 1% are extremely saline. For the 50-100 cm, there is sharp decline in the proportion of sites having low salinity and a corresponding big increase in sites having moderate and high salinity. Similarly, as depth down the profile increases, the proportion of extremely saline sites also increases. Note the presence of these salinity levels is largely natural. Monitoring will continue.

Information sourced from relevant Councils

Figure 3 shows the change in depth to watertable area between August 2004 and 2005 in the Murray irrigation area. The map shows the greatest change in water table depth continues to occur in an area bounded by Jerilderie, Berrigan and Finley and an area between Bunnaloo and Deniliquin. Unlike these parts, the area to the northeast of Wakool on the Edward River does not feature in the longer term changes to water table depth but is highlighted in the shorter term as shown in Figure 3.

**Figure 3: Change in depth to watertable area (ha) August 2004 to August 2005**



Source: Murray Irrigation Limited Sustainability Report 2005

## Soil erosion

Soil erosion is the physical loss of soil from an area by wind or water. As for other forms of land degradation, there are generally severe impacts on agricultural productivity, road and building infrastructure and water quality. In general, erosion has occurred as a result of clearing of vegetation on susceptible soils and inappropriate land management practices. Erosion is of interest to SoE reporting because it indicates a significant decline in the health of the land.

Balranald, and Wentworth were the only LGAs to record changes to their erosion data during 2005/06. Balranald identified that soil erosion could not be eliminated due to the ongoing drought conditions Wentworth recorded sheet and rill erosion.

It is significant to note that the majority of LGAs within the Murray region actively support their local Landcare Groups.

LGA	Landcare Group	Activity
Balranald	Homebush Landcare Group, Penarie Balranald	Ongoing drought affected many areas.
Berrigan	Boomanoomana Landcare & Drainage Group – East Barooga Fullers Road Landcare – South Finley & North Tocumwal Native Dog Landcare Group – South East Berrigan Berrigan Conservation and Tidy Towns Group	
Conargo	North Conargo Landcare Group	
Corowa	Corowa Landcare Group	-
Deniliquin	Southern Riverina Field Naturalists Tidy Towns Committee	
Greater Hume	Holbrook, Culcairn, West Hume and Upper Murray Landcare groups	
Jerilderie	Jerilderie Landcare Group Jerilderie Tidy Towns	No change since last report
Murray	Green Gully Landcare Moama Landcare	
Wakool	-	
Wentworth	Anabranche Sporting and Landcare Group Inc The Lower Murray Darling Rangeland Conservancy The Rangeland Action Plan Committee is based at Wentworth and they also host the Community Landcare Coordinator for LMD and they host a Rangeland Implementation Officer for the LMD CMA.	

Information sourced from relevant Councils

## Land contamination

Land is contaminated when the level of a hazardous substance is greater than that which would naturally occur at the same site. Hazardous substances potentially pose an immediate or long-term risk to the health of humans or the environment.

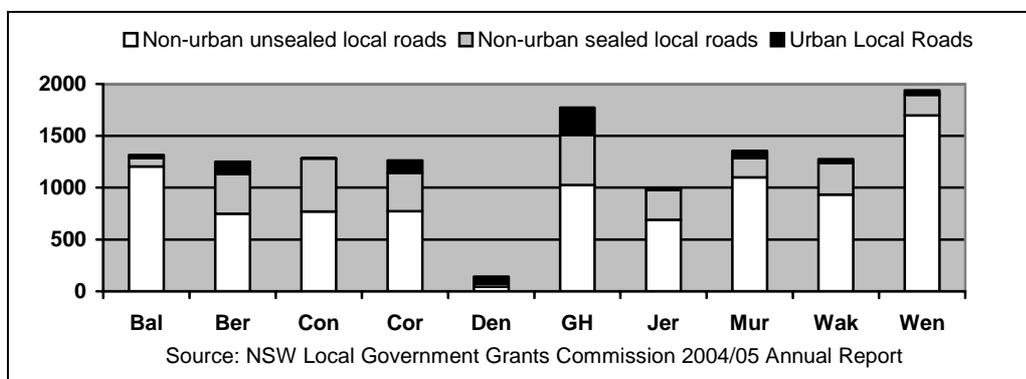
The location and extent of an area contaminated by identified contaminants is of concern to SoE reporting because it is an indicator of the threat by land contamination to soil and aquatic organisms, vertebrates that might be feeding on contaminated organisms, and ultimately on human health.

The 10 LGAs within the study area all reported that no change had been recorded during 2005/06 with regard to land contamination within their jurisdiction.

## Road construction & use

There is approximately 12,500 kilometres of local roads within the LGA's participating in this SoE report. Six percent are classified as urban local roads, 22 percent as non-urban sealed roads and 72 percent as non-urban unsealed roads. The breakdown of these roads for each LGA is shown in Figure 4. Generally the larger the area of an LGA, the greater the length of roads within it. Compared to other LGA's in the region, Deniliquin has a short length of local road because the municipality does not extend far beyond the urban area of the city. Wentworth has the greatest length of unsealed local roads, Conargo has the most rural sealed road and Greater Hume the most urban sealed road. With 10 towns and villages within its boundaries, it is not unexpected that Greater Hume would reflect this statistic.

**Figure 4: Road length 2004/05 - kilometres**



The following table provides data of only those changes that have occurred to Council maintained and managed roads during 2005/06.

LGA	New Roads Created	Ongoing maintenance	Other changes impacting traffic/road use
Balranald	-	-	-
Berrigan	14 New Murray River Bridge Crossing – Cobram/Barooga 4 x new roads at Tocumwal, 3 for rural residential 7 x new roads at Barooga, 2 for rural residential 2 x new roads at Finley	-	Realignment of MR226 to new bridge over Murray River Cobram/Barooga. Construction of new roundabout and main street improvements at Deniliquin Street, Tocumwal.
Conargo	0		
Corowa	1 3km Bull Plain Road 2.1km local sealed urban in Howlong, Corowa and Mulwala	Average of 25km per year reseals	
Deniliquin	1 New road for expansion of cemetery	Ongoing	Upgrade unsealed road to a sealed road, 330 metres
Greater Hume	None		
Jerilderie	0	Scheduled maintenance	Rehabilitation on South Coree Road.
Murray	2 2km of local sealed rural roads 2km of local sealed urban road		Pericoota Road and the Cobb Highway has seen rapidly increasing traffic volumes.
Wakool	3km of local sealed urban road	-	-
Wentworth	0	13km gravel resheet 5 km shoulder widening	

Information sourced from relevant Councils

No updates on traffic counts have been undertaken and/or published by the RTA since those reported on in the principal SoE report.

**Figure 5: Roads Grants 2005/06**

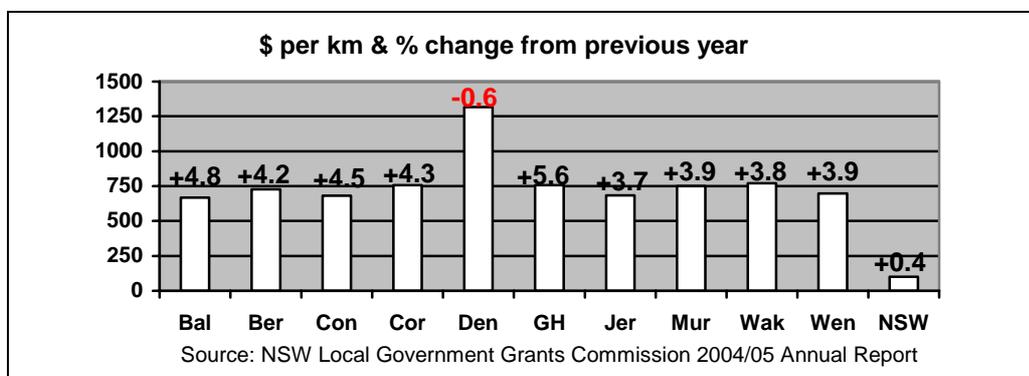


Figure 5 displays the roads grants provided by the state during 2005/06 to the Councils within the region. The grants are expressed on a dollar per road kilometre basis to allow more direct comparison between LGA's. It is interesting to note that the amount per kilometre is very similar for the nine rural based Councils with Deniliquin being the exception because of its predominantly urban characteristics. Only Deniliquin experienced a reduction in roads grants between 2004/05 and 2005/06. Those Councils that received an increase in grants were at a rate well above the overall increase for NSW. Also on a dollar per kilometre basis, the amount of funding is significantly higher than that for the state as a whole.

### **Building, subdivision & major development**

The future quality of communities is dependent upon on the condition and extent of infrastructure systems. To effectively manage public infrastructure assets it is necessary to develop long-term management plans that incorporate the true cost of developing, maintaining and upgrading infrastructure systems, as well as projecting likely future demand and other factors. It also includes planning for risk, to minimise the likelihood of failure. Inadequate planning can present significant problems for future generations.

BASIX (the building sustainability index) as a new planning requirement that applies to the building of new homes, has since been introduced across NSW to improve the energy and water efficiencies in homes. From 1 July 2005 a BASIX certificate is required for a new home, (including new multi unit residential developments) anywhere in NSW. BASIX calls for the reduction in water consumption, a reduction in energy consumption and a pass in the Thermal Comfort section. All new Development Application for new dwellings and unit development within all the councils therefore had to be accompanied by a BASIX certificate, which indicate if the subject dwelling was designed in a manner to reduce the water and energy consumption as is required.

The following table details the number of subdivisions approved by each Council during 2005/06, the number of new lots created by the approved subdivisions and the number of new dwellings approved.

LGA	Subdivisions approved 2005/06	Number of new lots created	New dwellings approved 2005/06
Balranald	12	26	6
Berrigan	34	130	119
Conargo	6	6	5
Corowa	24	56	140
Deniliquin	15	61	35
Greater Hume	39	187	40
Jerilderie	0	0	2
Murray	34	125	82
Wakool	8	10	16
Wentworth	26	60	51

Information sourced from relevant Councils

Greater development activity occurs in townships along the Murray River such as Howlong, Corowa, Mulwala, Barooga, Tocumwal and Moama than further to the north. This growth might also be the result of the increased employment opportunities in

towns across the river in the Victorian towns which in turn stimulate growth in the 'border' towns in NSW. Also greater development activity tends to occur in the eastern part of the region possibly because of the proximity to Albury-Wodonga and shorter distance to Melbourne. Greater Hume Shire Council also recorded two designated development approvals in this period.

### Agriculture

Murray Irrigation has a rice growing policy aimed at reducing accessions to the watertable, increasing water use efficiency and encouraging best management practices. A component of this policy is a soil suitability criterion to select soils that minimise leakage to the watertable from irrigation of the rice crop. Rice cannot be grown on a field unless it has been tested and approved by Murray Irrigation as suitable for rice growing.

Table 1 shows the overall area grown to rice in the Murray irrigation district declined by 21 percent between the 2003/04 and 2004/05 seasons. Whilst this is still significantly higher than the 2002/03 season when the availability of water was severely constrained, it is well below the area that is generally sown when farmers can access their full entitlement such as in 2000/01 and 2001/02. It is likely the area sown to rice will continue to decline as the dry conditions continue across the region.

**Table 1: Area (ha) grown to rice 2000/01 - 2004/05**

Irrigation District	2000/01	2001/02	2002/03	2003/04	2004/05
East Berriquin	25,530	21,407	382.9	6,916	5,834
West Berriquin	8,218	5,869	184.8	2,834	1,787
Denimein	5,578	4,078	119.9	1,462	992
Deniboota	10,471	8,394	483.1	3,344	1,899
Wakool	19,728	15,402	374.3	8,173	7,351
TOTAL	69,525	55,150	1,545	22,729	17,863

Source: Murray Irrigation Sustainability Report 2005

### Public open space

Land in towns is used for residential, commercial and industrial uses as well as urban green space. The amount of land used for each affects the nature and extent of impacts of urbanisation on the environment and the demands for infrastructure such as energy and water supply systems. The way land is used in urban areas also impacts on the quality of life for residents as it affects the amount of privacy, space and noise experienced by the residential population, resulting in a range of effects on human health.

The area of urban green space should be further disaggregated into the area of urban land devoted to native vegetation, parks, gardens, recreation and other open spaces, relative to the total urban area and whether this green space is accessible to the public. This is because urban green space that is not easily accessible for all does not contribute as much to the overall quality of life for an urban population.

No changes to the public open space controlled by the LGA's within the study region were reported for 2005/06.

## 4.2 ATMOSPHERE

The atmosphere is no respecter of human boundaries and any division of it into jurisdictional regions is artificial and unhelpful. The air in the region forms part of the great global movements of air that drive the climate system and re-distribute heat around the planet - in the process moving pollutants too. Clearly areas are subjected to deteriorations in the state of the atmosphere caused by actions elsewhere and this must be borne in mind when reading any material in this theme.

In this theme, we report on the condition of the atmosphere in the region including rainfall and temperature statistics.

Also of importance to human health, although little monitored, is the quality of air inside buildings.

### Pollution complaints

The data available on DEC's website has not been updated since the principal SoE report and consequently there is no data to present in addition to that in the principal SoE report.

The following table provides some data supplied by each LGA from their own complaints records.

