

**Muswellbrook Shire Council**

2010/2011

# State of the Environment

October 2011



# Contents

Executive Summary .....	iii
Introduction .....	1
Towards Sustainability .....	3
Community Event Participation .....	4
Council's Corporate Water Consumption .....	7
Council's Corporate Electricity Consumption .....	8
Council's Fuel Usage .....	8
National Greenhouse Emissions Reporting Scheme .....	8
Human Settlements .....	10
Population and Settlement Patterns .....	11
Economic Development in Muswellbrook .....	12
Waste .....	14
Amenity .....	16
Heritage .....	18
Transport .....	19
Water Resources .....	21
Drinking Water Quality .....	22
Drinking Water Consumption .....	23
Treated Effluent Reuse .....	24
Hunter River Water Monitoring .....	25
Land .....	26
Contaminated Land .....	26
Coal Mining .....	27
Atmosphere .....	29
Air Sampling .....	29
Upper Hunter Air Quality Monitoring Network .....	31
Biodiversity .....	32
Monitoring Biodiversity .....	32

## List of Tables

Table 1 Sites and Participants on Clean Up Australia Day.....	5
Table 2 Council Fuel usage across fleet .....	8
Table 3 Council's estimated CO <sub>2</sub> emissions.....	9
Table 4 Population distributions in Muswellbrook Shire as of 2006 Census.....	11
Table 5 Major projects approved by Department of Planning in Muswellbrook LGA 2010/11 .....	13
Table 6 Type and Number of Community Complaints.....	17
Table 7 Water Quality Compliance .....	22
Table 8 Water Consumption across the LGA.....	23
Table 9 Amount of Treated Effluent Reused .....	24
Table 10 Comparison of water use suitability.....	25
Table 11 Area of Mining in Muswellbrook Shire .....	28
Table 12 Comparison of Air Sampling Results.....	31
Table 13 Numbers of records and species listed on NPWS Wildlife Atlas for Muswellbrook LGA.....	33
Table 14 Numbers of records and species listed on Protected Matters database for Muswellbrook LGA .....	33

## List of Figures

Figure 1 Community Participation in Environmental Programs .....	4
Figure 2 Council's Corporate Water Use.....	7
Figure 3 Population of Muswellbrook by geographical distribution .....	11
Figure 4 Population of Muswellbrook by age group .....	12
Figure 5 Complying Development Certificates Issued.....	13
Figure 6 Development Applications Issued.....	13
Figure 7 Amount of total waste disposed from Muswellbrook Shire .....	15
Figure 8 Type and Number of Community Complaint .....	17
Figure 9 Water Consumption compared across past reporting periods.....	23
Figure 10 Water Quality advertisement from June 2011 .....	25
Figure 11 Mining Impact in Muswellbrook Shire to June 2011 .....	27
Figure 12 Average monthly results for 10/11 reporting periods by parameters .....	30
Figure 13 Average Annual results for 2005 to 2011 reporting periods by parameters.....	30

# Executive Summary

The 2010/11 State of the Environment report for the Muswellbrook Local Government Area is the final supplementary report for the current term of Council. The indicators represented in the report were primarily developed in 2008 based on the local environmental objectives council can control or monitor.

Council has 33 indicators that cover the main themes of the report. These are included through the 6 major themes.

- Towards Sustainability
- Human Settlements
- Water
- Land
- Atmosphere
- Biodiversity

Of the 33 indicators, 23 are showing a positive trend this year, 7 are indicating a decline and 3 are stable.

Community and school participation in Council run or sponsored events has doubled to over 600 people in the last year.

Both Council and Community water use has dropped significantly and in both areas the consumption is well below the target set for 2015. However this is attributed to it being a wetter year. Significant fluctuations in both community and council water use need to be monitored further.

Council's fuel use has turned around after several years of consistent increase. More regular monitoring of this should help to maintain this improvement.

Council's electricity use continues to grow along with total greenhouse gas emissions. Council CO<sub>2</sub> contribution is 24,333 tonnes and growing despite the fuel use reduction. Council has partnered with Planet Footprint to help monitor this more regularly.

Waste disposal has increased due to construction work being carried out in the shire, however recycling has nearly doubled. Despite the increase in waste disposal, improved management at the Waste Management Facility has provided nearly 10 more years of life in the current void.

Mining continues to grow with 15% more land exposed by mining than the previous year. There has also been 10 times more land cleared than rehabilitated in the Muswellbrook LGA due to mining in the past year.

Air quality measurements held by Council shows decreasing levels of very fine particulate matter (PM<sub>2.5</sub>) in the atmosphere at Muswellbrook. At just under 5µg/m<sup>3</sup> it is the lowest annual average Council has measured. The establishment of the Upper Hunter Air Quality Monitoring Network will be able to show much more detail about air quality in the coming years.



# Introduction

Muswellbrook Shire Council prepares an annual State of the Environment Report to review and assess the Shire's natural and built environments. The report is a legislative requirement, which also provides a strategic tool to identify issues for addressing in Council's next Management Plan.

Muswellbrook Shire Council's State of the Environment Report reports on the status of the main environmental issues facing Muswellbrook Shire. The State of the Environment Report is structured around 6 major themes.

- Towards Sustainability
- Human Settlements
- Water
- Land
- Atmosphere
- Biodiversity

Significant environmental indicators are assessed to consider the impacts and level of sustainability that the community or Council has on the environment. Once these impacts have been assessed, an organisation such as the local council can manage its activities to improve environmental outcomes.

The environment in which we live, work and relax faces many pressures. These pressures broadly include the impact of development and human activities on the natural environment. Some of the biggest environmental issues of our time revolve around the global impact of the energy consumed through business, industry and transport on our climate and weather patterns. Other important issues include maintaining biodiversity and preventing pollution of our waters, land and air.

The current state or health of the environment is determined by how much impact these pressures have made on environment. The environment is resilient to many pressures, but often a tipping point becomes closer until finally an environmental process or system collapses. The impact on the environment by these pressures is measurable in many ways. This report provides information on key indicators that have been selected as means of measuring the state of the environment.

The Council and the community can respond to the state of the environment by reducing pressures and repairing or correcting the damage where possible. Although the Council and the community may have substantial motivation to make improvements to the environment, we are limited by the resources that are available and the priorities determined for those resources.

## Muswellbrook Shire Council

[Muswellbrook Shire Council](#) incorporates an area of 3,404 square kilometres of which 1,446 square kilometres (42%) are National Parks and nature reserve. The Local Government Area includes the towns of Muswellbrook, Denman and the village of Sandy Hollow. Muswellbrook includes major business districts, industrial areas, rural holdings, and diverse residential areas.

Muswellbrook Shire enjoys a rich diversity of rural enterprises including, dairying, olive growing, horse breeding and award winning wine making industries. The Shire has a very strong industrial sector based around mining and power generation and associated support industries.

Muswellbrook Shire continues to undergo immense development mainly in the extractive industries. While this economic growth is progressing in the region, it is vital to ensure realistic sustainable development through the diversity of industries, improved education facilities, development of a strong skills base and continued employment opportunities.

## Council's Role

Local government is the most diverse of Australia's three levels of government. It is an important player in the area of environment and heritage management in Australia, and has the responsibility for protecting the environment,

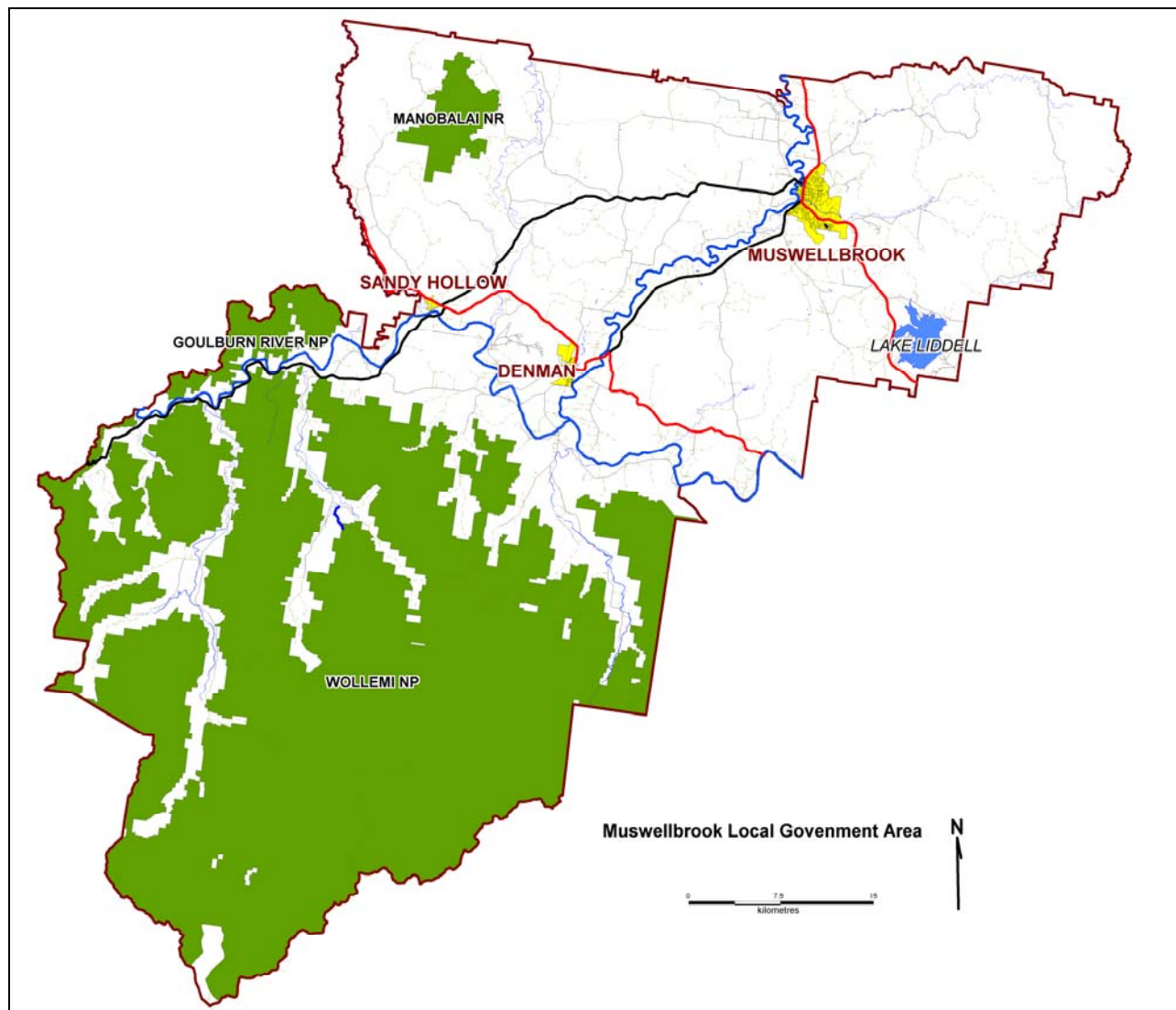
planning future landscapes, providing infrastructure, managing natural resources, and conserving or managing cultural heritage through a variety of mechanisms.

The execution of Council activities has associated environmental impacts which need to be managed to reduce the level of affect. The main environmental impacts associated with Council activities generally involve the consumption of materials and resources such as energy, water, chemicals and building materials.

The protection of the environment by Local Government is facilitated by the utilisation of a variety of Acts which can be implemented in relation to a specific circumstance. The Acts which provide Council with legislative powers to manage environmental activities include the *Local Government Act (1993)*, the *Environmental Planning and Assessment Act (1979)* and the *Protection of the Environment Operations Act (1997)*. These Acts provide a range of tools which can be used by Council to address breaches of legislation.

Council has a Local Environment Plan (LEP) and Development Control Plan (DCP) to place controls on the types of development that are permitted in particular areas and control the way those developments are carried out to minimize environmental impact.

Council's Management Plan sets out Council's environmental strategies and policy in relation to its role as an environmental steward and manager. Virtually all of the council's functions have some form of environmental implication. The State of Environment Report is used to assist in reporting progress and effectiveness of these strategies.



# Towards Sustainability

## Management Plan Goals

- To improve awareness and ownership of environmental issues in the Muswellbrook community so that the community can implement positive environmental behaviour and promote the principles of Ecologically Sustainable Development.
- Protect and enhance the environment through the promotion of an environmentally sustainable community; achievement of world's best practice standards in the rehabilitation of mines and extractive industries; to promote wildlife corridors and habitat areas; protect remnant vegetation; reduce mainstream flooding; promote community participation in the determination of major developments and to enhance the quality and enjoyment of the environment for present and future generations.
- To co-operatively and strategically manage growth, development and construction that recognises environmental standards, particularly air and water quality and promotes sustainability principles such as energy and water efficiency.
- To provide a comprehensive strategic planning framework to protect the environment, satisfy legislative requirements, to meet community needs and to involve the community in the decision making process.

## Indicators

Indicator	08/09	09/10	10/11	Trend
Community event participation	109	~135	199	✓
Students contacted through school environmental education	0	~220	418	✓
Number of active water watch groups	6	7	8	✓
Megalitres of water used by Council	175	251	192	✓
Percentage reduction in corporate water consumption from Water Campaign baseline	39%	12%	33%	✓
Megawatt-hours of electricity used by Council	5 299	5 464	5 646	✗
Percentage of renewable energy generated by Council	0.053%	0.052%	0.052%	—
Kilolitres of fuel used in Council's fleet	300.85	346.87	291.28	✓
Tonnes of equivalent CO <sub>2</sub> emitted by Council operations	22 384	23 012	24 333	✗

### Key for trends:

- ✓ Towards sustainability
- ✗ Away from sustainability
- No trend
- ? No data

## Discussion

### Community Event Participation

Considerable effort has gone into encouraging the community to participate in local events, with council staff endeavouring to involve the community through making contact with local service groups and industry. This contact has resulted in an increase in community involvement in events such as National Tree Day and Clean Up Australia Day.

Community participation numbers in Muswellbrook Shire Council over the past five years are detailed in Figure 1.

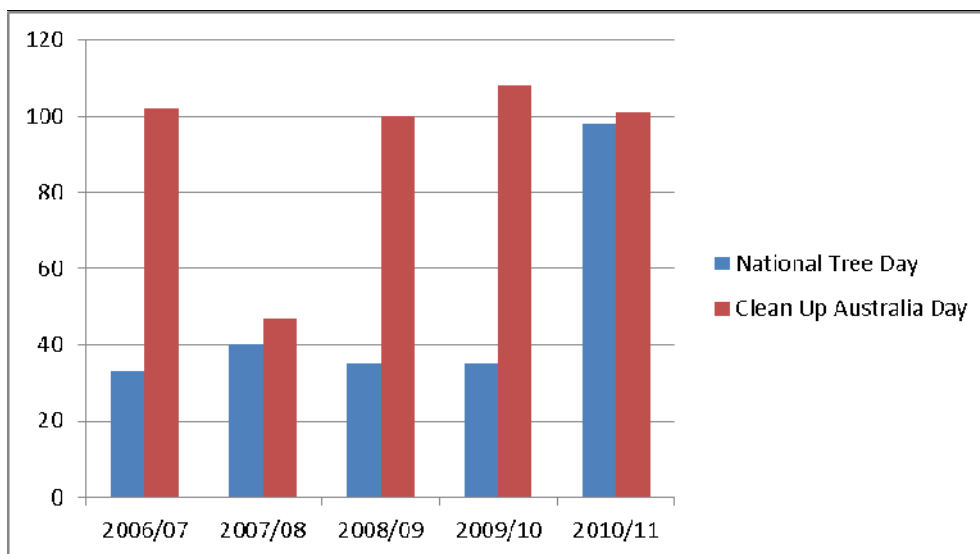


Figure 1 Community Participation in Environmental Programs

### National Tree Day

National Tree Day is a Planet Ark initiative that has seen over 20 million trees planted Australia wide since its inception. It is an opportunity for schools, community groups and local residents to come together to make a positive difference to our environment. Growing local native trees, shrubs and ground covers helps to provide food and shelter for Australia's wildlife, increase native biodiversity and combat the habitat loss that threatens much of our wildlife.

A total of 98 community members participated in National Tree Day in the Muswellbrook Shire at two sites; Highbrook Park, Muswellbrook and the Denman Wetlands with 1000 trees and shrubs planted at Highbrook Park and 300 trees and shrubs planted at the Denman Wetlands. Free barbecues manned by local service groups were provided at both sites at the completion of planting for all volunteers.



National Tree Day Highbrook Park Muswellbrook

<http://treeday.planetark.org>

## Clean Up Australia Day

Clean-Up Australia Day celebrated its 21<sup>st</sup> birthday in 2011. It was held on Sunday 6 March 2011 at a number of sites across the Shire. The day was well attended by community members, with over 5200 kg of rubbish and recyclables removed from our local parks, waterways and roadsides by 101 volunteers. Free barbecues manned by local service groups were provided at both Muswellbrook and Denman for all volunteers.



by local service groups were provided at both Muswellbrook and Denman for all volunteers.

Table 1 details sites and participants for Clean Up Australia Day 2011.

Several of the local schools also participated in Schools Clean Up Day in Muswellbrook Shire. These were

- Muswellbrook South Public School,
- Muswellbrook High School,
- St James Muswellbrook,
- Denman Public School,
- St Josephs Denman and
- St Josephs Aberdeen.

Just some of the Clean up Australia Day bags filled with rubbish.

**Table 1 Sites and Participants on Clean Up Australia Day**

Site	Volunteers
Karoola Park	Muswellbrook Girl Guides
Karoola Wetlands	Community volunteers
Brennan Park and Muswellbrook Indoor Sports Centre	Mt Arthur Coal
Fitzgerald Park	Community volunteers
Highbrook Park	Mt Arthur Coal
Olympic Park	Community volunteers
Simpson Park	Community volunteers
Wollombi Park	Community volunteers
Muswellbrook Township	Muswellbrook Chamber of Commerce, Coal and Allied, Mt Arthur Coal and Stan Ray.
Muswellbrook South	Community volunteers
Coal Road Muswellbrook	St Heliers Correctional Centre Work Crew
Denman Wetlands and Parks	Denman Scout Group and Mt Arthur Coal
Denman Recreation Area	Denman Little Athletics Centre

[www.cleanup.org.au](http://www.cleanup.org.au)

## Upper Hunter Show

Council participated in the Upper Hunter Show. On display was the Sustainability Trailer, along with a large amount of material highlighting services that Council can provide and information on how to live in a more sustainable fashion.

Council also launched a program called "Let's Get Your Water Use Sorted" at the show aiming to reduce household water consumption across the shire. Approximately 100 families signed up to this initiative at the show. Council will continue to offer this program to residents throughout the year. A large number of school students and the community attended the display.

## **School Environmental Education**

In 2011 Council has continued using a proactive approach towards School Environment Education by providing schools with opportunities to implement environmental programs. To assist with this Council has developed a program called "Eco-Cational Schools".

This program makes a number of free activities available to schools

- Environment Days
- Environmental Audits
- School Environmental Management Plans
- Assignment Information

During the 10/11 reporting period two schools across the shire participated in environmental education. Muswellbrook Christian School held an Environment Day where all students at the school participated in a range of environmental education activities such as constructing worm farms, composting, waste audits and getting a school vegetable garden started. Sandy Hollow Public School held an environmental audit, where students from years 4, 5 and 6 audited the schools electricity consumption through studying electricity bills and counting lights, air conditioning, heaters and other electrical appliances and estimating their usage. Students then explored ways to reduce consumption of electricity and presented this information to their school. 53 school students participated in the program during the reporting period.

Council also engaged "Waste Watchers" from Keep Australia Beautiful with assistance from Macquarie Generation to run environmental education sessions at schools. In 2010 Waste Watchers visited four schools running a session called "Wide World of Waste" with 249 students participating in the program and learning more about reducing the waste that ends up in landfill by using the 3 bin system effectively, composting and using worm farms.