LGA	Complaints Register?	Number of Complaints 2004/05	Details/nature of complaint
Balranald	Yes	2	Backyard burning Dead animals
Berrigan	Yes	6	Backyard burning Odour from factory waste water in Barooga Oil & odour in Tocumwal
Conargo	No	0	
Corowa	-	0	Backyard burn.
Deniliquin	No	-	
Greater Hume	Yes	0	
Jerilderie	Yes	0	
Murray	Yes	11	Most pollution complaints were regarding rubbish/litter.
Wakool	Yes	0	Number of odour concerns raised with feedlot at Murray Downs, which were referred to State Government.
Wentworth	Yes	19	4 air 1 chemical 1 noise 3 pesticide 10 water

Information sourced from relevant Councils

## Motor vehicle use

Whilst providing an important means of transport, motor vehicles are a source of air pollution and are therefore relevant to SoE reporting. The table below provides information of the kilometres travelled by Council owned vehicles within each LGA as well as the volume of fuel consumed.

LGA	Kilometres travelled by Council vehicles during 2005/06	Litres of fuel used by Council vehicles during 2005/06
Balranald	500,000	60,000
Berrigan	-	-
Conargo	607,000	385,000
Corowa	-	91,000 ULP 273,000 distillate
Deniliquin	800,000	200,000
Greater Hume	2,700,000	550,000
Jerilderie	-	-
Murray	1,600,000	498,501
Wakool	1,270,000	124,337.27
Wentworth	423,985	111,910

Information sourced from relevant Councils

Figure 6 and Figure 7 present the most recent data available from the RTA in regards to vehicles and drivers. Figure 6 shows the number of licensed drivers in each LGA and reveals that most LGA's experienced a small decline. The significant rise in Corowa and decline in Greater Hume is explained by the recent adjustment to the LGA boundary between the two (as well as Albury). The annexure of the Howlong from Greater Hume to Corowa would explain most of the change. This change now places Corowa in the category of having the most licensed drivers of any LGA included in this SoE. Corowa and Greater Hume aside, Wakool experienced a 7 percent increase in licensed drivers over the previous year (2004).

Figure 6: Licensed drivers 2005

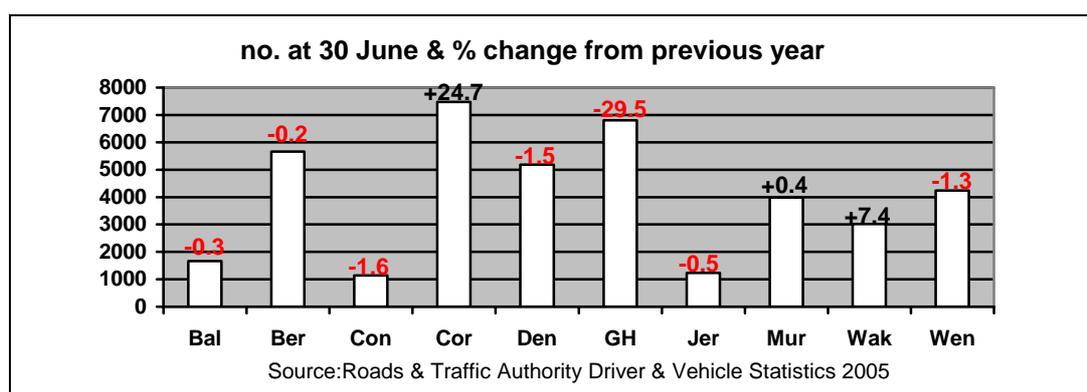
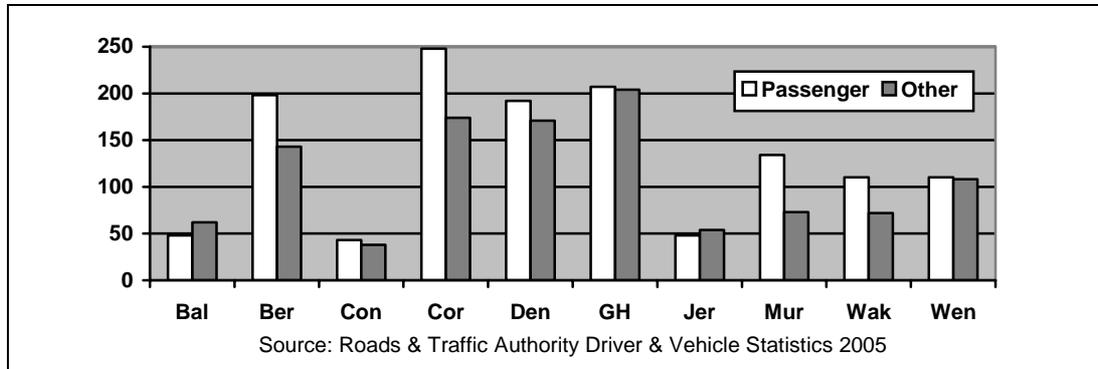


Figure 7 shows the number of new vehicles registered in each LGA in 2005. Corowa had by far the most new passenger vehicle registrations with Greater Hume, Berrigan and Deniliquin all around the 200 mark. Greater Hume experienced the most non-passenger vehicle registrations. Generally, the larger rural and less-populated LGA's

in the region such as Balranald, Conargo, Jerilderie and Wentworth have a higher proportion of non-passenger vehicle registrations.

**Figure 7: New vehicles registered 2005**

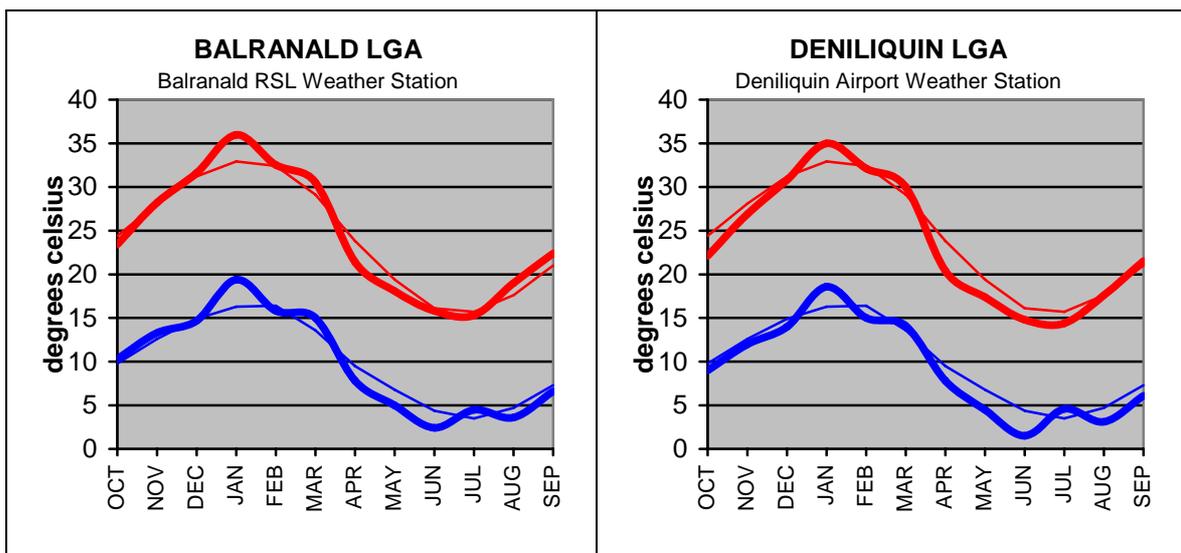


### Temperature

Temperature, along with rainfall, is one of the main factors that influence the nature and species composition of ecosystems, as well as the types of agricultural activities that can be carried out in the region. It is the temperature extremes that are of most interest, as longer-term averages are slow to change in response to climate changes, both natural and human induced such as the enhanced so-called 'Greenhouse' effect. For example, many crops are vulnerable to an unseasonably late frost, or an extremely hot day at specific stages in crop growth.

Temperature also affects human comfort and this is reflected in energy usage, as many dwellings and places of work require some heating in the coldest winter months, and/or cooling in the hottest summer months.

**Figure 8: Mean minimum and maximum monthly temperature - 2005/06 vs historical**



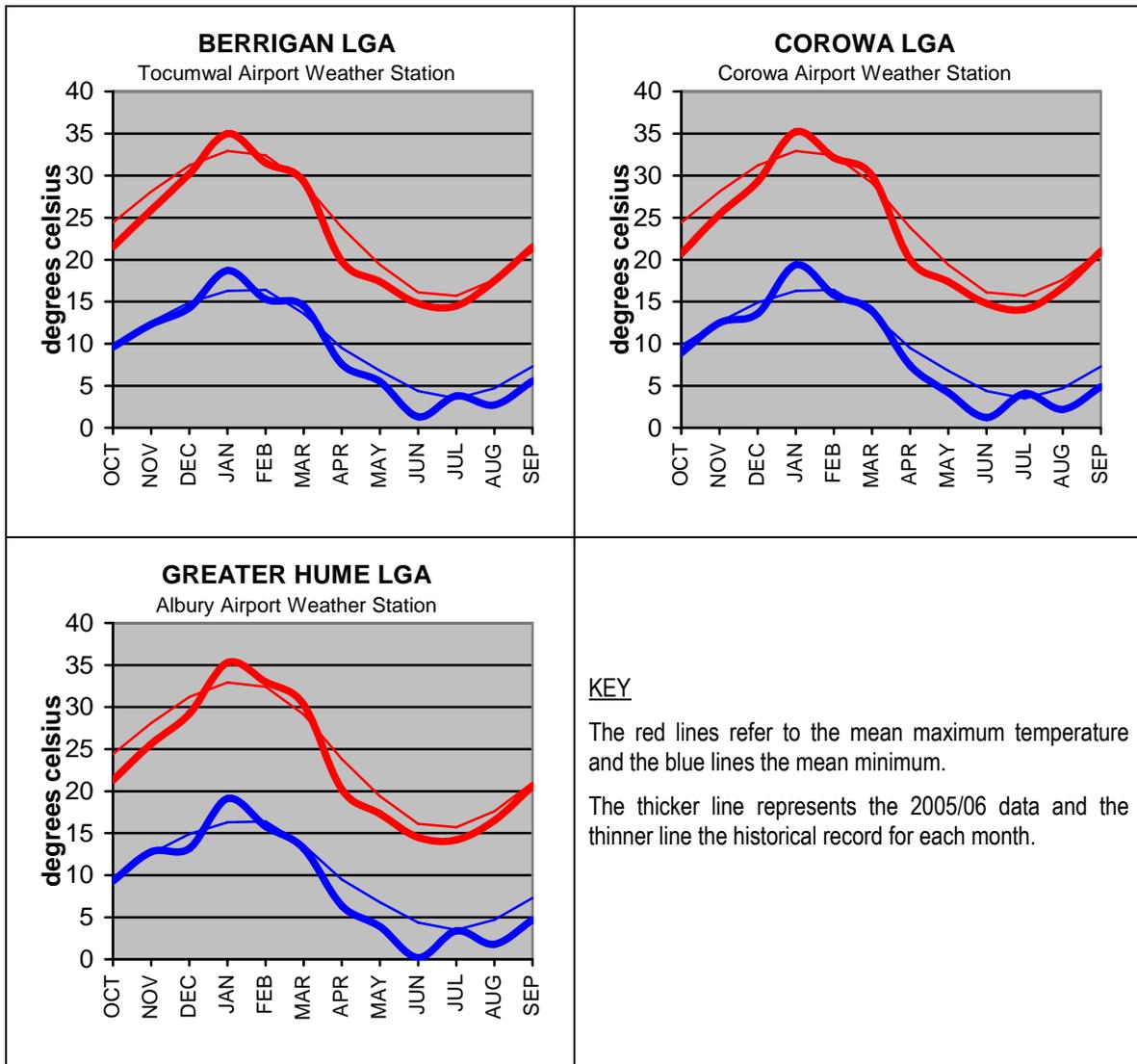


Figure 8 charts the mean minimum and monthly temperatures experienced across the region in 2005/06 compared to the historical average. The charts show that across the region the spring of 2005 was generally cooler than average, the summer hotter than average (significantly hotter in January), and the autumn and winter of 2006 being cooler than average.

## Smoke

The amount of particles in our atmosphere can result in a loss of visibility because of haze, as well as increases in the number of people affected by respiratory problems like asthma and bronchitis. This is the reason for including air borne particles as an indicator in the SoE report.

Within the study area the two primary sources of smoke are, firstly, stubble burning of agricultural paddocks that have generally been sown with cereal crops and secondly, during the winter months where the use of solid fuel heaters contributes to the particulate count. The table below displays the data received from the LGAs

LGA	Number of permits for stubble burning 2005/06 during restricted periods	Number of permits for solid fuel heaters 2005/06
Balranald	0	0
Berrigan	136	3
Conargo	0	0
Corowa	90	3
Deniliquin	-	-
Greater Hume	0	5
Jerilderie	0	Permit not required – exempt development
Murray	0	0
Wakool	0	12
Wentworth	160	2

Information sourced from relevant Councils

### Environment Protection Licences

Environment Protection Licences are issued by the Department of Environment and Conservation (DEC) for scheduled premises. Table 2 lists all licences currently in place across the LGA's included in this SoE report. Compared to the previous year when eight new licences were issued, in 2005/06 there was just two. Both these new licences were for cattle feedlots. Twenty licences were varied during the year and three were transferred to new licensees. No existing licences were surrendered during 2005/06.

There were a number documented cases by DEC of breaches to Environment Protection Licence conditions across the region during the reporting period. The more notable breaches include problems with the Holbrook, Mulwala and Deniliquin Sewerage Treatment Plants, breaches of monitoring requirements at an abattoir in Deniliquin and feedlots at Culcairn and Burraboi, spillage and noise breaches at a concrete batching plant in Moama and illegal dumping at the Moama landfill. Two wineries in the Wentworth LGA were in breach over monitoring and levels of conductivity. Based on the DEC records, the most number of breaches in the region for 2005/06 were recorded at the Ginkgo Mineral Sands Project at Wentworth and related to monitoring requirements.