## **Solar Boat Challenge**

In conjunction with local primary schools, high schools and local industry Council coordinates an annual Solar Boat Challenge, where teams of students design, build and race solar boats. The teams must also give a short presentation about solar power and their experiences building their boats. This initiative not only encourages school students to learn more about the uses of solar power, alternative energy, design and manufacturing skills and in turn apply this acquired knowledge but also focuses on team work and presentation skills. The Solar Boat Challenge also gives schools and industry the chance to work together on building the solar boat fostering good relations between schools and industry. Twenty seven teams comprising of 116 students took part in the solar boat challenge during the reporting period.

### [Solar Boat Challenge](#)

## **Waterwatch**

Waterwatch is a national community network of volunteers that monitor their local waterways. Waterwatch encourages all people to become active in monitoring and protecting their local waterways. Volunteers monitor their local water ways and undertake projects to improve the quality of the waterways. There are eight groups currently registered with Waterwatch in the Muswellbrook area.

### [Waterwatch](#)

# Council's Corporate Water Consumption

The Council adopted water conservation goals in 2009 to:

- Reduce Council's corporate potable water consumption by 20% on 2004/05 base year levels by 2015. The base year consumption was 287,000 kL.
- Reduce the community's potable water consumption by 16% on 2003/04 base year levels by 2015. The base year consumption was 2,022,000 kL.

In the 2010/2011 year Council's corporate water use has reduced from last year. The total Council use of water is 192,999kL representing 33% reduction from the baseline value.

This has largely been attributed to the significant rainfall reducing the need to water playing fields. Also a significant leak at the Muswellbrook Aquatic Centre was repaired in the reporting period.

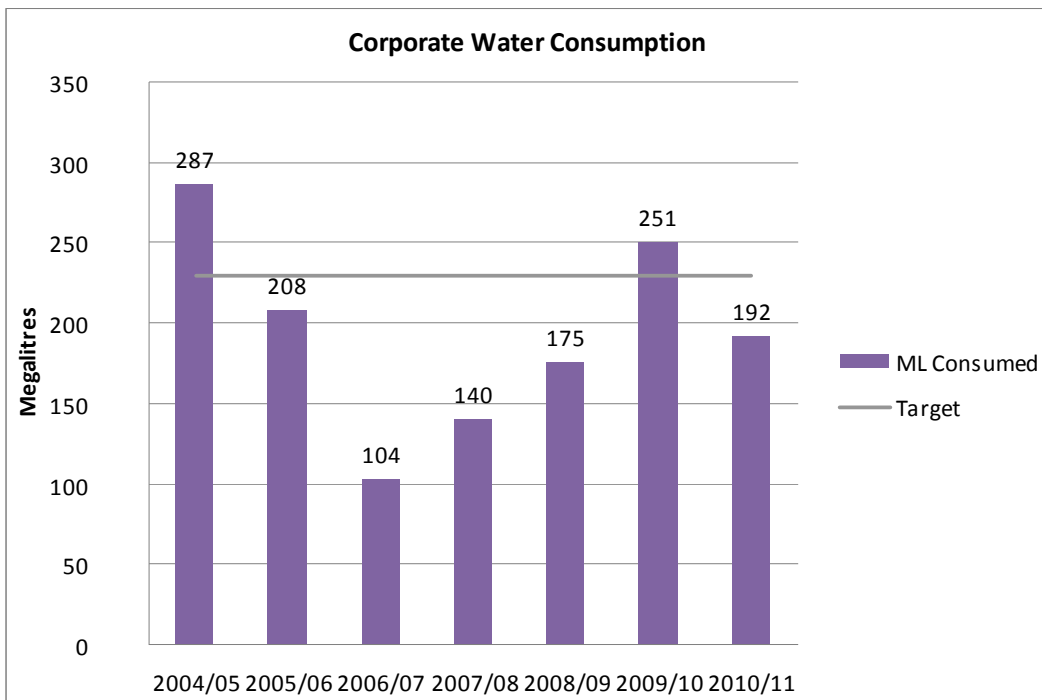


Figure 2 Council's Corporate Water Use

## Council's Corporate Electricity Consumption

The majority of electricity in NSW is produced through coal fired power stations. More sustainable forms of energy are also available in some areas of the State such as natural gas, petroleum products, thermal, solar and wind energy. These forms of energy production are becoming more widely recognised and utilised as they become more efficient and cost effective however the combustion of coal to produce electricity remains the predominant energy source.

Council's electricity consumption for the reporting period has increased by 3% when compared to the previous reporting period.

Council's Administration Building has a demonstration photovoltaic array that supplements the electricity use of the building. The total energy contribution from the photovoltaic panels was 2.94 MWh for the year, with an average of 8.06 kWh per day. This is sufficient power for an energy efficient household without electric hot water, stove, and air-conditioning or heating. This has saved a total of 882 kg of CO<sub>2</sub> emissions over the reporting period.

## Council's Fuel Usage

Muswellbrook Shire Council is responsible for a large fleet of vehicles that are required to assist Council to carry out all its functions. The fleet varies from 4 cylinder cars, four wheel drives, light plant and heavy vehicles. Table 2 details fuel consumption of Council's fleet for the past four years.

**Table 2 Council Fuel usage across fleet**

Type of Fuel	07/08 Consumption	08/09 Consumption	09/10 Consumption	10/11 Consumption
Unleaded	32.77 kL	28.59 kL	33.95 kL	17.17 kL
Diesel	164.55 kL	186.98 kL	257.87 kL	245.60 kL
LPG	23.05 kL	18.84 kL	16.45 kL	16.35 kL
E10 Unleaded	56.92 kL	66.44 kL	38.6 kL	37.22 kL
TOTAL	277.30 kL	300.85 kL	346.87 kL	316.34 kL

Council fuel use has decreased by 9% since the last reporting period.

Consumption of both unleaded and diesel fuel has decreased. This is a positive trend after significant increases in past years. Council will continue to monitor this and seek further reduction through the selection of more economical vehicles.

## National Greenhouse Emissions Reporting Scheme

The National Greenhouse and Energy Reporting Act 2007 (the NGER Act) came into effect on 29 September 2007. The NGER Act is administered by the Federal Government Department for Climate Change introduces a single national reporting framework for the reporting and dissemination of information about the greenhouse gas emissions, greenhouse gas projects, and energy use and production of corporations.

Under current legislation Council is not required to submit a report for the 2010/2011 reporting period because emissions from Council's operations have not exceeded any of the relevant reporting thresholds this year. See Table 3 for an estimation of Council's total CO<sub>2</sub> emissions.

**Table 3 Council's estimated CO<sub>2</sub> emissions**

<b>Emission Category</b>	<b>kt CO<sub>2</sub>-e 08/09</b>	<b>kt CO<sub>2</sub>-e 09/10</b>	<b>kt CO<sub>2</sub>-e 10/11</b>	<b>Scope</b>
Electricity	4.768	4.918	5.081	2
Diesel	0.504	0.696	0.663	1
Automotive gasoline (petrol)	0.210	0.164	0.121	1
Other Fuels	0.030	0.026	0.026	1
<b>Methane emissions</b>				
Waste Management Facility	14.13	14.91	15.700	1
Water and Waste	2.740	2.741	2.741	1
Total Methane emissions	16.87	17.651	18.441	1
<b>Total 2009/2010</b>	<b>22.384</b>	<b>23.455</b>	<b>24.333</b>	<b>1 &amp; 2</b>

Council's emissions are anticipated to increase due to the nature of the emission calculations for the Waste Facility. Since methane emissions are calculated on the exponential decay of waste placed in the void in the past, emissions will therefore increase for every year waste is added to the void.

It is pleasing to note that Council's petroleum fuel use has decreased over 10/11 period and green house gas emissions from fuel have correspondingly decreased by 9%.

Council's electricity use has increased over 10/11 period and greenhouse gas emissions from electricity use have increased by 3%.

Council's greenhouse gas emissions from waste have increased by 5%.

Overall council's total greenhouse gas emissions for the 10/11 period have increased by 4% when compared to the previous reporting period.

Council is working on developing suitable indicators relevant to the size and activity of the Council. These indicators will better reflect energy consumption and emissions per head of population or number of staff. This will allow for comparison with other Councils to rate performance.

# Human Settlements

## Management Plan Goals

- To provide residents with an efficient, reliable and effective domestic waste collection service.
- To achieve a self funded, efficient and environmentally sustainable waste management service to meet community needs and legislative requirements
- Increase public awareness of recycling, reuse and waste reduction.
- Maximise resource recovery at Muswellbrook Waste Depot by promoting source separation by providing written information to all customers therefore increasing the lifespan of council's void.
- Investigate and promote sub-regional co-operation for waste disposal.
- To maintain the open space recreation assets in accordance with agreed levels of service and within available budget.
- To provide and maintain assets which allow the sustainable delivery of selected services in the interest of fulfilling recognised social, sporting and recreational needs, to a standard which is understood and accepted by the community.
- Identify and pursue grant funding for Aboriginal Heritage Study for entire LGA.
- To maintain communication systems between Council and the Aboriginal community
- To operate and maintain an effective heritage management and assessment process.
- To provide and maintain assets which allow the sustainable delivery of selected services to a standard which is understood and accepted by the community.

## Indicators

Indicator	08/09	09/10	10/11	Trend
Development Consents determined by Council	290	290	378	—
Tonnes of waste disposed of	22436	21332	26355	X
Tonnes of recycling diverted from landfill	2508	2520	4638	✓
Approximate lifespan of council's void	10-15 years	15 – 20 years	26 years	✓
Tonnes of green waste diverted from landfill	4581	2855	3190	✓
Number of Environmental Complaints to Council from the community	63	95	54	✓
Number of heritage items listed in LEP	134	134	134	✓
Number of grants secured to fund an Aboriginal Heritage Study.	0	0	0	X

### Key for trends:

- ✓ Towards sustainability
- X Away from sustainability
- No trend
- ? No data

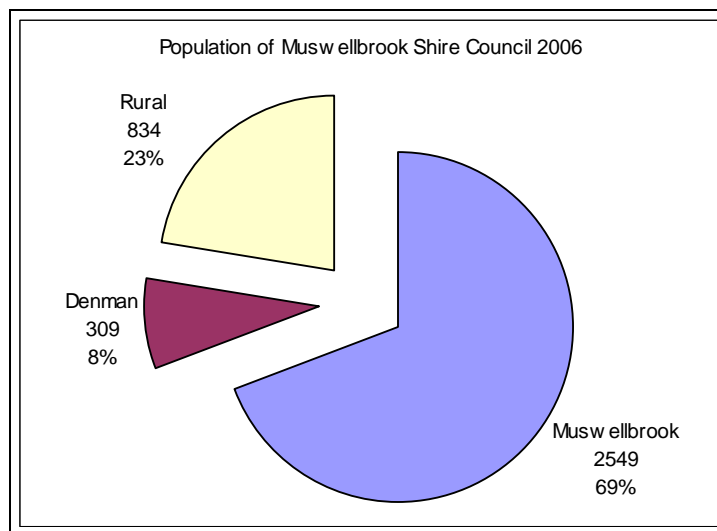
## Discussion

### Population and Settlement Patterns

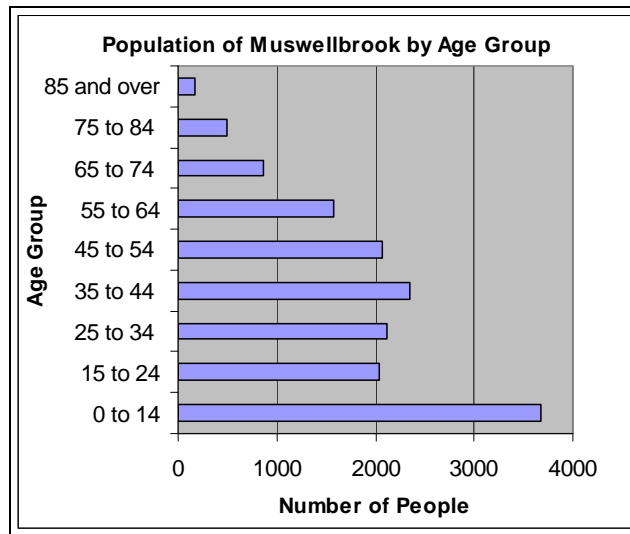
Muswellbrook Shire Council does not keep track of population in the Shire between National Censuses. Therefore Council relies on the data provided by the Australian Bureau of Statistics. The National Census population count was conducted on August 6, 2011. Results are not yet available for the 2011 census. The data provided by the ABS for the 2006 Census is included in the tables and graphs below. The current estimated population of the Shire is 16,676. Population growth for the reporting period was 1.8%. This was one of the highest Local Government Area growth rates in the Hunter and is assumed to be related to the large scale development in open cut coal mining and the associated residential development.

**Table 4 Population distributions in Muswellbrook Shire as of 2006 Census**

	<i>0-14</i>	<i>15-34</i>	<i>35-54</i>	<i>55-64</i>	<i>65+</i>	<i>Total</i>
Muswellbrook	2549	1451	4128	1012	1083	10223
Denman	309	178	532	175	192	1386
Rural	834	431	1716	372	274	3627
Total	3692	2060	6376	1559	1549	15236



**Figure 3 Population of Muswellbrook by geographical distribution**



**Figure 4 Population of Muswellbrook by age group**

It should be also noted that the population of Muswellbrook has continued to be impacted in the last reporting period by extensive mine development and expansion. Both Mt Arthur Coal and Xstrata Mangoola Coal have been undertaking significant construction projects employing several hundred contractors. These workers typically reside in the towns during the week while working and go home to families on the weekend. Therefore they place demands on infrastructure, waste and water without necessarily adding to our official population figures. This makes it difficult to assess and justify the need or use of infrastructure and services.

## Economic Development in Muswellbrook

During the 2010-2011 reporting period Muswellbrook has mainly undergone statewide development that required NSW Department of Planning approval as opposed to council approval. There were a small number of large scale developments that Council did approve including:

- Hungry Jacks
- Sub Zero
- Renovations at a number of retail and hospitality businesses.
- 119 new development lots were released in subdivision certificates.

Council developments that occurred in the 2010-2011 reporting period include:

- New library facilities
- Completion of the Muswellbrook Skate Park
- Stage two of the Muswellbrook CBD revitalisation.

## Complying Development Certificates

The number of Complying Development Certificates issued by Council and accredited certifiers in the 2010-2010 reporting period has increased slightly when compared to the previous year. The use of Private Certifiers has influenced this trend.

## Development Applications

The number of development applications determined by Council in the 2010-2011 reporting period has increased when compared to the previous reporting period. There has been a substantial increase in residential applications and a small decrease in commercial applications while industrial applications have remained stable. The continued increase in residential applications is reflected by the release of several subdivisions in Muswellbrook and Denman.

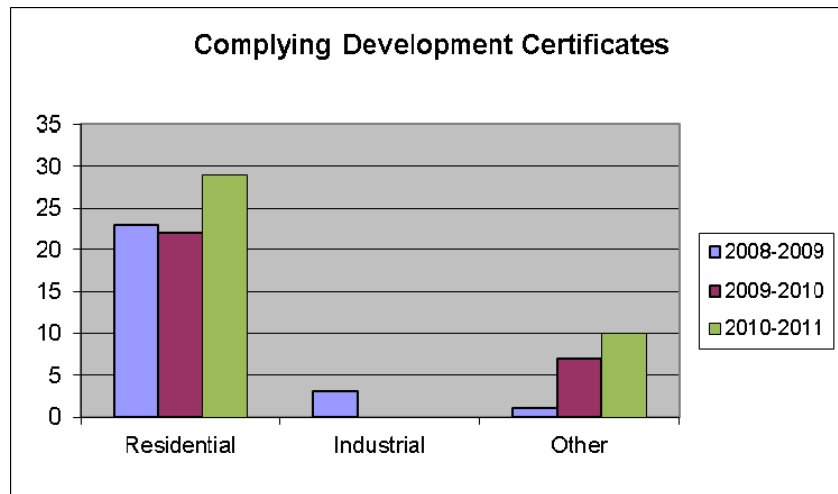


Figure 5 Complying Development Certificates Issued

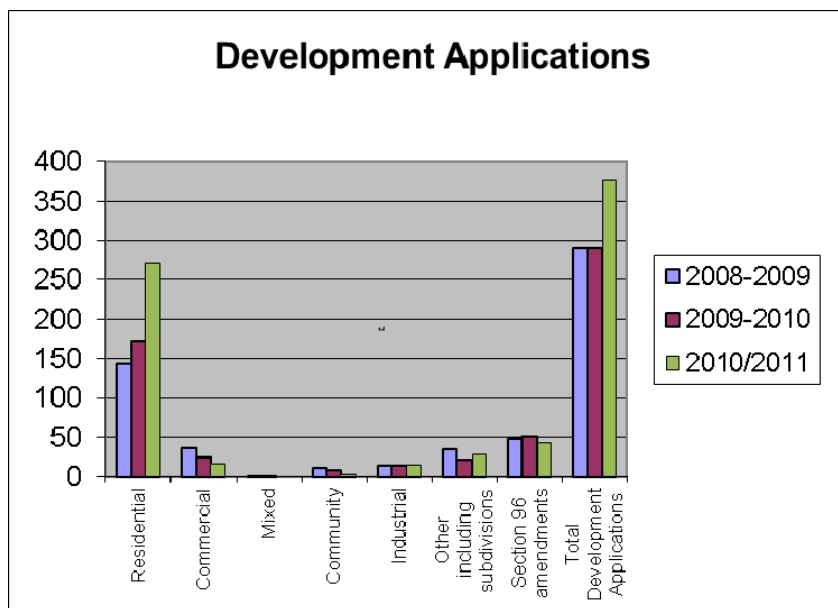


Figure 6 Development Applications Issued

## Major Projects

The NSW Department of Planning assesses major projects in the Muswellbrook Shire. In 2010/11 reporting period the following project was approved by the department.

Table 5 Major projects approved by Department of Planning in Muswellbrook LGA 2010/11

Project	Approved
Mt Arthur Mining Complex –Open Cut Expansion Project	24/09/2010

Applications for a further 6 projects applications were received by the department in the reporting period.

- Mangoola Mine Modification 4 - Modify Approved Mine Plan Assessment
- Bayswater to Mt Piper transmission line relocation
- Bengalla Mine Modification 4 Assessment
- Drayton South Coal Project Application

Details of major projects in the shire can be found at the [Department of Planning](#) website.

Other development is carried out in the Shire under the provisions of the Infrastructure State Environmental Planning Policy (SEPP). These include work on a range of infrastructure facilities including roads, water and sewer, energy transmission line, railways track work and school redevelopments. Each authority must comply with strict guidelines; however Council is not involved in the approval process for these developments and is not always informed about such projects.

Council is aware that significant infrastructure work is being carried out in the Shire and in the most part this is related to the development of coal mining.

## Waste

Muswellbrook Shire Council provides a waste disposal service and facilities to the community. The sustainable reuse and/or disposal of waste products have therefore become a major focus of resources for all local governments. Reducing waste to landfill extends the life of Council's voids. This in turn reduces the need to find and develop new waste disposal areas.

To help improve the life of the current land fill void, Council has implemented several initiatives to increase compaction and reduce the need for daily cover material. By using steel plates to keep waste from being blown around instead of soil, Council reduces the amount of unnecessary filling of the void. During the 2009/10 reporting period the void had a 15 - 20 year lifespan. With improved management, compaction and capping the estimated lifespan of the void has increased to a 26 year lifespan at current disposal rates.

Council's collection service includes kerbside collection of household waste, recyclable material and garden organics to urban and several rural areas of Muswellbrook, Denman and Sandy Hollow. The [Muswellbrook Waste Management Facility](#) receives waste from kerbside collection through the [three bin system](#) as well as waste brought to the Muswellbrook and Denman Transfer Stations. Several Waste contractors also dispose of waste at the facility.

A total of 26,355 tonnes was collected from the Muswellbrook Shire at the Waste Management Facility in the 10/11 year. A further 3,708 tonnes was collected from Upper Hunter Shire kerbside collections. Of the total from Muswellbrook Shire, 18,525 tonnes was disposed of in the landfill, 4,638 tonnes was recycled through the Materials Recovery Facility and metal recycling and 2, 855 tonnes was green waste.