**Table 2: DEC issued Environment Protection Licences**

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
<b>BALRANALD</b>				
Balranald Gypsum Pty	White Plains Gypsum Ivanhoe Road Balranald	Mining (Other than Coal)	Licence variation approved 15/8/05.	
Balranald Gypsum Pty Ltd	Paxtons Mine Lease Ivanhoe Road Hatfield	Mining (Other than Coal)		
Balranald Gypsum Pty Ltd	Ivanhoe Road Hatfield	Mining (Other than Coal)		
Balranald Shire Council	Balranald Water Treatment Works 36 Court Street Balranald	Misc Licensed Discharge to Waters (any)		
<b>BERRIGAN</b>				
Berrigan Shire Council	Finley Sewage Treatment Plant Dales Road, Finley	Sewage Treatment - small plants		
Collins; David Eric George, D & M Collins	"Claremont", Cruikshanks Road, Berrigan	Pig Production		
Equity Park Enterprises Pty. Ltd	Equity Park Enterprises Pty Ltd, Piney Road, Berrigan	Pig Production	Licence variation approved 14/10/05.	
Kydd, N. J. & I. R. Pty Ltd	Hornemans Road, Finley	Milking Facilities		
McGrath, M.W. & M. L. Pty. Ltd	"Lynton", RMB 1620 Langunyah Road, Tocumwal	Pig Production		
McPherson; Allan S J ASJ McPherson & Co McPherson; Geoffrey ASJ McPherson & Co McPherson; Valda M ASJ McPherson & Co	"Avalon Park" RMB 1630 Langunyah Road Tocumwal	Pig Production	Licence variation approved 20/12/05.	
Mossgiel Nominees Pty Ltd	Ruwolts Road, Mulwala	Milking Facilities		Not all soil monitoring carried out as required (No. of incidents = 1)
Perryman's Knackery Pty Ltd	Perryman's Knackery Mardinora Road Tocumwal	Other Livestock Processing	Licence variation approved 7/7/05.	

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
Ricegrowers' Co-Operative Limited	Rice Marketing Board Finley Storage Facility Rice Mill Road Finley	Other Agricultural Crop Processing (3)		
<b>CONARGO</b>				
Ricegrowers' Co-Operative Limited	Blighty Rice Storage Sheds Riverina Highway Blighty	Other Agricultural Crop Processing (3)		
<b>COROWA</b>				
ADI Limited	ADI Limited Bayly Street Mulwala	Chemical Storage - Other Chemical Storage Explosive or Pyrotechnics Production Hazardous, Industrial or Group A Waste P Other Chemical Processing	Licence variation approved 30/8/05.	
Baird; Heidi J. & Baird; Innes	Hopefield Piggery Hopefield Road Corowa	Pig Production	Licence variation approved 14/8/05.	
Boral Resources (Vic) Pty Limited	Corowa Sand & Gravel Riverina Highway Howlong	Other Land-Based Extraction		
Corowa Shire Council	Mulwala Sewage Treatment Works Bayly Street Mulwala	Sewage Treatment - small plants	Licence variation approved 28/2/06.	BOD - Plant overloaded (No. of incidents = 8) Oil and Grease - Plant overloaded (No. of incidents = 1) Phosphorous - Plant overloaded (No. of incidents = 1) Total Suspended Solids - Plant overloaded (No. of incidents = 6) Volume - Plant overloaded (No. of incidents = 2)
Corowa Shire Council	Mulwala Filtration Plant Gulai Road Mulwala	Misc Licensed Discharge to Waters (any)		Volume \ day (No. of incidents = 12)
Corowa Shire Council	Corowa Sewage Treatment Works 27 Nixon Street Corowa	Sewage Treatment - small plants		
Corowa Shire Council	Corowa Garbage Depot Albury Road Corowa	Environmentally Sensitive or Inappropriate Land filling		
Corowa Shire Council	Corowa Saleyards 449-471 Honour Avenue Corowa	Saleyards		
Greater Murray Area Health Service	Corowa Hospital Guy Street Corowa	Hazardous, Industrial or Group A Waste G		

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
Hanson Construction Materials Pty Ltd	Pioneer Construction Materials Pty Ltd Posiedon Road Corowa	Concrete Batching		
Howlong Sand & Gravel Pty Ltd	Howlong Sand & Gravel "Tarcoola" Albury Road Howlong	Crushing/Grinding/Separating		
Hughes, Adrian Kevin	Lot 2 Almond Lane Corowa	Composting and Related Reprocessing	Licence transfer approved 20/12/05.	
ICM Farm Products Australia Pty Ltd	Kunanadgee Station Spring Drive Corowa	Milking Facilities	Licence transfer approved 10/10/05. Licence variation approved 5/6/06.	
Melban Pty Limited Cool - Off	Melban Pty Ltd Jude Road Howlong	Other Livestock Processing	Licence variation approved 22/7/05.	
Mills; Donald James Rosedale Nominees Pty Ltd Mills; John Rosedale Nominees Pty Ltd	"Kardinia" Balldale Coreen Road Corowa	Pig Production		
Mooroola Pty Ltd	Mooroola Pty Ltd "Wangamong" Oaklands	Pig Production		
Nagle; Rodney David I & R Nagle	I & R Nagle "Wongalea" Berrigan Roadside Corowa	Pig Production		
QAF Feeds Pty Ltd	QAF Feeds Pty Ltd Albury Road Corowa	Other Agricultural Crop Processing (3)	Licence variation approved 9/11/05.	
QAF Meat Industries Pty Ltd	QAF Meat Industries Pty Ltd Redlands Road Corowa	Animal Slaughtering Pig Production		
Ridley Agriproducts Pty Ltd	Ridley Agriproducts Whitehead Street Corowa	Other Agricultural Crop Processing (3)		
<b>DENILIQVIN</b>				
Deniliquin Council	Deniliquin Sewage Treatment System Calimo Street Deniliqui	Sewage Treatment - small plants		The concentration of Suspended Solids at the discharge point 1 exceeded the licence limit of 30 mg/L (No. of incidents = 1).

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
Deniliquin Council	Deniliquin Waste Disposal Depot Hay Road Deniliquin	Solid Waste Land filling		
Deniliquin Council	Deniliquin Saleyards Saleyards Road Deniliquin	Saleyards		
Famicorp Pty Ltd	Famicorp Pty Ltd Abattoir Road Deniliquin	Animal Slaughtering		No water or insufficient water in piezometer on sampling occasions. Therefore insufficient sample for chemical analysis for the entire Reporting Period. This occurred at 5 monitoring points. (No. of incidents = 10).
Four Seas (NSW) Limited	Charlie Carp Fertiliser Lot 2 Saleyards Road Deniliquin	Rendering or Fat Extraction		
Greater Murray Area Health Service	Deniliquin Hospital 40 Charlotte Street Deniliquin	Hazardous, Industrial or Group A Waste G		
Murray Irrigation Limited	Murray Irrigation Area of operations within Shires of Wakool, Windouran, Corowa, Berrigan, Jerilderie, Conargo, Murray & Deniliquin	Irrigated Agriculture		
Ricegrowers' Co-Operative Limited	Deniliquin Rice Mill Sale Yards Road Deniliquin	Other Agricultural Crop Processing (3)		
<b>GREATER HUME</b>				
Albury Galvanizing Pty Ltd	Albury Galvanizing Pty Ltd Lot 9 Davis Drive Jindera	Hazardous, Industrial or Group A Waste G	Licence variation approved 27/4/06.	
Barwondale Feedlot Pty Ltd	Cookardina Road, Henty	Feedlot Production	New licence approved 19/12/05.	
Boral Bricks Pty Ltd	Boral Bricks Pty Ltd Hueske Road Jindera	Ceramics Production Crushing/Grinding/Separating Other Land-Based Extraction		
Boral Resources (Vic) Pty Limited	Weeamera Road Culcairn	Hard-Rock Gravel Quarrying		
A P Delaney & Co Pty Ltd	"Rockwood" Olympic Way Table Top	Crushing/Grinding/Separating Hard-Rock Gravel Quarrying		

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
Greater Hume Shire Council	Comer Street Henty	Sewage Treatment - small plants		
Greater Hume Shire Council	Cemetery Road Culcairn	Sewage Treatment - small plants		
Greater Hume Shire Council	Klemke Avenue Walla Walla	Sewage Treatment - small plants		
Greater Hume Shire Council	Bath Street Holbrook	Sewage Treatment - small plants		Suspended solids readings recorded 32 mg/L and 35 mg/L (No. of incidents = 2).
Hyne & Son Pty Limited	21 Bond Street Holbrook	Wood or Timber Milling		Water quality monitoring not undertaken. However current operation under new owners does not reflect the original drafting of the licence (No. of incidents = 1).
Kalawa Pty Ltd	"Kalawa" Bells Road Gerojery	Other Land-Based Extraction		
Michell Australia Pty Ltd	116 Schnaars Road Culcairn	Tanning or Fellmongery		
QAF Meat Industries Pty Ltd	Bungowannah Piggery Riverina Highway Bungowannah	Composting and Related Reprocessing Pig Production		
Regmont Pty. Limited	Back Henty Road Culcairn	Feedlot Production		Chemical analysis of soil samples from the reuse areas during the reporting period (No. of incidents = 1) No solids were applied during the reporting period therefore no sampling taken (No. of incidents = 1).
<b>JERILDERIE</b>				
Jerilderie Shire Council	Jerilderie Sewage Treatment Works Wilson Road Jerilderie	Sewage Treatment - small plants		
Ricegrowers' Co-Operative Limited	Hogan Rice Storage Sheds Cnr Newell Highway & Berrigan Road Jerilderie	Other Agricultural Crop Processing (3)		
<b>MURRAY</b>				
Associated Feedlots Pty. Ltd.	Amaroo Park Sollis Road Mathoura	Feedlot Production		

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
Boral Resources (Vic.) Pty. Limited	Boral Resources (Vic) Pty Limited 8 Eddy Avenue Moama	Concrete Batching		Diesel fuel spilt from overhead tank. Contaminated aggregate and sand around tank bunding. Infringement Notice No.7613450617 (No. of incidents = 1). Noise level from site exceeded 5dB(A) L during the day (No. of incidents = 1).
Bunnaloo Pastoral Company Pty Ltd	"Lenian" Nolan Road Bunnaloo	Feedlot Production	New licence approved 22/8/05.	
Camboon Pty Ltd	Ballyrogan Road, Bunnaloo	Pig Production		
Closter's Group Pty Ltd	Moama Wastewater Treatment Works Hillside Road Moama	Hazardous, Industrial or Group A Waste P		
Deep Creek Marina Pty Ltd	Deep Creek Marina Perricoota Road Moama	Other Vessel Construction/Maintenance		
Kempen; Sheila G & S Kempen	"Birchfield" Fitzpatrick Lane Wombota	Pig Production		Weather analysis monitoring not undertaken at "Birchfield" piggery during 2005/06 (No. of incidents = 1)
Future Fuels Australia Pty Ltd	Moama Refinery Hillside Lane Moama	Petroleum Refining	Licence transfer approved 7/12/05.	
Murray Shire Council	Moama Solid Waste Depot Centre Road, Moama Moama	Solid Waste Land filling		Private company disposed of an unknown quantity of baby food, which was classified as liquid waste. Approximately less than one 3m <sup>3</sup> skip bin (No. of incidents = 1). Sampling to be undertaken quarterly only undertaken 3 times during reporting period (No. of incidents = 1).
Murray Shire Council	Moama Sewage Treatment Plant Hillside Road Moama	Sewage Treatment - small plants		
Ricegrowers' Co-Operative Limited	Caldwell Rice Storage Sheds Rosella Street Caldwell	Other Agricultural Crop Processing (3)		
Ritchie; Richard Michael	Drums Go Round 6 Eddy Avenue Moama	Drum or Container Reconditioning Hazardous, Industrial or Group A Waste P		
Symons; Robert Wesley	Old Moama Slipway 1 Forbes Street Moama	Other Vessel Construction/Maintenance		

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
<b>WAKOOL</b>				
Garrison Cattle Feeders Pty Ltd	'Garrison' Moulamein Road Murray Downs	Feedlot Production		
QAF Meat Industries Pty Ltd	Brooksbank Properties Pty Ltd "Balpool Station" Via Moulamein	Composting and Related Reprocessing Other Agricultural Crop Processing (3) Pig Production		
Ricegrowers' Co-Operative Limited	Burraboi Rice Storage Sheds Wakool Road Burraboi	Other Agricultural Crop Processing (3)		
Ricegrowers' Co-Operative Limited	Moulamein Rice Storage Sheds Corner of Hay & Tchelery Roads Moulamein	Other Agricultural Crop Processing (3)		
Tasman Group Services Pty. Ltd.	Yambinya Station Jimaringle Road Burraboi	Feedlot Production	Licence variation approved 4/7/05.	During the reporting period until the commencement of licence variation 1049105, stock numbers exceeded the EPL limit of 8,000 head (No. of incidents = 1). Some of the soil sampling completed as a component of the EPL was undertaken outside the licence period. (No. of incidents = 1) Tasman Group Services had not installed a weather station as per the requirements of the EPL. (No. of incidents = 1)
<b>WENTWORTH</b>				
Arumpo Bentonite Pty Limited	On Arumpo Station Wentworth	Mining (Other than Coal)		
Bemax Resources NL	Ginkgo Mineral Sands Project , Nob Road Wentworth	Land-Based Extraction - Other Mining (Other than Coal) Non-Ferrous Production (excluding Aluminium) - Secondary Waste Generation or Storage - Hazardous, Industrial or Group A	Licence variation approved 9/5/06.	Monitoring point 6. Monthly monitoring of standing water level and TDS required. Monitoring not commenced until June and August respectively therefore less than the required number of samples were collected and analysed (No. of incidents = 5). Monitoring Point 8. Monthly monitoring of standing water level and TDS required. Monitoring of TDS not able to be undertaken due to inability to collect sample from bore (No. of incidents = 12). Monitoring point 2. Monthly monitoring of standing water level and TDS required. Monitoring not commenced until June and July respectively therefore less than the required number of samples were collected and analysed (No. of incidents = 5).