From the shire alone, waste to landfill has increased this year with an additional 2,568 tonnes or 14% of waste disposed of to landfill in comparison to the 09/10 reporting period. This increase in waste to landfill is largely from industries, construction and demolition and the commercial. The amount of recycling has increased by 46% as a percentage of total waste when compared to the 09/10 reporting period. Green waste collected in 10/11 has increased by 335 tonnes or 11% as a percentage when compared to the 09/10 reporting period.

The percentage of recycling diverted from the Shire waste stream has gone from averaging 11.5% for several years to 18% during this reporting period.

It is pleasing to note the increase in recycling and green waste figures; however contamination of recycling is still a major issue in the Muswellbrook Shire with an estimated contamination rate of 14%.

The total waste added to landfill at the Muswellbrook Waste Management Facility was 21,192 tonnes. This is an increase of 2,735 tonnes or 15%.

During the reporting period Council undertook a Waste Audit of kerb side bins and found that;

- 23% of waste collected from households in the general waste (red lidded) bins was recyclable and included items such as plastic bottles and containers and aluminum cans; indicating that recycling rates could further improve.
- The rate of contamination in the recycling (yellow lidded) bins was 14% and included items such as plastic bags, construction material and garden waste.
- Compliance was best with green waste (green lidded) bins with a contamination rate of approximately 1%.

The audit highlights that Council could further improve recycling rates by increasing the amount of recyclables that are removed from the residual waste stream and by reducing the amount of residual waste that ends up in the recycling bins. It also highlighted that food waste made up a large proportion of waste going into landfill. By introducing programs that are designed to divert food from the residual waste stream Council could further reduce the amount of waste ending up in landfill.

As part of its continuing efforts to minimise waste, Council commissioned Impact Environmental Consultants (IEC) to perform a waste characterisation audit in order to better understand the volume and composition of its mixed waste stream. This audit was conducted between 17 and 23 March 2011 in accordance with the New South Wales Office of Environment and Heritage guidelines. 220 red lidded bins were randomly selected from across the community's five collection zones. These were individually sorted to ascertain the composition and quantity of the waste. All information gathered was collected in a manner that protected the resident's privacy.

Food represented the highest proportion of waste at 28%, followed by paper at 21%, plastics at 15%, mixed organics at 10% and glass materials at 8%. The paper stream was made up of 50% non recoverable paper such as disposable nappies and disposable paper and much of the plastics stream was made up of unrecoverable items such as plastic film. .

On average, nearly 18% of the waste discarded is potentially recyclable. Council will look at ways it can help residents recycle more waste.

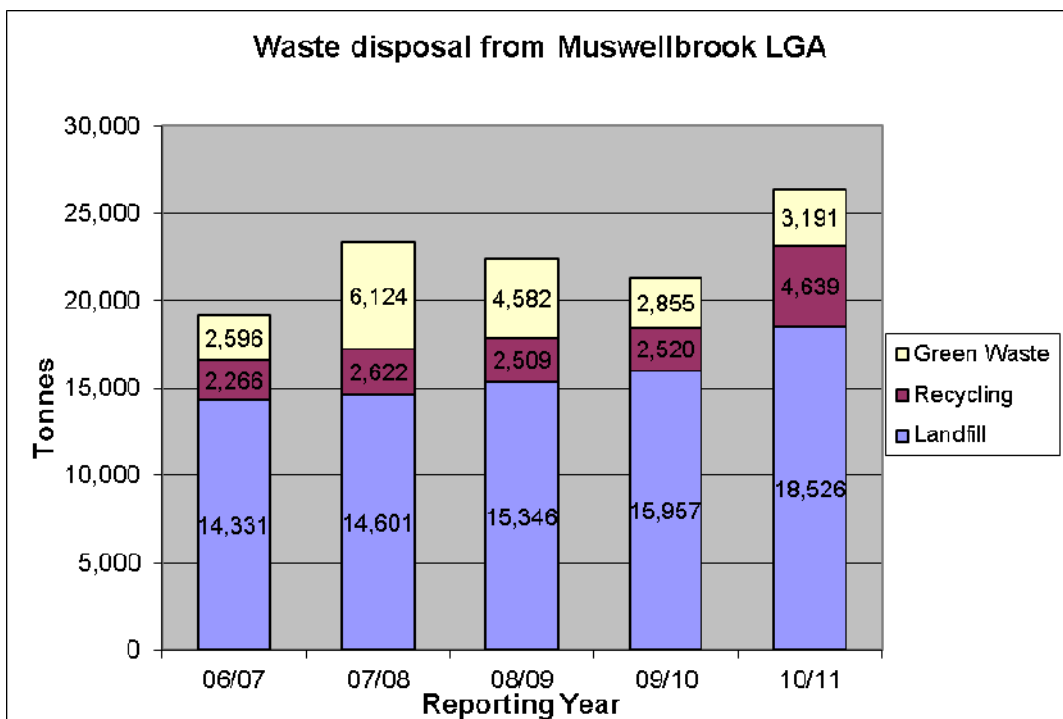


Figure 7 Amount of total waste disposed from Muswellbrook Shire

## E-Waste

Electronic Waste or e-waste can come in many forms. There are many types of plastics and metals found in equipment such as

- Computers
- Photocopiers
- Printers
- Faxes
- Monitors
- Batteries

Some of these plastics and metals can be highly toxic and environmentally damaging.  
[http://www.cleanup.org.au/PDF/au/e\\_waste-fact-sheet.pdf](http://www.cleanup.org.au/PDF/au/e_waste-fact-sheet.pdf)

In 2008 Council held its first E-Waste Collection Day which proved to be so successful that it became an annual event. Council held an E-Waste Collection Day in December 2010 at the Muswellbrook Indoor Sports Centre.

There was a total of 9600 kilograms of E-waste collected from 194 people and diverted from landfill. Almost 9100 kilograms of this waste was recycled. The Muswellbrook Waste facility now has an E-Waste container on site and all types of E-Waste can now be dropped off at the Muswellbrook Waste Facility for recycling throughout the year.

### **E-Waste**

## **Mobile Muster**

Mobile Muster is an initiative of the Australian Mobile Telecommunications Association in partnership with Landcare Australia. It is a mobile phone recycling program which began in 1999. Recycling mobile phones reduces the need to use raw materials which; saves natural resources, reduces hazardous waste entering landfill, prevents pollution and protects our environment. During the reporting period Mobile Muster saw 17,500 kg of batteries diverted from landfill nationally. Muswellbrook Shire Council has a collection box for mobile phone recycling in the administration area which can be used by both staff and members of the community. Muswellbrook Shire Council collected 9 kg of mobile phones, batteries and accessories during this period which were sent to Mobile Muster for recycling.

### **Mobile Muster**

## **Hoarder's Haven**

Hoarder's Haven is a successful and innovative way of reducing the amount of waste that goes to landfill. Items that are in good condition and are reusable are either donated by members of the public using the waste depot or are salvaged from collected waste by waste depot staff. Items available at Hoarder's Haven include such things as furniture, antiques and sporting equipment.

Hoarder's Haven is open on demand at the waste collection depot.

### **Hoarder's Haven**

## **Amenity**

Amenity can be defined as what people value about a place and how it affects their quality of life. The qualities of a place vary from person to person and with cultural and socio-economic differences. Things that can affect the amenity of an area include the physical landscape, open spaces, recreational areas, accessibility and level of noise.

Council provides and manages selected recreation services to the community, with active and passive recreation for all age groups the aim. These facilities include

- Playgrounds
- Parks
- A Skate Park
- Swimming Pools
- Sports Fields
- Golf Course
- Pathways and
- Cycle Ways

## **Community Complaints**

Council receives a large number of complaints from the community regarding issues that affect the amenity of the local area. Traditionally environmental complaints mainly relate to noise and dust. Odour and illegal dumping of waste are the other two categories that Council commonly deals with.

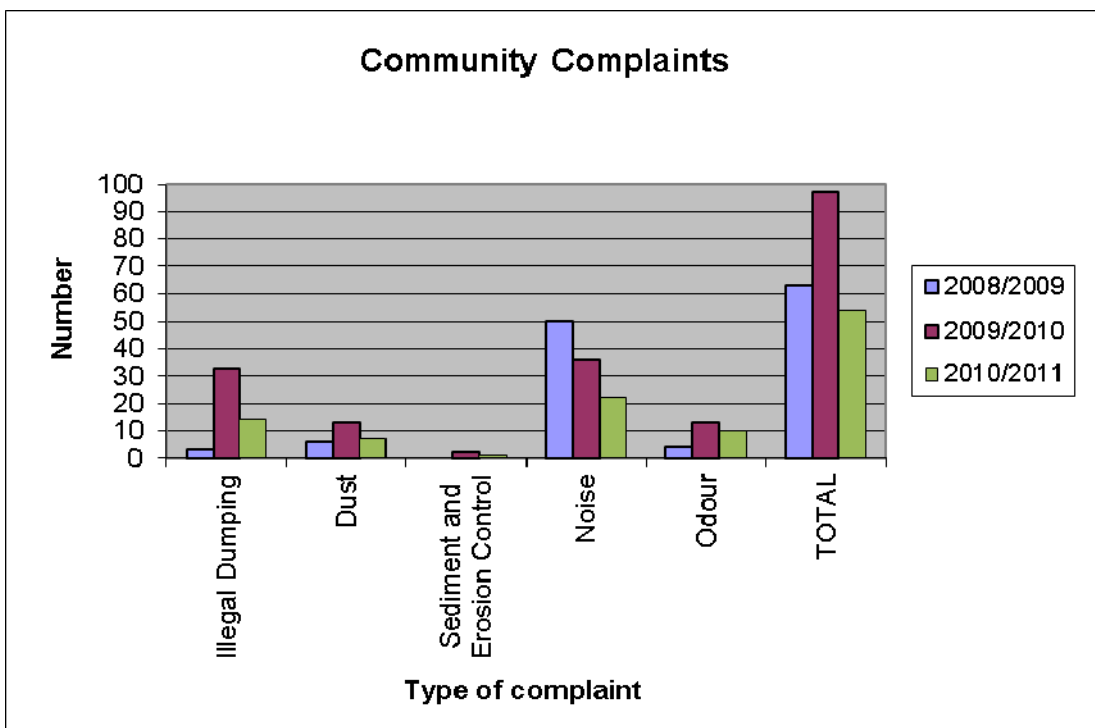
Issues such as noise pollution which can be described as any noise that has a negative effect on daily life, odour which is difficult to regulate and very subjective and dust which is a major issue in this area due to the high number of extractive industries and state approved developments which are in close vicinity to housing.