LICENCE HOLDER	PREMISES	ACTIVITY	CHANGE FROM 2004/05	NON-COMPLIANCE 2005/06
Boral Resources (Vic) Pty Limited	Corwana Bend, Coomealla Pump Dareton	Misc Licensed Discharge to Waters (any)		
Doompah Pty Ltd	Old Renmark Road Wentworth	Feedlot Production		
Hardy Wine Company Limited	Silvercity Highway Mourquong	Wine or Spirit Processing	Licence variation approved 10/1/06.	At monitoring point 11 only 1 of 2 samples were taken for groundwater analysis (No. of incidents = 1). At monitoring point 6 only 2 of 3 samples were taken as per the licence (No. of incidents = 1).
Ilinga Pty Ltd	30 River Drive Buronga	Other Vessel Construction/Maintenance	Licence variation approved 29/9/05.	
Larmon Pty. Ltd	Arumpo Road Mourquong	Mining (Other than Coal)		
Mawson E.B. & Sons Pty Ltd	Cnr Silver City Highway & Corbett Avenue Buronga	Concrete Batching		
Simeon Wines Limited	1031 Silver City Highway Buronga	Wine or Spirit Processing	Licence variation approved 27/7/05.	Monitoring Point 1 - The conductivity (uS/cm) during the reporting period ranged from 1400 uS/cm to 6800 uS/cm. The average conductivity (uS/cm) over the reporting period was 3491 uS/cm with a standard deviation of 1525 (No. of incidents = 6).
Wentworth Shire Council	Kookaburra Drive Dareton	Sewage Treatment - small plants	Licence variation approved 26/5/06.	
Wentworth Shire Council	Alcheringa Drive Gol Gol	Sewage Treatment - small plants	Licence variation approved 26/5/06.	
Wentworth Shire Council	Pooncarie Road Wentworth	Sewage Treatment - small plants	Licence variation approved 26/5/06.	
Wentworth Shire Council	Lagoon Road Off Cadell Street Wentworth	Sewage Treatment - small plants	Licence variation approved 26/5/06.	
Western Murray Irrigation Ltd	- Dareton 4659	Irrigated Agriculture		

Source: Department of Environment & Conservation (EPA Division) website.

### 4.3 WATER

It is a generally accepted common goal that water should support healthy communities of plants and animals, as well as meeting the direct requirements of humans in production of harvested plants and animals, in recreational activities such as swimming, fishing, and in the provision of aesthetic surroundings.

Within the region, various types of water resources are to be found including major rivers within the Murray-Darling Basin such as the Murray, Murrumbidgee and Darling, man-made lakes and reservoirs of a wide range of sizes, groundwater systems, and areas which cross between land and water, the wetlands.

In fresh water systems humans are now realising the significance of biological flow as a constraint to amount of water that can be withdrawn from river systems for irrigation or for industrial or community purposes. Given that it is estimated that 81% of the available divertible waters of the Murray-Darling Basin are already utilised for human purposes, it is anticipated that water management factors will be a particularly significant component of natural resources management and sustainable development.

There is often a perception of the quality of water and the ecosystem that does not accord with the natural variability of these systems. Recreational amenity of lakes and streams is measured in terms of their water clarity, freedom from visible turbidity and scums, and visible evidence of aquatic life. Similarly, the quality of a water supply is judged in terms of its reliability and aesthetics.

However, for Australian inland streams, the stream flow and associated water quality naturally vary. Conditions may swing from low flows to floods. Native organisms have not only adapted to this variability, they may even require it.

Until recently, there has been a European-based approach to managing water resources in a manner consistent with maintaining urban amenity and agricultural productivity. The substantial exploitation of available water supplies has meant the end of the old approach of simply building more dams to sustain the water supply. In its place, a demand management and risk-based management approach is now emerging.

There has also been an attitude of preservation that fails to recognise natural change. For example, some wetlands are lakes in transition to terrestrial plains; or, occasionally, fauna may be severely stressed by natural events - but this may be helpful in an evolutionary sense. In the same vein, the occasional incidence of algal blooms is a natural phenomenon. Of course, changes in land use and waste discharges have resulted in a substantial increase in both the severity and frequency of algal blooms, and could affect the dominant algal species when blooms do occur.

#### Rainfall

The Department of Primary Industries in NSW releases a new drought map each month. The drought maps are prepared from information provided by the 48 Rural Lands Protection Boards (RLPB) around the state, rainfall details from the Bureau of Meteorology and reports from DPI regional staff.

Drought classification of an area takes into account the following factors:

- a review of historic rainfall records for the area
- pasture availability
- climatic events such as frosts
- seasonal factors such as pasture growing seasons.

NSW Government assistance measures require that a RLPB district be in the drought-affected category for six months before landholders are eligible for financial assistance.



The monthly drought status for each of the RLPB districts in the MROC region (see map opposite) for the reporting period is shown in Figure 9. Generally, seasonal conditions are more favourable in the eastern part of the region than the west. Whilst the Wentworth RLPB district did not achieve 'satisfactory' status at any time during the reporting period, the Hume district was regarded as 'satisfactory' for eight months of the year extending from October 2005 through to May 2006. However by June 2006 all districts in the region were regarded as being back 'in drought'.

**Figure 9: Seasonal conditions 2005/06**

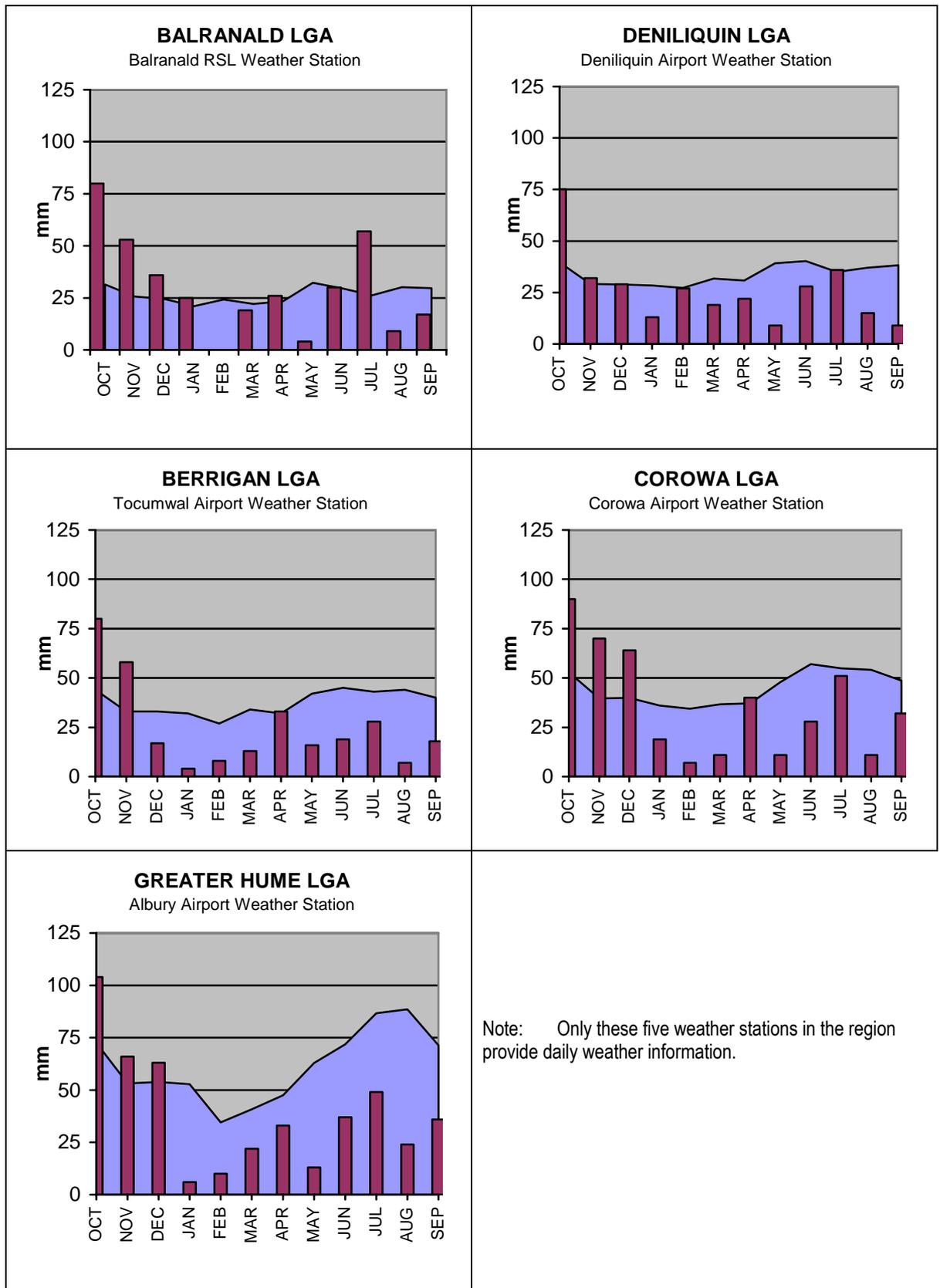
RLPB DISTRICT	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Wentworth	RED	RED	RED	RED	ORANGE	RED						
Balranald	RED	RED	RED	ORANGE	ORANGE	GREEN	GREEN	GREEN	GREEN	ORANGE	ORANGE	RED
Riverina	RED	RED	RED	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	ORANGE	ORANGE	RED
Murray	RED	RED	ORANGE	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	ORANGE	ORANGE	RED
Hume	RED	RED	ORANGE	GREEN	RED							

RED = In drought      ORANGE = Marginal      GREEN = Satisfactory

Source: Department of Primary Industries

Figure 10 shows most areas across the region experienced above average monthly rainfall in the spring of 2005 but lower than average for the remainder of the reporting period. This is consistent with the drought status chart at Figure 9. Rainfall deficiencies in this period were more pronounced in the eastern part of the region.

**Figure 10: Monthly rainfall 2005/06 against the historical average**



Source: Bureau of Meteorology

## Water use

Water is taken from streams and groundwater for a large number of purposes such as domestic use, agricultural use and industrial uses.

The amount of water used is of concern to SoE reporting because the impact on stream flow can be significant, placing pressure of aquatic ecosystems and limiting the amount of water available for downstream users. The need to ensure adequate flow for aquatic ecosystems is the reason that environmental flow regulations have been enacted in most jurisdictions.

Total water consumption tends to increase as human population increases. This can require the construction of extra water supply reservoirs to meet the increased demand for water, thus placing further pressure on the natural environment. Where this is not possible, it is necessary to investigate alternative sources of water, reduce per capita consumption of water, or to introduce water restrictions, typically the case in the summer months in some areas.

The following table displays data from the 10 LGA's in the region indicating their approach to the points raised in the previous paragraph.

LGA	Water Restrictions Imposed	Excess Water Charges and Calculations	Average Annual Household Water Consumption	Increase In Water Supply
Balarald	No	22 cents/kl for unfiltered water in excess of 200kl allowance and 60 cents/kl for filtered water	940kl	No
Berrigan	Yes. Berrigan township limited water between May and August due to empty MIL supply channel.  Restrictions included no fixed sprinklers and hand watering of gardens in July. Restrictions were voluntary.	Berrigan/Finley/Barooga 55 cents/kl over 250kl allocation of filtered water and 27 cents/kl over 500kl allocation of unfiltered water.  Tocumwal 45 cents/kl over 750kl allocation of filtered water	Berrigan/Finley/Barooga 197kl treated and 428kl untreated.  Tocumwal 577kl treated (single supply).	No
Conargo	No	\$30/100kl after allocation of 700kl in Conargo and 1000kl in Wanganella.	Wanganella 535kl Conargo 429kl	No

LGA	Water Restrictions Imposed	Excess Water Charges and Calculations	Average Annual Household Water Consumption	Increase In Water Supply
Corowa	Yes – all year. No watering at all between noon and 4pm. No watering between midnight and 5am except for automatic systems.	\$0.50/kl	407kl	No
Deniliquin	No		580kl	No
Greater Hume	Yes, during daylight savings time no fixed sprinklers between 9am and 6pm.	400kl allowance, from 400kl to 1,000kl 90 cents per kl and in excess of 1,000kl @ \$1.10 per kl.		No details provided
Jerilderie	No	\$1/kl over 100kl	240kl	No
Murray	No		365kl	No
Wakool	No	Water allowance per household of 600KL	-	No details provided
Wentworth	No	\$2.60/kl over 250kl of filtered water \$0.60/kl over 700kl raw water	180kl filtered water 555kl raw water	No

Information sourced from relevant Councils

**Figure 11: Potable water consumption 2003/04**

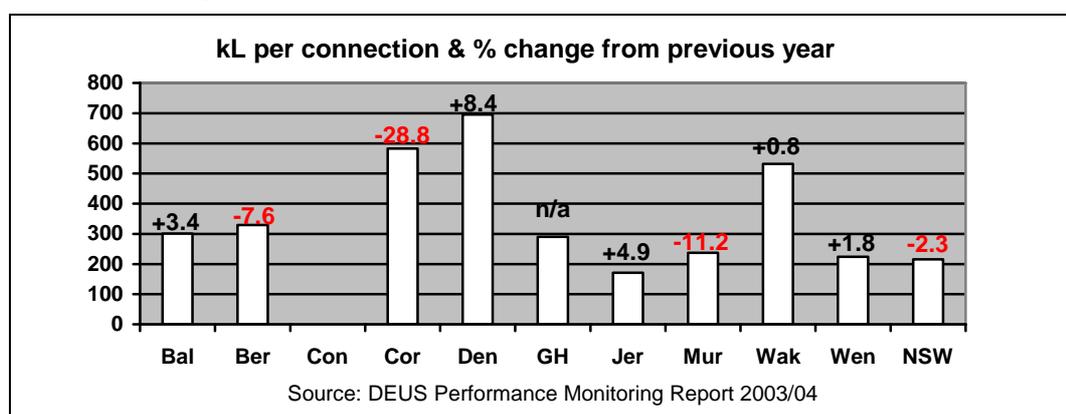


Figure 11 displays the potable water consumption by LGA for the Murray region for the year 2003/04. Four LGA's achieved a reduction in consumption over the previous year with Corowa making the biggest gain. Deniliquin has both the highest rate of consumption as well as the highest increase from 2002/03. Most LGA's are comparable to the average consumption rate achieved by NSW as a whole although Corowa, Deniliquin and Wakool are all considerably higher.