See table 5 and figure 6 for the number and types of environmental complaints received by Council during this reporting period. There has been a decrease in complaints across all sections since the last reporting period. This may indicate that residents are now reporting complaints directly to the source instead of council. Overall complaints to council have decreased by 44% when compared to last year's reporting period.

In attributing any value to complaint numbers, it must be considered that the number of complaints or reported incidents does not necessarily reflect the state of the environment and is a poor indicator. The level of complaints received and recorded is impacted by the perception in the community that Council is able to address the cause of complaints, improved systems for recording and dealing with complaints, and the community's unwillingness to tolerate less than desirable condition. Of course it may also reflect that these matters are inherently changing in frequency and or magnitude. Table seven details complaint types and numbers received by council.

**Table 6 Type and Number of Community Complaints**

Complaints	2008/2009	2009/2010	2010/2011
Odour	4	13	10
Noise	50	36	22
Dust	6	13	7
Erosion/Sediment Control	0	2	1
Illegal Dumping	3	33	14
<b>TOTAL</b>	<b>63</b>	<b>95</b>	<b>54</b>



**Figure 8 Type and Number of Community Complaint**

Several of the odour complaints relate mainly to commercial activities occurring adjacent to residential development. Council seeks to ensure the best practices to reduce odour are implemented at these commercial enterprises.

Noise complaints during this reporting period have mainly been of a domestic and commercial nature. It is possible that industrial noise complaints are being made directly to the source of the noise.

Council manages many of these environmental issues through the following measures:

**Complaints Protocol** – enables Council to adequately deal with and monitor complaints;

**Sediment and Erosion Surveys** – Council undertakes monthly Sediment and Erosion Surveys of construction sites to ensure these common sources of sediment are maintained at appropriate standards;

**Litter and Illegal Dumping Identification Protocol** – enables all Council staff to easily report regular littering and illegal dumping site for regulatory follow-up and specific cleanup action for event such as Clean-up Australia Day;

**Noise Guide for Local Governments** – Council undertakes responses to and management of noise complaints as per the recommendations in this document.  
<http://www.environment.nsw.gov.au/noise/nglg.htm>

**NSW Industrial Noise Policy** – used in the management of commercial and industrial noise emissions and the determination of noise limits for operations and activities.  
<http://www.environment.nsw.gov.au/noise/industrial.htm>

**Noise Monitoring** – as per specific approvals all mining operations are required to monitor and manage the level of noise emissions. The relevant approvals for the mining operations also require that the data and interpretations be reported to the community and Council on a regular basis

**Dust Monitoring** – Complaints about dust can be addressed by council if the source of the dust is from a source other than a mine and prevention notices can be issued. Dust from mining industry operations should be reported to the relevant mine community information line. Mining industry operations are required to monitor and manage the levels of dust. The relevant approvals for the mining operations also require that the data and interpretations be reported to the community and Council on a regular basis.

## Complaints about Major Projects

In relation to complaints about Major Projects, including mining and the power stations, Council has adopted a policy outlined in Council's Guidelines for Community Consultative Committees. The policy requires the complainant to make the complaint to the Operating Company in the first instance. Phone numbers for each operation are regularly published in the local newspapers and are available on [Council's website](http://www.muswellbrook.nsw.gov.au/Council-services/Environment/Mines.htm)  
<http://www.muswellbrook.nsw.gov.au/Council-services/Environment/Mines.htm>

Where the complainant is not satisfied with response or actions by Operating Company, the Operating Company will refer the complaint to Muswellbrook Council (Environmental Services Department, Environment Manager). The individual may also refer the matter to Council directly.

## Heritage

As part of Council's commitment to heritage management, an agreement is maintained between NSW Heritage Office and Council to support the current heritage advisory service. This agreement ensures that Council's Heritage Advisor attends Council and is accessible to the community on at least one day per month.  
<http://www.heritage.nsw.gov.au/>

During this reporting period no new heritage sites have been added to the Heritage Register. Council will continue to maintain and monitor heritage issues across the Shire

Provisions for heritage assessment have been included in the Local Environment Plan (LEP) and Development Control Plans 2009. The purpose of the LEP is to define what a parcel of land may be used for.

Under the LEP the objectives involving heritage are

- To conserve the environmental heritage of Muswellbrook, and
- To conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views, and
- To conserve archaeological sites, and
- To conserve place of Aboriginal heritage significance.

### [Local Environment Plan](#)

The Heritage Strategy outlines actions to be followed by Council to promote heritage conservation throughout the Muswellbrook Shire Council area.

The Muswellbrook Local Environmental Plan 2009 was gazetted in April 2009, and lists 134 items of environmental heritage and identifies three (3) heritage conservation areas within the Muswellbrook Shire Council area.

## **Aboriginal Heritage**

Council formed the Aboriginal Reconciliation Committee in 1997 to ensure that council maintains effective communication systems with the local Aboriginal people. The committee consists of representatives from council, the Aboriginal community, government and non government Aboriginal service providers, NSW Police and the Local Ministers Association.

The heritage of Aboriginal people is an important aspect of development assessment which is considered by Muswellbrook Shire Council. Developments undertaken must consider and preserve where possible the sites and artifacts considered to be of cultural significance to the local Aboriginal tribes. Council provides listings of proposed developments to the Wanaruah Land Council to facilitate consultation regarding the potential for Aboriginal Heritage impacts arising from development, if any impacts are found the Wanaruah Land Council can then advise on the development.

### [Aboriginal Heritage](#)

## **European Heritage**

Muswellbrook Local Government Area has an extensive and well documented European heritage. This has resulted in a large number of sites and structures which have heritage value. The management and preservation of these sites and structures is important to Council and is managed through the maintenance of a Heritage Inventory.

The most significant impact on heritage items is caused by inadequate management of the items which allows the destruction or damage to the buildings or sites. The most common threat to heritage buildings is through lack of maintenance allowing them to become derelict and possibly unsafe requiring extensive restoration works or even demolition.

A number of heritage homesteads in the area are located in close proximity to open cut coal mining which are often subject to blasting vibrations. This could result in further damage to these buildings and sites if not managed correctly.

### [European Heritage Information](#)

## **Transport**

A large road network consisting of State, Regional and Local roads exists within the Shire. The network includes approximately 69 km of state highways, 39km of regional road, and 583 km of local roads. Council undertakes road maintenance and improvement activities on the network using a combination of its own workforce and specialist contractors.

The road network carries traffic generation by extractive industries, industrial estates, commercial and agricultural activities and residential suburbs. The main towns served are Muswellbrook and Denman.

In addition to State and National highways, the Shire is also served by a rail network, providing freight and passenger services to industrial and residential sectors. Council lobbies State and Federal governments to ensure the provision of adequate road and rail infrastructure. Council is continuing to advocate for an alternative route for heavy vehicles to bypass Muswellbrook.

### [Roads and Footpaths](#)

Public transport in the form of buses in the urban area of Muswellbrook is a viable and operational form of public transport. However across the broader local government area the distance between populated areas of Muswellbrook, Denman and Sandy Hollow along with the cluster settlements makes public transport a non viable option. This spread of settlements requires a reliance on private transport to link residents to essential infrastructure and services.

There are a wide range of transport options available in Muswellbrook to link residents to major cities, regional centres and other states. This includes passenger rail services which are provided by the state government and bus services which are privately owned and operated. This also includes services which link with Newcastle airport.

### [Public transport](#)

## **Paved Road Surfaces**

During this reporting period Council accepted a total of 2,415 lineal metres of constructed road length, all sealed equating to 20,527 m<sup>2</sup> of paved road space. Council does not maintain, except under contract to the RTA or keep inventory, relating to state roads.

## **The Bicycle Plan**

The construction of cycle ways and walkways within newly developed areas within the local government area was introduced by Council to promote the use of sustainable transport methods within the local community. Council will continue to expand the linkages of cycle ways to encourage the use of bicycles to provide low cost, sustainable transport.

Council currently manages 12.2 km of shared pathways, an increase of 2.1 km since the last reporting period.

There are no dedicated Bicycle Paths within the Shire and they are all shared paths. There are plans to add further shared paths in the future.

# Water Resources

## Management Plan Goals

To operate water supply and sewerage systems to provide agreed levels of service by

- Operating the water and sewerage systems according to the Strategic Business Plan.
- Reviewing and amending operational strategies of the Integrated Water Cycle Management (IWCM) Strategy.

To provide environmentally sustainable Water and Sewerage services that

- Are affordable
- Meet best value
- Represent industry best practice

## Indicators

Indicator	08/09	09/10	10/11	Trend
Percentage compliance with NHMRC Drinking water Guidelines	99%	99%	99%	✓
Megalitres of drinking water consumed	2095	2149	1456	✓
Percentage reduction in community water consumption from Water Campaign baseline	-4%	-6%	28%	✓
Megalitres of sewage effluent reuse	994	922	1 003	✓
Percentage of sewage effluent reuse	100%	100%	100%	✓
Percentage of water monitoring samples indicate Hunter River water use suitable for Primary Contact	25%	12%	17%	✗
Percentage of water monitoring samples indicate Hunter River water use suitable for Secondary Contact or Stock Watering	82%	87%	87%	✓

### Key for trends:

- ✓ Towards sustainability
- ✗ Away from sustainability
- No trend
- ? No data

## Discussion

The sustainable management of water resources throughout Australia has become a major focus for all populations and organisations. The issue of water supply to communities, industry and the environment has become an ever increasing challenge. The reliance on surface water resources has caused an increase in use of other water sources such as ground water and reuse water such as greywater.