## Potable water quality

According to the latest DEUS Performance Monitoring Report (2003/04), most Councils achieved a 100% success rate for all potable water samples tested for physical and chemical water quality standards. Corowa and Wakool achieved the physical chemical standard on 97% of their samples. *E.coli* contamination is the primary health-related indicator for water and all Councils achieved 100% in this regard during 2003/04 with the exception of Wentworth which achieved 89%.

These results are similar to those achieved in the previous year.

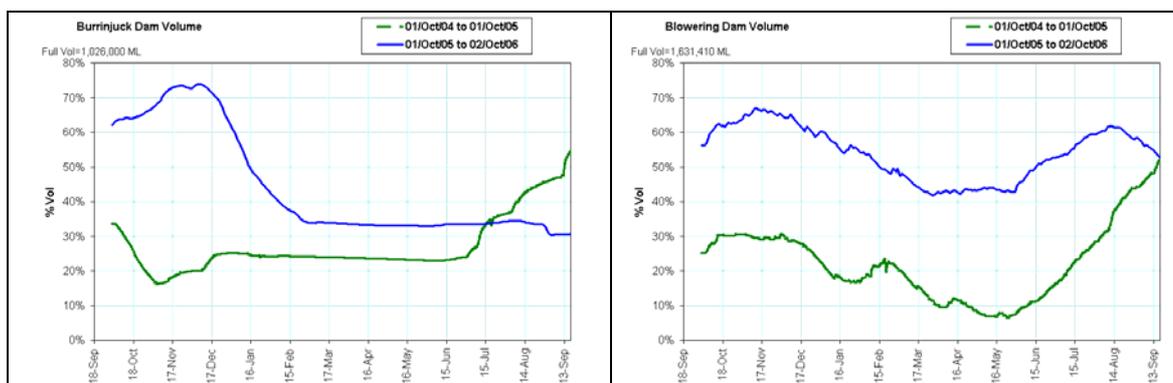
Both Deniliquin and Jerilderie issued directions for residents to boil water in October and November 2005. The poor water quality in Deniliquin was caused by a build up of sediment in the storage towers which has since been rectified. Wakool also reported two outbreaks of blue-green algae. This was low alert outbreaks with duration of two weeks.

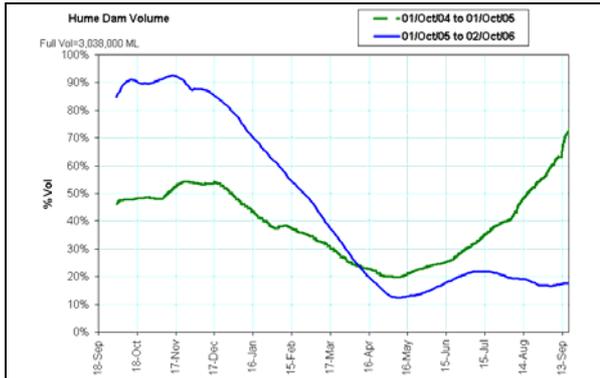
## Water storage

The three major water storages servicing the irrigation areas of the Murray region are Hume, Burrinjuck and Blowering (see map opposite). Figure 12 shows that all three storages commenced the year with significantly higher levels than the year before but by the end of the reporting period (June 30) the storage levels in Burrinjuck and Hume were similar to the corresponding period the year before and have since fallen below.



**Figure 12: Levels of water storages servicing the region 2005/06**



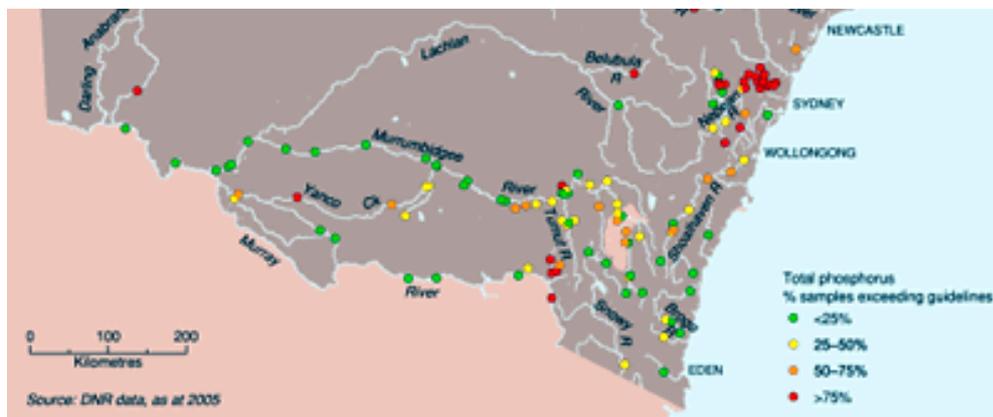


Source: Waterinfo, NSW Government

### River quality

Algae are the simplest form of plant life. A count of all the algae present (as measured by chlorophyll-a levels) is used to indicate the productivity of aquatic systems. In conditions of warm, poorly mixed, nutrient rich waters, algal counts may grow to extremely high densities. Figure 13 indicates sites along rivers within the Murray region that have a high incidence of phosphorous readings that exceed guidelines. These areas are at greater risk of algal blooms than other parts of the river system with lower phosphorous readings. The amounts of algae and blue-green algae are of interest to SoE reporting because these reflect the impact of human activity and other environmental factors on the aquatic environment, and also the suitability of water for continued use by humans and other species.

**Figure 13: Percentage of times total phosphorous levels exceeded recommended guidelines at NSW sites in the Murray Region**



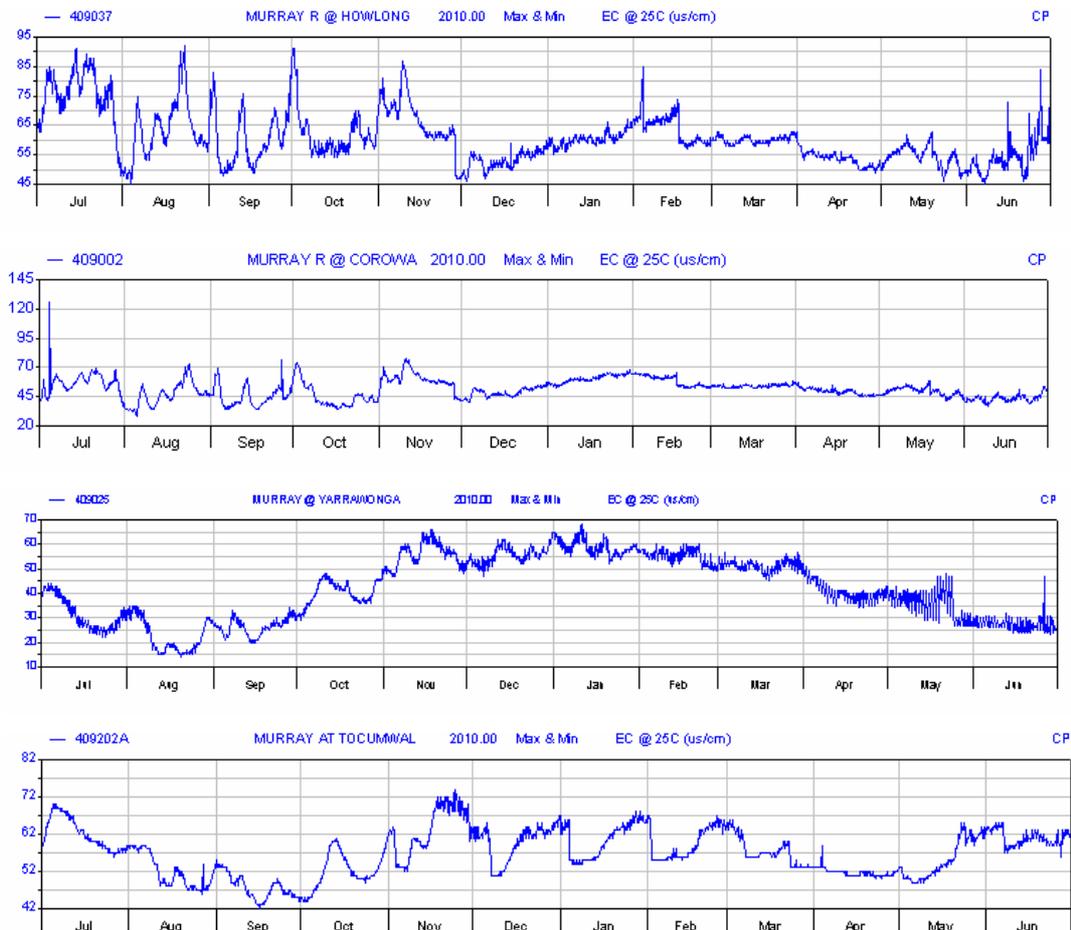
Source: DNR 2003-05

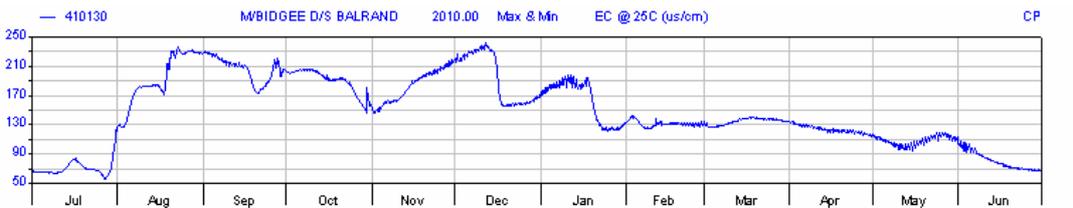
Salinity levels within rivers are an indicator of water quality and therefore river health. Salinity levels can be ascertained by measuring the electrical conductivity of water. A measure of the ability of water to conduct an electric current between electrodes relates to the nature and amount of salts present in the water and increases with concentration. The measurement is usually expressed in microsiemens per centimetre ( $\mu\text{S}/\text{cm}$ ).

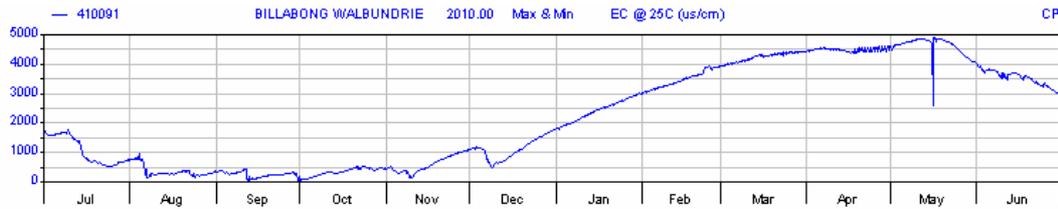
Figure 14 shows the results of monitoring electrical conductivity at various locations within the region's rivers for 2005/06. Some observations of the results include:

- Salinity levels generally increase with distance downstream in the catchment. This can be demonstrated in the Murray River by comparing measurements of EC levels at Howlong followed by Corowa, Yarrowonga, Tocumwal, Barmah, Torrumbarry, Swan Hill and Wakool Junction.
- The tributaries of the Murray generally have higher salinity levels.
- The Billabong Creek has salinity levels many times higher than other rivers in the region. The EC reading at Walbundrie increased by more than five times in the six months between December 2005 and May 2006, peaking at nearly 5000.
- There is no real pattern across the region as to the peaks and troughs of EC levels throughout the year.

**Figure 14: Salinity levels in the regions rivers**







### Stormwater discharge

There is no new information relating to stormwater discharge.