Council provides water treatment and reticulated water supply services to the urban areas of Muswellbrook, Denman and Sandy Hollow and sewerage reticulation and treatment to the urban areas of Muswellbrook and Denman. The fully regulated Hunter River provides a highly reliable source for both Muswellbrook and Denman whilst Sandy Hollow relies on the Goulburn River. The Goulburn River water has very “hard” properties. Water described as “hard” is high in dissolved minerals, specifically calcium and magnesium. Hard water is not a health risk, but a nuisance because of mineral buildup on fixtures and poor soap and/or detergent performance. The

particular mix of minerals in the water at Sandy Hollow is difficult to treat and so there is effectively no softening process being applied.

As the water and sewerage supply authority Council faces a number of challenges in maintaining a high level of service, these include

- Augmentation of water and sewerage facilities to meet population growth.
- Managing the risk associated with the supply of potable water and the treatment and disposal of sewage for the community.
- Improving the serviceability and economic life of assets by regular maintenance and rehabilitation;
- Improving the quality and reliability of Sandy Hollow’s water supply
- Fluoridation of Denman and Sandy Hollow water supplies.

### [Water and Sewerage Services](#)

## Drinking Water Quality

Council maintains a sampling and testing program in accordance with the NHMRC Guidelines as it is the local water authority. Overall the water quality has remained stable when compared to the last reporting period with the exception of turbidity and pH which have decreased marginally when compared to the last reporting period. This is mainly due to water treatment plant malfunctions and issues with turbidity and hardness that arise from using the Hunter River as a water source. Table seven details water quality compliance for the 2010/11 reporting period.

**Table 7 Water Quality Compliance**

<b>Physical and Chemical</b>	<b>Muswellbrook</b>	<b>Denman</b>	<b>Sandy Hollow</b>
Physical	96%	94%	58%
Chemical	98%	98%	95%
<b>Key Characteristics</b>			
Turbidity	97%	100%	100%
pH	95%	84%	87%
Colour	100%	100%	100%
<b>Microbiological</b>			
E.Coli	100%	100%	99%
Total Coliforms	99%	99%	97%

## Reasons for Non-Compliance

### **Muswellbrook**

The 4% non compliance of physical factors in Muswellbrook is due to

- High hardness which could not be treated because of changes made to the treatment process to treat high turbidity of the river water (source water) during periods of heavy rain
- High turbidity reading due to dirty water in a some parts of the distribution system

The 2% non compliance of chemical parameters is due to plant malfunction and an aging pipe system which is due to be replaced in the 2011/12 financial year.

The 1% non compliance of microbiological factors is due to low chlorine readings.

### **Denman**

The 6% non compliance of physical parameters is due to increased hardness and total dissolved solids, turbidity and pH and this is due to a plant malfunction.

The 1% non compliance of microbiological factors is due to sample contamination at the time of sampling.

### **Sandy Hollow**

Non compliance of physical and chemical parameters are due to the source water being hard water – there is no softening process. Low chlorine levels are due to a plant failure.

3% non compliance in total coliforms was due to a period of low chlorine levels.

1% non compliance in *E.Coli* is due to sample contamination at the time of sampling.

## Drinking Water Consumption

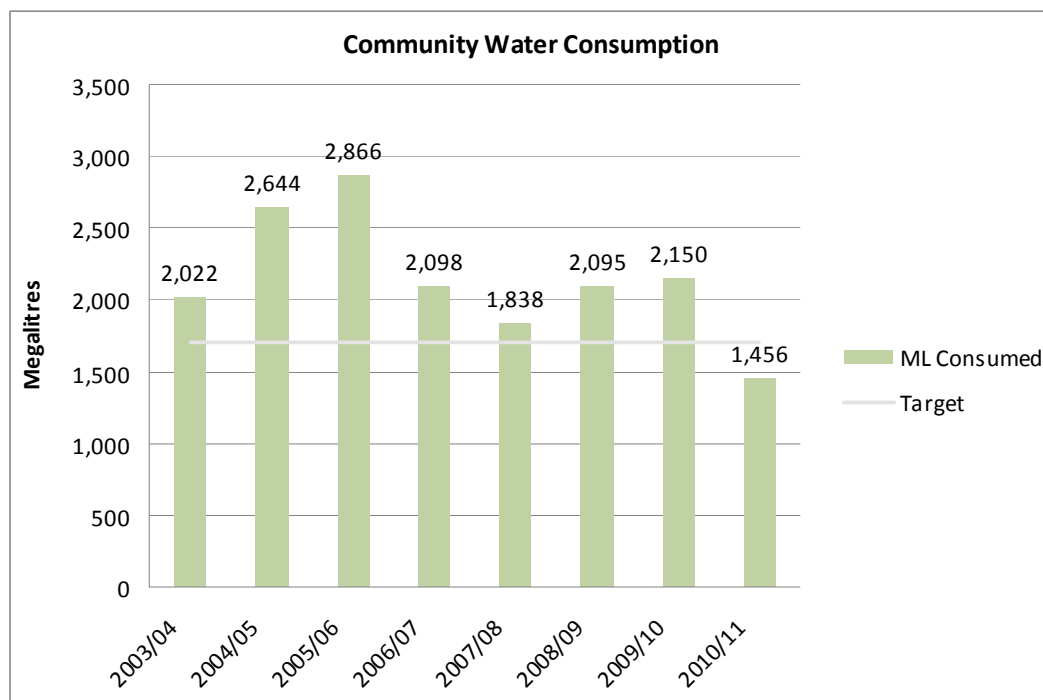
Through the Water Campaign, Council has set a goal to reduce the community water consumption by 16% on the 2003/04 baseline level by 2015.

Due to a wetter year reduced water consumption across the Shire has been achieved. The community water saving goal has easily been met this year.

During the reporting period council extracted 2151ML of water from the Hunter River to supply water to the community. Table 8 details water consumption across the LGA.

**Table 8 Water Consumption across the LGA**

Location	Water Consumption (ML)	Water Campaign baseline community water consumption(ML)	Percentage reduction from baseline
Muswellbrook	1305	1792	27%
Denman	134	206	35%
Sandy Hollow	17	24	28%
Total	1456	2022	28%



**Figure 9 Water Consumption compared across past reporting periods**

## Integrated Water Cycle Management Strategy

Muswellbrook Shire Council is continually planning its water, sewerage and stormwater business activities. The Integrated Water Cycle Management Strategy aims to maximise the benefit derived from available water resources through the efficient and appropriate management of urban water services. It also encourages the evaluation of opportunities to minimise the impact of the urban water services on the available water resources through the

identification and assessment of potential management solutions to address a range of catchment, water resources and urban issues.

An IWCM Strategy considers issues such as

- The future urban water services needs and customer expectations
- The availability of water including water sources such as rainwater, effluent and stormwater;
- The high consumption of town water on a per head of population basis when in comparison to state medians and similar sized populations and
- The impact of town water use on other water users including the environment and future generations.

## Demand Management

The Demand Management Strategy provides the water supply managers of Muswellbrook Shire Council an action plan to improve water use efficiency in the Muswellbrook Shire Council local government area.

The potential benefits of a demand management program include improving the efficiency of water resource use and also delaying capital works for new infrastructure by extending the life of current infrastructure and therefore reducing the operational costs of providing town water services. This in turn leads to lower water supply rates for the consumer, a more secure water supply into the future and leaves more water for environmental uses. Balancing investment in demand management initiatives with supply side investments is a best practice management approach for a water utility.

The purpose of the plan is to provide an investment program for the implementation of effective demand management measures in the Muswellbrook Shire Council service area

## Drought Management

The Drought Management Strategy establishes how Muswellbrook Shire Council will manage its water supply scheme during periods of drought.

The main drought management issues faced by Muswellbrook Shire Council are:

- The need to supply minimum water requirements to all water supply service areas in order to meet health and sanitary water requirements in the event of total loss of water supply.
- A high residential potable water consumption per connected property compared with other Hunter River local water utilities
- The need to manage community perceptions about availability of water, river flows and restrictions placed on other water users (e.g. agricultural and industry) during drought
- The expected population growth across all the Local Government Area that will increase total water demands; and
- The need to cater for shift workers when applying water restrictions

## Treated Effluent Reuse

Council has a target of 100% effluent reuse. This results in nil discharges from either the Muswellbrook or Denman Sewerage Treatment Plants. Council has achieved its target of 100% effluent reuse through its proactive reuse program with local mining companies and golf clubs.

**Table 9 Amount of Treated Effluent Reused**

<b>Amount of Treated Effluent Reused ML</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>
Hunter Valley Energy Coal	824	700	848
Muswellbrook Golf Club	102	143	105
Denman Golf Club	68	79	50
<b>Total Effluent Reused</b>	<b>994</b>	<b>922</b>	<b>1003</b>
<b>Percentage of Effluent Reused</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

# Hunter River Water Monitoring

Council maintains a monitoring program of water quality in the Hunter River and tributaries. The results are published monthly in local newspapers. The Water quality is expressed as a star rating for turbidity, salinity and faecal coliforms and a water use suitability in terms of primary contact (swimming), secondary contact (boating and fishing), stock watering and drinking).

Look out for the advertisements in local papers to see what the water quality was like from the day of sampling.