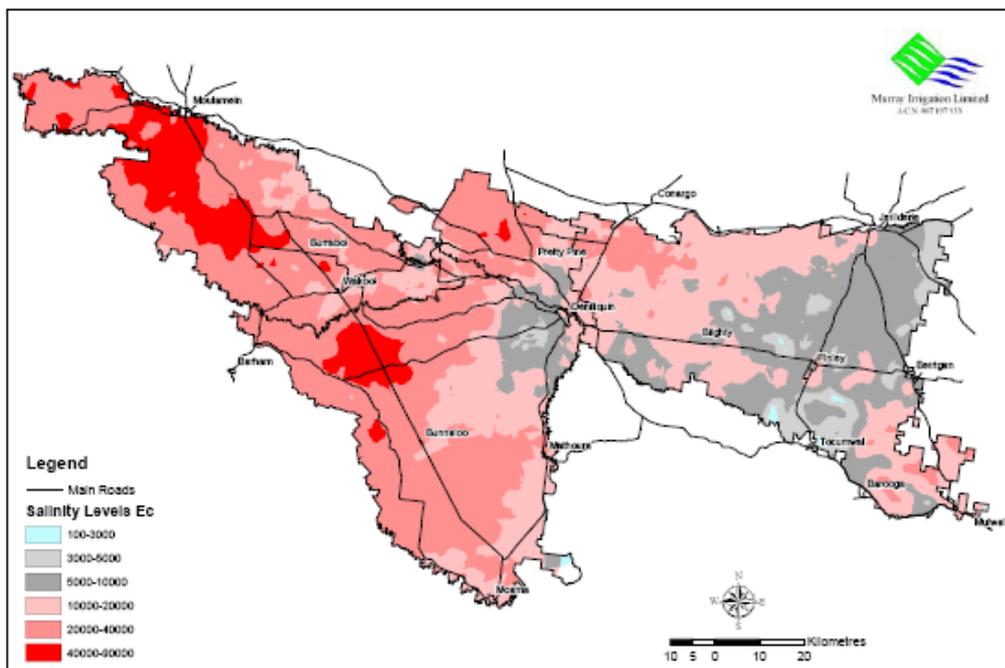
### Wetlands

There is no new information relating to wetlands.

### Groundwater quality

Figure 15 shows the levels of groundwater salinity within the Murray Irrigation that extends from Moulamein to Berrigan. The results are sourced from MIL's monitoring program. The maps shows that salinity levels in groundwater are higher around the Moulamein and Wakool area and lower in the east around Finley and Berrigan.

**Figure 15: Groundwater salinity in Murray Irrigation piezometers 2003**



Source: Murray Irrigation Limited Compliance Report 2004/05

## 4.4 BIODIVERSITY

There are two quite different fundamental needs that have to be met before it can be ensured that biodiversity is being conserved both for its intrinsic value and for its

benefits to humans (including aesthetic and cultural benefits as well as material benefits such as improved agricultural productivity).

The first is philosophical. There must be a concept of stewardship, such that, as humans, we accept a fundamental responsibility to protect biodiversity, and to leave it to the next generation in at least as healthy a condition as it was left to us. An associated requirement is to apply the 'precautionary principle' - that it is better to err on the side of caution than otherwise, as a species or community once gone can never be recovered.

The second requirement is more pragmatic and is a need to know exactly what constitutes the current biodiversity situation, so that changes can be recognised, and corrections made as necessary. This is obviously easier said than done, but at the very least the existence and status of species and communities of concern in region need to be known. Initially such species and communities will be those specified in 'threatened species' legislation, but the process of such listing is very much ongoing, and a concerned management authority must also take account of other species and communities of local concern.

### **Native flora & fauna**

Changes in patterns of the number of species of living organisms and their relative abundance in a given area can occur naturally – either seasonally or after significant events such as fire or storms. However, a significant loss of native species from an area is generally a clear indicator of major ecosystem disturbance such as habitat loss or predation/competition from introduced species.

It can be difficult to identify all species in an area, and even more difficult to monitor their populations. A significant decline in the abundance and condition of a particular species can be indicative of general trends for native species in the area in general.

No Councils within the study area reported any changes to biodiversity in their region during 2005/06.

#### ***Freshwater Fish Habitat Trust Grants 2005/06***

##### ***Thegoa Lagoon Fish Passage Remediation project (\$26,600)***

This is the next stage funding of an ongoing project to re-establish fish passage from the western end of Thegoa Lagoon that will allow fish and flows back into the lagoon from the Murray River.

#### ***NSW Environmental Trust Grants 2005***

There were no Environmental Trust Grants given in the Murray region in 2005.

#### ***New listings under the Threatened Species Conservation Act 2005/06***

The following final and preliminary listings apply to species known to habitat parts of the Murray region.

##### ***Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes***

The NSW Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list Myall Woodland in the Darling Riverine

Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act.

Within the Murray region, the Myall Woodland occurs in the Local Government Areas of Berrigan, Conargo, Corowa, Jerilderie and Murray.

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions has been substantially reduced and modified by clearing and grazing over the past 160 years. In the Riverina, NSW NPWS (2003) estimated that 94% of Myall Woodland had been cleared, leaving approximately 780km<sup>2</sup>. In the Murray valley, which partly overlaps the Riverina region, Miles (2001) estimated that 190km<sup>2</sup> of Boree Woodland remained, representing only 4% of the pre-clearing distribution.

Myall Woodland continues to be threatened by clearing and fragmentation associated with cropping, overgrazing by feral and domestic animals, pest outbreaks and weed invasion. The Scientific Committee is of the opinion that Myall Woodland is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

*Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions*

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Preliminary Determination to support a proposal to list the Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions as an ENDANGERED ECOLOGICAL COMMUNITY in Part 3 of Schedule 1 of the Act. The listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

Within the Murray region, the Inland Grey Box Woodland occurs in the Local Government Areas of Berrigan, Conargo, Corowa, Deniliquin, Greater Hume, Jerilderie, Murray and Wakool.

Grassy box woodlands of NSW were rapidly targeted for agriculture development and extensively cleared or degraded (Benson 1991) so that by 1948 few remnants existed and those were often degraded by grazing (Beadle 1948). The Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions has been greatly reduced in area, highly fragmented and greatly disturbed by clearing, cropping, grazing, and introduction of pasture species and addition of fertiliser. In the Riverina and Cobar Peneplain Bioregions, Todd (2003) reported that 762 000 hectares of Inland Grey Box Woodland has been reduced by 97 per cent to 20 000 hectares of remnants.

The Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions is eligible to be listed as an endangered ecological community as, in the opinion of the Scientific Committee, it is facing a very high risk of extinction in New South Wales in the near future.

### Old Man Saltbush Shrubland in western NSW

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Preliminary Determination to support a proposal to list the Old Man Saltbush Shrubland in western NSW as an ENDANGERED ECOLOGICAL COMMUNITY in Part 3 of Schedule 1 of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

Within the Murray region, the Old Man Saltbush Shrubland has been recorded in the Local Government Areas of Balranald, Conargo, Wentworth and Wakool.

Old Man Saltbush Shrubland in western NSW has undergone a large reduction in geographic distribution and has been extensively modified since European settlement. In the Riverina Bioregion, Todd (2003) combined maps of extant vegetation and estimated the current areal extent of Old Man Saltbush Shrubland to be 27500 hectares. This represents a decline in the distribution of the community of approximately 70 per cent in that region. In the Riverina, Old Man Saltbush Shrubland is now largely restricted to the north and central north-west of the bioregion (White et al. 2002); its current distribution is patchy and ranges from small clumps to scattered isolated individuals of *Atriplex nummularia* (Scott 1993, Porteners 1993, Porteners et al. 1997). Fox (1991) found that only small relict stands remain of what were extensive stands in the south-west corner of NSW from the Ana Branch and Mildura 1:250000 map sheets. The community, although not highly disturbed, is now very rare in the Pooncarie 1:250000 map sheet area (Porteners et al. 1997). Across the Hay Plain, Porteners (1993) found Old Man Saltbush to be largely cleared and showed little regeneration due to moderate to heavy grazing.

In NSW only small areas of Old Man Saltbush Shrubland are currently known to occur within conservation reserves. Westbrooke and Miller (1995) identified localised sites of '*Atriplex nummularia* low open-shrubland (4d) community' in Mungo National Park that occupied less than one percent of the park area. J. Benson (unpublished) also cites the presence of Old Man Saltbush shrubland at Pindera Downs Aboriginal Area, Yanga Nature Reserve and Willandra National Park.

Old Man Saltbush Shrubland in western NSW is threatened by grazing from domestic and feral herbivores. *Atriplex nummularia* is palatable to stock, goats, kangaroos and rabbits (Porteners 1993, Porteners et al. 1997) and has long been considered an important fodder plant (Beadle 1948). The Old Man Saltbush Shrubland in western NSW is eligible to be listed as an endangered ecological community as, in the opinion of the Scientific Committee, it is facing a very high risk of extinction in New South Wales in the near future.

### *Eucalyptus leucoxylon* F. Muell. subsp. *pruinosa* (F. Muell. Ex. Miq.) Boland, Yellow Gum

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Preliminary Determination to support a proposal to list *Eucalyptus leucoxylon* F. Muell. subsp. *pruinosa* (F. Muell. Ex. Miq.) Boland, Yellow Gum as a VULNERABLE SPECIES in Schedule 2 of the Act. Listing of vulnerable species is provided for by Part 2 of the Act.

*Eucalyptus leucoxylon* subsp. *pruinosa* is a tree species which, in New South Wales, occurs at the bases of sandy rises and on loamy clay flats on the floodplains of the Murray River and its tributaries in the Riverina Bioregion (Thackway & Creswell 1995). It is currently known from several localities along the Murray River, including a concentration of six stands to the west of Moulamein, on the south-western plains.

The population is estimated to comprise 1000-4000 mature trees restricted to small remnant stands. These stands are estimated to occupy a total area of 100-200 hectares, representing only 25 per cent of the species' pre-European distribution in New South Wales (J. S. Benson unpubl. data). Most remaining stands are threatened by a lack of regeneration due to grazing and soil compaction. Other potential threats include canopy dieback, small-scale clearing, salinity and drift of pesticides and herbicides (J. S. Benson unpubl. data). No stands are known to be protected in conservation reserves or under secure property agreements.

The Scientific Committee is of the opinion that *Eucalyptus leucoxylon* F. Muell. subsp. *pruinosa* (F. Muell. Ex. Miq.) Boland (Yellow Gum) is likely to become endangered in nature in New South Wales unless the circumstances and factors threatening its survival cease to operate.

#### *New Species Recovery Plans 2005/06*

The following Species Recovery Plans were approved during the reporting period.

#### Bush Stone-curlew *Burhinus grallarius*

The Bush Stone-curlew *Burhinus grallarius* is endangered in NSW, and is one of a number of woodland birds that has declined substantially in abundance and distribution since European settlement. Its decline is linked to the spread of exotic predators, particularly the fox, and the conversion of large areas of native vegetation to intensive agricultural practices and urban landscapes. The area bounded roughly by Albury, Wagga Wagga, Hay and Wentworth is regarded as the stronghold for the species in NSW.

The recovery plan for the Bush Stone-curlew was adopted in February 2006 and considers the requirements of the species across its known range in NSW. It identifies the actions to be taken to enhance the long-term viability of the Bush Stone-curlew in nature and the parties which will undertake these actions.

#### Vegetation clearing

Clearing vegetation is one of the major pressures on terrestrial ecosystems – both native ecosystems and agricultural lands. For this reason it is a key indicator in SoE reporting. In December 2005, the responsibility for the regulation of vegetation clearing in rural areas was transferred from local government to the Catchments Management Authorities. Councils still control vegetation in urban areas, mainly through the use of Tree Preservation Orders.

In 2002 the NSW Auditor-General's performance audit *Regulating the Clearing of Native Vegetation* found that the then regulatory regime was not working. The follow-up audit in 2006 assesses the extent to which agencies have changed their practices as a result of the earlier audit. Since the last report the Government has introduced new legislation designed to overcome the deficiencies alluded to above and to better

manage the on-going tensions between economic development and conservation. The update report discloses official illegal land clearing figures that are only just available.

Table 3 shows the greatest area of new clearing since 1997 has been in the central west and northwest of NSW in the vicinity of towns such as Hillston, Condobolin, Nyngan, Tottenham, Cobar, Coonamble, Moree and Walgett. This area is on the western edge of existing wheat and sheep farms and not within the area to which this SoE report applies. By comparison the Murray/Murrumbidgee region has experienced much less illegal clearing activity.

**Table 3: Estimated illegal clearing by DNR region, 2005**

DNR Region	Estimated illegal clearing in 2005 Hectares
North Coast	460
Hunter	1,450
South Coast	630
Central West	17,160
Far West	6,810
Barwon	2,270
Murray/Murrumbidgee	910
<b>Total</b>	<b>30,000</b>

Source: Department of Natural Resources June 2006

Councils participating in this SoE report advise as follows in regards to vegetation clearing activities.

LGA	Tree Preservation Order	Applications for vegetation clearing	Approvals for vegetation clearing	Roadside Management Plan	Permit required for firewood collection
Balranald	Tree removal in the urban area is dependent on assessment of hazard or nuisance practice to replace removed trees with more appropriate specimens or shrubs still in force.	Three applications for vegetation clearing for intensive agriculture for pumping pipelines -	Three approvals provided by Lower Murray Darling CMA via farm management plans.	No	No

LGA	Tree Preservation Order	Applications for vegetation clearing	Approvals for vegetation clearing	Roadside Management Plan	Permit required for firewood collection
Berrigan	No	Not recorded	-	Yes Central Murray Roadside Vegetation Survey & Management Guidelines BSC Vegetation Management Plan Linear Reserves Project	Yes – generally prohibited on roadsides except after major storm events
Conargo	Yes – protects trees over 3 metres within lands known as “Sandhill country” being the sand dune formations on LEP Maps	Nil	Nil	Yes	No
Corowa	Yes. Species are nominated in a Schedule to the LEP.	All applications referred to Department of Natural Resources	12	Yes. Management Plans describe levels of management for high, medium and low conservation values.	Yes
Deniliquin	No	0	0	Management plan for three road reserves with significant vegetation	Yes
Greater Hume	No approval required for tree removal	Nil	Nil	Weed spraying on road shoulders	Permit required for firewood collection
Jerilderie	No	-	-	Roadside vegetation plan adopted in 2002 still applies	Yes

LGA	Tree Preservation Order	Applications for vegetation clearing	Approvals for vegetation clearing	Roadside Management Plan	Permit required for firewood collection
Murray	No	0	0	Murray Shire Roadside Vegetation Management Plan 200	No
Wakool	Approval required for tree removal in sand hill areas	No applications for tree removal/veg clearing	0	Routine survey and spraying regime	Approval required for firewood collection.
Wentworth	Yes – 4 applications received approval to remove 15 willow trees	23	1 35ha as per property vegetation plans	No	No

Information sourced from relevant Councils

## Weeds

Noxious weed control on roads and reserves is an important component of most Council's weed management plans. Under the arrangements, Councils and RLPB's can apply for Operational Grants to assist in the treatment of specific weeds on roads and other land. Priority is given to implementing agreed State and regional weed management plans.

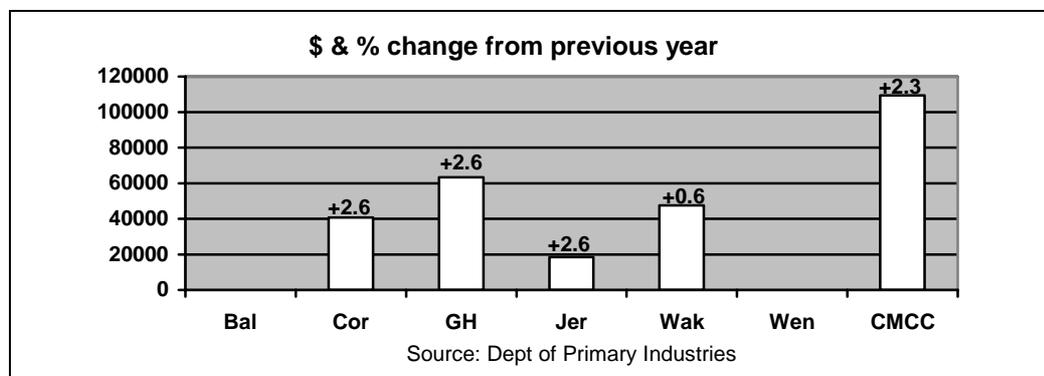
For 2005/06 the NSW Government provided funding for the high priority weeds on the following basis - \$80,000 for Alligator Weed control, \$35,000 for Parthenium weed, \$50,000 for Parkinsonia, \$47,000 for Mesquite, \$27,000 for a range of other aquatic weeds and \$370,000 for other high priority weeds.

Details of 2005/06 funds allocated for all high priority weeds within the Western and Eastern Riverina Noxious Weeds Advisory Groups are:

Alligator Weed Taskforce .....	\$69,000
Silverleaf Nightshade .....	\$59,000
Prairie Ground Cherry .....	\$15,000
Cooatai Grass .....	\$14,000
Sagittaria .....	\$9,000
Chilean Needle Grass .....	\$7,000
Black Willow/Murrumbidgee Catchment .....	\$5,000
Serrated Tussock .....	\$5,000
Hardhead thistles .....	\$2,000

The Central Murray County Council (CMCC) was again provided with \$35,648 in 2005/06 for administrative purposes and \$3,000 each for the Eastern and Western Riverina Noxious Weeds Advisory Group.

**Figure 16: Weed control coordination funding 2005/06**



Greater Hume Shire Council uses regional and state weed plans as a basis of control for weed management in the shire. The shire has a complete range of class 4 weed management plans for control of local weeds. The shire's noxious weed policy directs the general process whereby weeds are controlled.

LGA	Commitment to Weed Control	Means of Weed Control including biological weed control	Other Weed Control Activities
Balranald	Yes	Shire road weed spray control, no biological control	On farm weed inspections One Council staff member committed to weed control.
Berrigan	Yes	Undertaken by Central Murray County Council	
Conargo	Yes	Weed spraying, roadside and tree plantations in August each year. Regular patrols for noxious weed identification. Weed mapping	Waterway inspections undertaken.
Corowa	Yes	Weed spray control on road reserves and other reserves and Council controlled land. No biological control.	Weed control policy currently being prepared.
Deniliquin	Yes	Undertaken by Central Murray County Council	

LGA	Commitment to Weed Control	Means of Weed Control including biological weed control	Other Weed Control Activities
Greater Hume	Yes	Spraying of declared weeds, biological control for Patterson's Curse	Mapping of declared weeds Waterways inspections of Billabong Creek, for general weed control, and sections of Mountain Creek for Alligator weed control. Other actions in this period included; Biological control of St Johns Wort, Patterson's Curse and Horehound. Undertook spray control of a number of state, regional and local weeds.
Jerilderie	Yes	Weed spray program, no biological weed control	Dedicated Weed Control Officer
Murray	Yes	Undertaken by Central Murray County Council	
Wakool	Yes	Undertaken by Central Murray County Council.	Survey of Edwards River for Sagittaria Survey of Shire for Parthenium weed Participation in schools program "Weed Warriors"
Wentworth	Yes	Committed to Lower Murray Darling Weed strategy implementation Council inspection policy Council weed spraying policy	Established 6 biological control sites Spray program targets high priority weeds GPS Mapping data base

Information sourced from relevant Councils

### Pest animals

Prior to 2004/05 locust plagues had been the primary problem of pest control for the study region. Mouse plagues are not uncommon throughout the area but the incidence of these are affected, to a very great degree, by climatic conditions. The ongoing drought conditions have witnessed animals such as kangaroos coming closer to areas of human habitation in search of food.

LGA	Incidence of Locust Outbreak 2005/06	Action taken	Further information concerning pests 2005/06
Balranald	0	-	-
Berrigan	0	-	Mice, rabbits and foxes are ongoing problems, increasing nuisance of corellas and kangaroos
Conargo	0	Council in conjunction with RLPB undertook a control programme within the Shire from October to January	Foxes, cats, rabbits and hares are feral animal pests.

LGA	Incidence of Locust Outbreak 2005/06	Action taken	Further information concerning pests 2005/06
Corowa	0	-	-
Deniliquin	0	-	-
Greater Hume Shire	No	None required	
Jerilderie	0	-	-
Murray	0	-	-
Wakool	No		Reported feral cats and Fox's
Wentworth	0	-	-

Information sourced from relevant Councils

## Dogs & cats

It is critical for the environmental health of a regional area for effective control of dogs and cats as a means of curbing the rate of increase of feral animals. Wild dogs and cats are major predators of native fauna as well as posing significant problems for farming livestock. Effective control of dogs and cats ensures that missing companion animals can be reunited with their owners whilst Council revenue from pet registration fees can help mitigate some of the costs incurred by Council.

LGA	Dogs Seized	Cats Seized	Further information
Balranald	18	0	-
Berrigan	87	17	One full time Ranger/Local laws officer to enforce companion animals legislation
Conargo	5	0	-
Corowa	122	20	Guideline on the Exercise of Function under the Companion Animals Act Guideline 2002.
Deniliquin	80	10	-
Greater Hume Shire	290	34 (domestic)	Council also control feral cats at the landfill sites and any other location in the Council area with high feral cat numbers. During 2005/06 Council dealt with approximately 56 feral cats.
Jerilderie	0	0	-
Murray	102	38	-
Wakool	80	62	-
Wentworth	127	0	-

Information sourced from relevant Councils

## Bushfire

Current fire regimes, including the incidence of bushfires, in relation to ecosystem requirements are of concern to SoE reporting because they indicate the pressure on native ecosystems of human activities in the environment.

LGA	Changes to Bushfire Prone Categories	Incidence of Bushfires	Bushfire Section 66 Notices
Balranald	No	0	-
Berrigan	No	75*	-
Conargo	No	18	-
Corowa	No	4	-
Deniliquin	No	0	-
Greater Hume Shire	No	-	-
Jerilderie	No	-	-
Murray	Yes	0	NSW Rural Bushfire Service included more bushfire prone areas.
Wakool	No	0	-
Wentworth	No	4	-

Information sourced from relevant Councils \* incidents include bushfires and motor vehicle accidents

## 4.5 HUMAN SETTLEMENT

The composition of a population (i.e. its characteristics) underpins the changes of the pressure of the human population on the environment. There is a direct impact on the level of resources required to provide the range of services and infrastructure required to maintain a given quality of life in areas such as health, housing, education, employment, transport, resource use and management and construction. An understanding of this and of the dependency ratio in the population means that, as the composition characteristics of a population change, environmental, economic and social pressures can be minimised.

### Demographics

For inter-censal years, estimates of population at the Australian level take into account natural increase and net overseas migration, while estimates for states and territories also use estimated interstate movements involving a change of usual residence. However the absence of migration data at the SLA (i.e. LGA) level means that it is not possible to estimate SLA populations by taking into account natural increase and net migration. Instead, Estimated Resident Populations (ERP's) are calculated using a mathematical model. In the mathematical model a relationship is established between changes in population and changes in other indicators over the period between the two most recent censuses.

**Figure 17: Estimated resident population 2005**

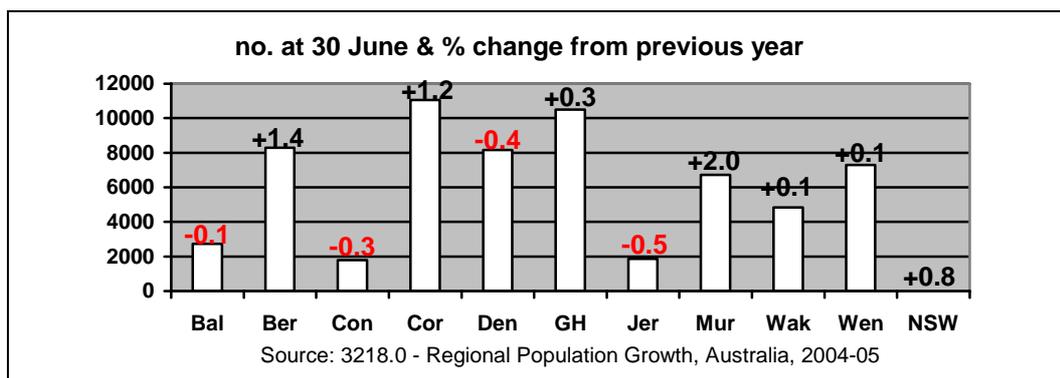


Figure 17 shows that compared to the equivalent chart in last years first Supplementary Report Corowa has increased substantially and is now the most populous LGA of those participating in this SoE. This is because at the time of last years report the official adjustment to population figures had not been made to the LGA's affected by the boundary change. The adjustment has resulted in a proportion of Greater Hume's population being reallocated to Corowa and Albury.

The three smallest LGA's in the region in Balranald, Conargo and Jerilderie have all experienced net population loss along with Deniliquin. The Murray LGA continues to be the fastest growing in the region and along with Berrigan and Corowa is growing at a rate in excess of that for NSW as a whole. Greater Hume, Wakool and Wentworth LGA's recorded small increases between June 2004 and 2005 according to the ABS estimates.

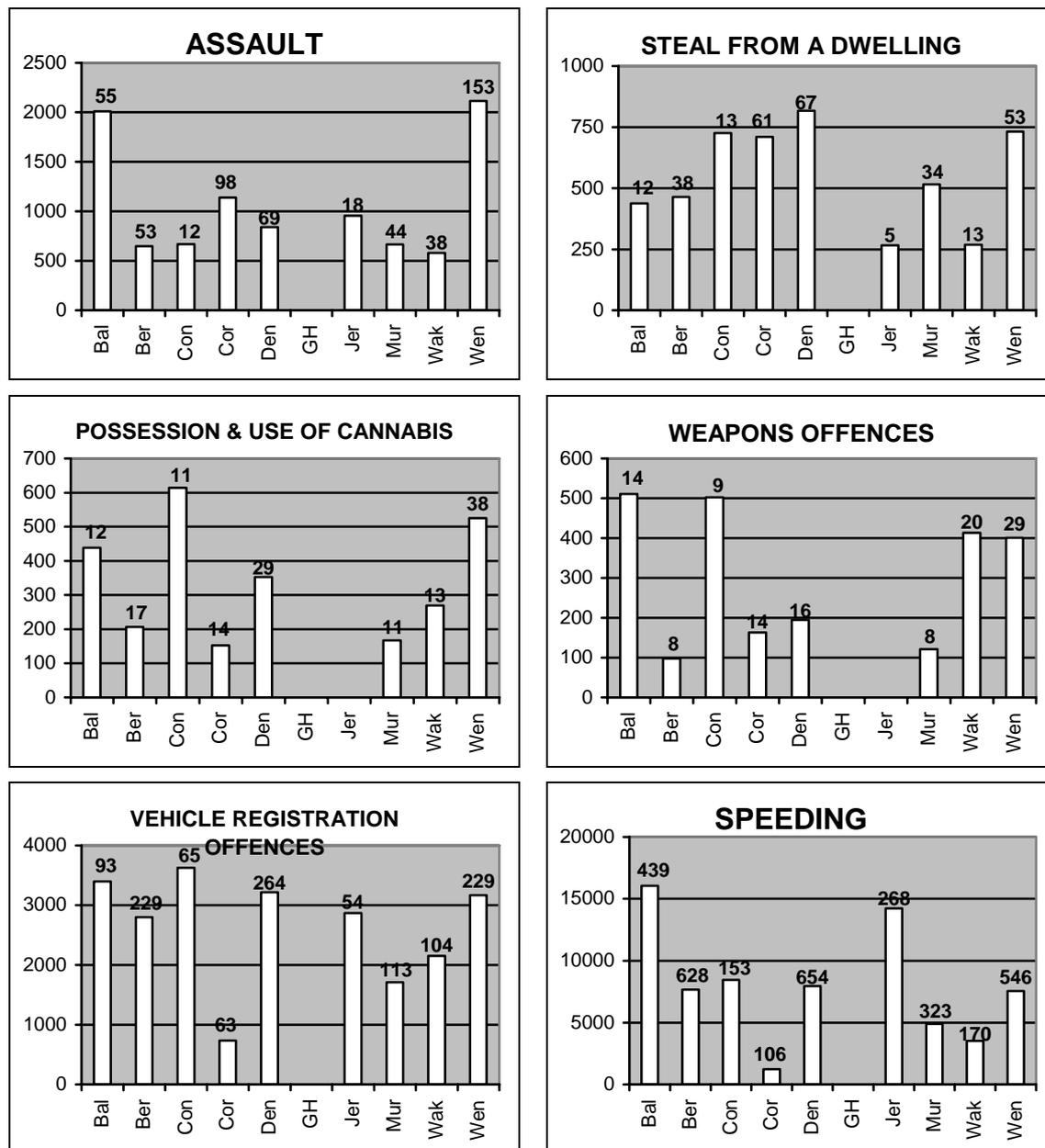
There is no new data available on birth and death rates for LGA's.

### Socio-economic status

There is no new data available on unemployment rates or income levels for LGA's.

A selection of crime statistics for participating LGA's produced by the NSW Bureau of Crime Statistics and Research is shown in Figure 18. Caution needs to be exercised in interpreting these statistics because of the low base from which they stem in many circumstances. Likewise direct comparisons on the number of incidents between LGA's should not be undertaken because of the differences in the size of respective populations. However, by expressing the number of incidents per 100,000 of the population allows for some comparison to be made.

**Figure 18: Recorded crime statistics 2005**  
rate per 100,000 population & number of incidents



Source: Bureau of Crime Statistics & Research, New South Wales

### Effluent treatment & disposal

Monitoring results for performance of sewerage treatment works are available for Berrigan, Corowa, Deniliquin, Jerilderie and Wentworth. This monitoring is undertaken by the Department of Energy, Utilities and Sustainability (DEUS). The most recent results are from 2003/04 and reveal Deniliquin and Corowa achieved less than 100% compliance with the 90 percentile requirement of the DEC licence for Biochemical

Oxygen Demand (BOD). Corowa achieved the requirement on 82% of occasions and Deniliquin 69% which are similar results to the previous year.

For Suspended Solids (SS), Berrigan and Wentworth again achieved the DEC licence requirement (90 percentile) with Corowa meeting the standard on 53% of occasions, Deniliquin 77% and Jerilderie 75%. The results for Deniliquin were a significant improvement over the previous year (2002/03).

Corowa advises that plans have commenced for a new sewerage treatment plant at Mulwala.

Wakool Shire Council advised that they commenced construction (but not completed) of Murray Downs MBR. The Greater Hume Shire Council also did some works on their sewerage treatment plants which included the construction of an additional sludge pond, additional aeration of the tertiary ponds, upgrading and chlorination of effluent as well as reuse schemes. The works undertaken by Greater Hume was worth \$85,000.

It is noted that Balranald, Conargo, Murray and Wakool do not have a DEC discharge licence. No results were available for Greater Hume.

### Waste to landfill

The amount of urban waste generated and disposed of (either legally or illegally dumped) indicates the pressure of towns and the associated waste on the environment through potential contamination of soils and groundwaters and the physical area of land used for waste disposal. It is one indicator of the sustainability of towns.

LGA	Waste to landfill	Location of landfill sites	Location of private or other landfill sites
Balranald	1,000 tonnes	Balranald and Euston	-
Berrigan	4,170 tonnes	Berrigan	Tocumwal – rubble, green waste and recyclables only and Finley recycling centre
Conargo	Not recorded	Pretty Pine, Conargo, Blighty, Wanganella and Booroorban	-
Corowa	7,500 tonnes	Corowa and Howlong.	Kerbside domestic waste disposed of at Albury City Council landfill.
Deniliquin	8,491 tonnes	North Deniliquin	-
Greater Hume	3,000 tonnes to Council landfill	Brocklesby, Culcairn, Henty, Holbrook, Mullengandra, Walla Walla and Woomargama	-
Jerilderie	110	Jerilderie Town Landfill and Jerilderie Common Landfill	
Murray	5,000 tonnes	10km north of Moama	
Wakool	Not specified	Moulamein, Goodnight, Koraleigh and Wakool	Private landfill via contractor Ellwaste Pty Ltd to Patho Landfills Victoria (880 tonnes of kerbside collection)

LGA	Waste to landfill	Location of landfill sites	Location of private or other landfill sites
Wentworth	2,827 tonnes	Pooncarie, Ellerslie, Pomona, Buronga	Wentworth and Dareton waste transfer stations

Usually the Department of Local Government Comparative Data publication for a particular year is released in the June of the following year. Unfortunately the 2004/05 data due to be published in June 2006 has still not been released. Consequently no updated information from the first Supplementary SoE Report on this issue is available.

### Materials recycling

Recycling is the process by which used products are sent to a factory where they are reprocessed to produce the same product or a different one. Examples include recycling glass from old bottles and jars to make new glass products, and the recycling of paper into newspaper and other paper products. Another form of recycling relates to organic matter such as foodstuffs or garden wastes like leaves or grass clippings which, when composted, make useful soil additives.

The level of recycling is of concern to SoE reporting because it is a response towards minimising the amount of waste requiring disposal into landfill each year, and thus reducing the impact of human settlements on the natural environment. The existence of markets for recycled materials, and their rates of uptake, indicates the viability of recycling as a self-sustaining industry into the future.

LGA	Recycling Program	Volume Recycled	Nature of Program
Balranald	Yes	230 tonnes	Waste deposited at Balranald and Euston landfill sorted into Metals, Green waste, Oils, Batteries, Timber and concrete rubble, Chemical containers (note rubber/tyres is 99% recycled by retailers)
Berrigan	Yes	899 tonnes	Fortnightly kerbside collection by Cleanaway in a joint contract with Moira Shire (Victoria) from 2,368 premises.
Conargo	No	-	-
Corowa	Yes	790 tonnes	Fortnightly kerbside collection of urban areas and six rural locations throughout the Shire by Cleanaway.
Deniliquin	Yes	91 tonnes	Voluntary recycling at landfill for paper, steel, cardboard, oil, batteries and glass.

LGA	Recycling Program	Volume Recycled	Nature of Program
Greater Hume	Yes	600 tonnes	500 households provided with fortnightly kerbside collection of recyclables. Paper and recyclables drop off site for 2000 residents of Holbrook. Weekly paper collection to 3000 residents of Culcairn, Henty and Walla Walla.  A total of 500 tonne of scrap metal was also recycled from landfill sites.
Jerilderie	No	-	-
Murray	Yes	510 tonnes	Services available in Moama, Mathoura, Cumberjunga and a rural service collecting from 2,501 homes.
Wakool	Yes	398 tonnes	Fortnightly kerbside collection at Barham, Wakool, Burraboi, Moulamein, Goodnight, Murray Downs and Koraleigh.  Collection from recycling skips at Barham Transfer Station, Wakool Tip, Koraleigh Tip, Goodnight Tip and Mallan
Wentworth	No	-	-

Seven of the 10 Councils have in place some form of regular recycling program or activity. This is a positive and encouraging impact for the environment within these locales.

Due to the lateness of the publication of the Department of Local Government Comparative Data publication no updated information from the first Supplementary SoE Report on this issue is available.

### Recreation

At the time of preparing this report the 2004/05 Department of Local Government Comparative Data publication was still not available. Consequently no updated information from the first Supplementary SoE Report on this issue is available.

### Community services

At the time of preparing this report the 2004/05 Department of Local Government Comparative Data publication was still not available. Consequently no updated information from the first Supplementary SoE Report on this issue is available.

### Environment & health

At the time of preparing this report the 2004/05 Department of Local Government Comparative Data publication was still not available. Consequently no updated information from the first Supplementary SoE Report on this issue is available.

### Noise

Noise pollution can be defined as unwanted noise and does not need to be determined by decibel level alone. Noise can be an unpleasant nuisance and the degree to which

this has an impact on the population is an indicator of the pressure on individual's quality of life in this SoE annual update.

In 2005/06 there were a number of noise complaints were made across the region. The information in the table below demonstrates that noise is generally not an environmental issue in the region and is restricted to a few isolated instances.

LGA	Maintenance of Complaint Register	Number of complaints received	Nature of complaint
Balranald	Yes	0	
Berrigan	Yes	6	Noisy factory pump Animals, pigs, corellas, cats Vehicles on Newell Highway, refrigeration units and parking.
Conargo	No	0	
Corowa	-	-	-
Deniliquin	Yes	3	2 x drums 1 x party
Greater Hume	No	0	
Jerilderie	Yes	0	
Murray	Yes	6	Dogs barking Noise from fans in silos Car wash Vehicles Air conditioners
Wakool	Yes	1	Unauthorised home industry.
Wentworth	Yes	1	Swimming pool pump

### Heritage listings

There is a growing awareness among Australians of heritage places and objects and the importance of preserving them.

The number and condition of heritage listing indicates the community's response to identifying and preserving heritage, as well as the value seen in heritage in maintaining a sense of place in a region – an important factor in our quality of life.

Identification of new places is an on-going process. Places and objects that are no longer listed should be identified individually, and the reason for de-listing provided, e.g. through decay or change of use that can involve demolition or inappropriate renovation.

LGA	Number of New Heritage Listings	Details of Listing
Balranald	Action taken to remove one listing	Balranald Court House and old Post Office – building no longer exists
Berrigan	No new listings	
Conargo	No new listings	

LGA	Number of New Heritage Listings	Details of Listing
Corowa	No new listings	
Deniliquin	No new listings	
Greater Hume	No new listings	
Jerilderie	No new listings	
Murray	No new listings	
Wakool	No new listings	
Wentworth	No new listings	

### Aboriginal sites

All LGA's within the study area are aware of the importance of identifying and preserving places and objects of Aboriginal heritage. All Councils advised that no new Aboriginal objects or places were identified within their LGA during 2005/06.

Several Council's have commenced the preparation of new LEP's under the State government's Planning Reform Program. In the course of preparing background information for some of these LGA's, a search of DEC's register during 2005/06 reveals 123 Aboriginal objects and places in and around the township of Moama and 98 in and around Mathoura. In Greater Hume Shire 19 Aboriginal objects or places are recorded in and around Culcairn, 14 at Henty, 10 at Jindera, six at Burrumbuttock and one at Jindera.

## 5. CONCLUSION

All Council's participating in this supplementary report appear to continue to take small steps towards a more positive contribution to the environment. Council's continue to become more aware of their responsibilities to the environment as a result of new environmental legislation as well as a general increase in awareness on environmental issues across the community as a whole. It is important that Council's continue to minimise the impact of their activities on the environment.

At the conclusion of the Principal SoE Report two years ago, a number of recommendations were made to assist Council's in addressing their responsibilities to the environment. The recommendations are not binding on any Council and are intended as a guide or stimulus for consideration of local government environmentally related projects and activities.

It is worth reiterating these recommendations for the benefit of this second supplementary report.

- Maintain a file on SoE reporting for the purposes of collecting environmental information as it becomes available. This will make the task of data collection easier for Council staff and allow for consideration of environmental matters that otherwise might be missed. The use of GPS and mapping systems could be particularly useful in this regard.

- Support government initiatives for improved land management practices that reduce the rate of land degradation.
- Seek funding and support from all possible sources to implement environmental improvements.
- Take the opportunity in the LEP review process to strengthen controls where appropriate for the protection of the environment and in particular the Murray River.
- Prepare Potentially Contaminated Lands Registers.
- Investigate opportunities to change Council work practices that reduce motor vehicle usage (eg. improvements in technology).
- Prepare long term (say 20 years) strategic plans across the whole of the LGA that includes aims and objectives for achieving net gain for the environment.
- Monitor major developments within their LGA for compliance, particularly those that have the potential to detrimentally impact on the environment.
- Seek environmental enhancements through conditions of consent on development applications (e.g. re-vegetation).
- Ensure that urban infrastructure such as potable water supply, sewer and stormwater drainage continues to be constructed and upgraded as resources permit.
- Encourage water conservation and recycling measures in new development as well as energy efficient design.
- Take a stronger stance on illegal activities such as vegetation clearing and firewood collection.
- Ensure staff are fully briefed and understanding of changes to environmental legislation and other regulations relating to the environment.
- Continue to initiate measures that reduce waste to landfill and increase waste recycling.
- Endeavor to be responsive to complaints on environmental matters (eg. odour and noise).
- Undertake reviews of heritage listings.