Overall the water quality monitoring sites have been suitable for swimming and primary contact for 17% of the time an increase of 5 % from the same period last year. The water use suitability for boating and stock watering has remained stable when compared to last year's reporting period at 87%

**Table 10 Comparison of water use suitability**

Water Use Suitability	2008/09	2009/10	2010/11
Primary Contact (swimming)	25%	12%	17%
Secondary contact and stock watering	82%	87%	87%

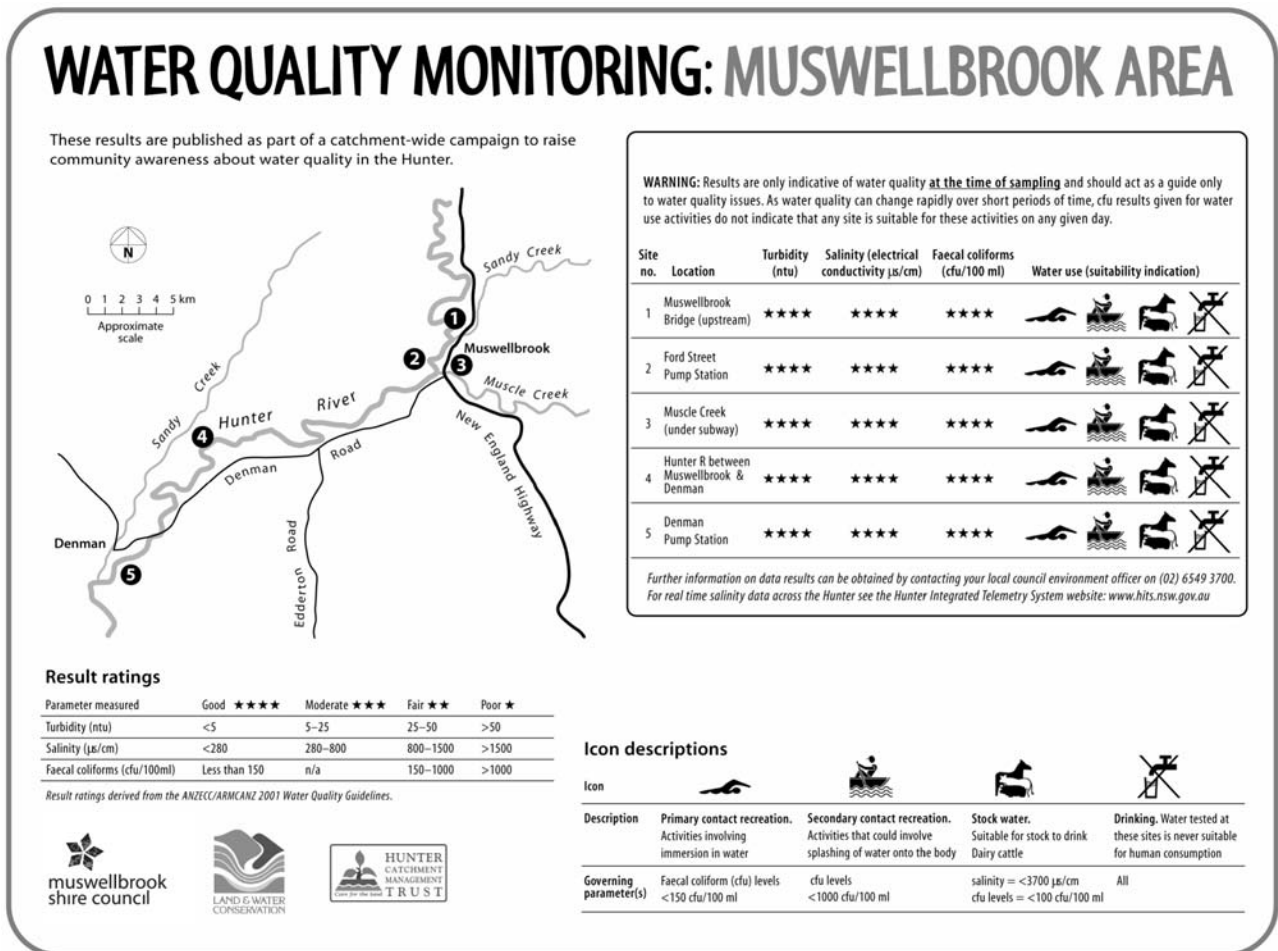


Figure 10 Water Quality advertisement from June 2011

# Land

## Management Plan Goals

- Manage community concerns in regard to environmental management of major industries in the Local Government Area.
- Maintain and improve the level of service for Rural Fire Service operations within the Shire.

## Indicators

Indicator	08/09	09/10	10/11	Trend
Total Number of Contaminated Site remediated	0	0	1	✓
Number of sites with Notices under the Contaminated Land Management Act	0	0	0	✓
Coal Mining: Change in Total Active Mining and Emplacement area	No Data	No Data	15%	✗
Coal Mining: Rehabilitation to clearing ratio	No Data	0.2:1	0.1:1	✗
Area of bushfire affected land	No Data	No Data	Negligible	—

### Key for trends:

- ✓ Towards sustainability
- ✗ Away from sustainability
- No trend
- ? No data

## Discussion

### Contaminated Land

Many past land use practices have resulted in the contamination of the land and water around many developments. Contaminated soil can pose a serious health risk and the risk to the environment may affect local waterways and groundwater. The regulation of land contamination by Council is primarily through the planning process. State Environmental Planning Policy 55 - Remediation of Land contains several provisions for Council to consider the potential of land to be contaminated before it is redeveloped or rezoned. The SEPP also requires property owners or developers to notify Council when they undertake contamination remediation works and give details of the results of any remediation.

Council holds details of information about past land uses that may have led to contamination and details of any remediation.

During the 2010/2011 reporting period:

- No SEPP55 Category 1 DAs received
- No SEPP55 Category 2 notifications c16 received
- 1 SEPP55 Validation notifications c18 received

Council will continue to monitor the redevelopment of land to ensure contaminated land is not redeveloped without due consideration of past uses.

In addition the DECCW also regulates contaminated land that poses a significant risk of harm to human health or the environment. Under the [Contaminated Land Management Act](#), DECCW can regulate major contaminated sites. DECCW holds a [Contaminated Land Register](#). No notices are recorded for the Muswellbrook Shire Council area.

## Coal Mining

Coal Mining is a significant industry in the Muswellbrook Shire covering over 174 square kilometres in approved mining developments. All mines are required to publish an Annual Environmental Management Report (AEMR) which is available from each mine.

In this State of Environment Report some data has been collated to give a picture of the overall state of the mining industry in relation to land disturbance and rehabilitation. The data from each mine is relevant to the last reporting period of each AEMR and may not be concurrent with other mines or the reporting period of this SoE. However, annual change will remain a good relevant indicator of the industry as a whole.

Coal mining flanks the New England Highway North of Singleton with five projects to the west of the Highway around Muswellbrook and one mine at the north of Denman.

One mine, Dartbrook, is an underground mine in Care and Maintenance mode with no active mining currently occurring. Mt Pleasant Mine, North West of Muswellbrook is yet to commence substantial works. Six mines are currently in operation.

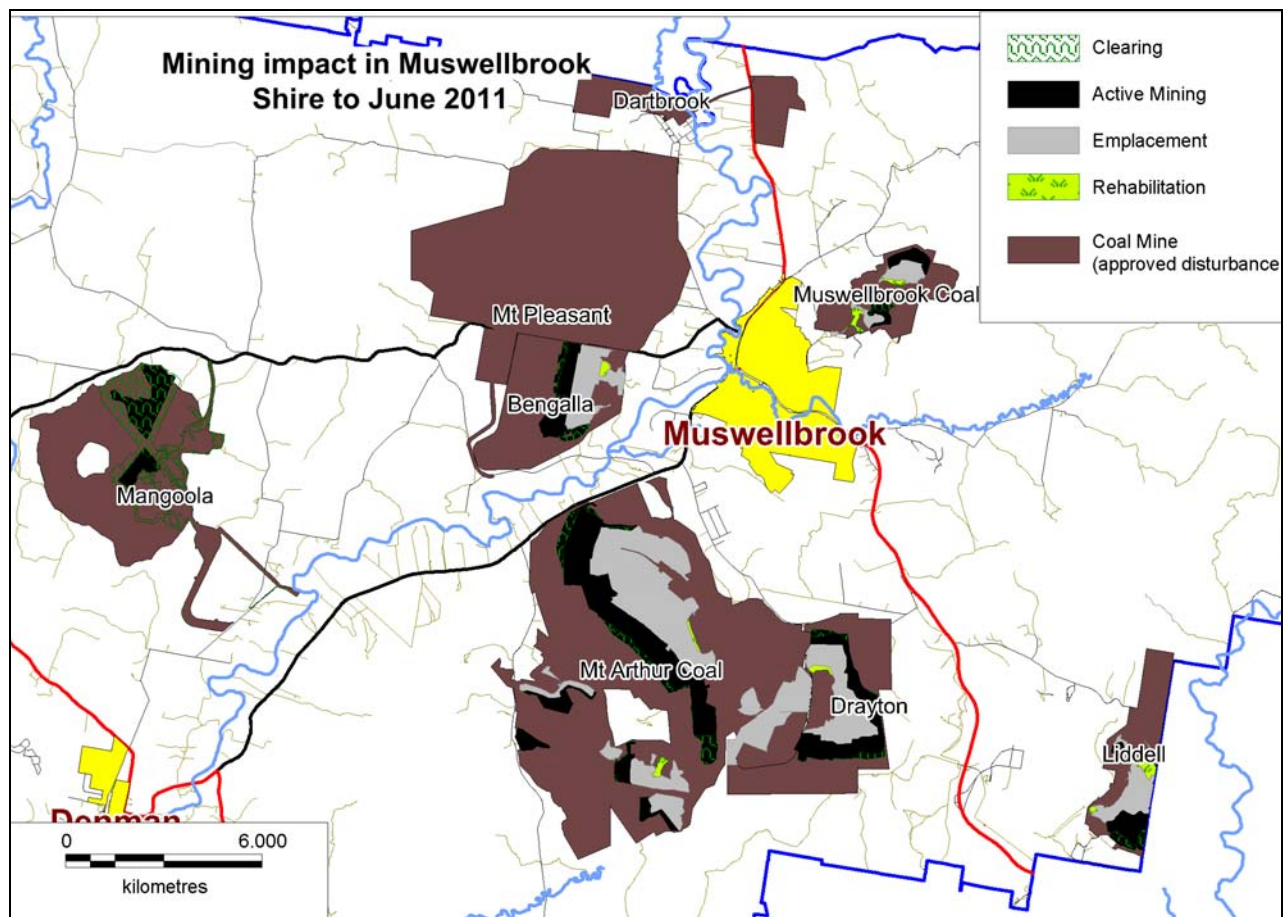


Figure 11 Mining Impact in Muswellbrook Shire to June 2011

The Indicators chosen to track mining land disturbance and rehabilitation are Change in Total Active Mining and Emplacement area and Rehabilitation to clearing ratio.

Change in Total Active Mining and Emplacement area is the difference between the total active mining and emplacement area of the current year minus the total active mining and emplacement area of the previous year divided by the previous year's area multiplied by 100. This will indicate whether overall mining activity is growing or declining. A positive number indicates growth and negative indicates decline.

The total active mining and emplacement area for the 2010/11 reporting period is 38.89 sq km. The previous year's active disturbance area was 33.93 sq km. The Change in Total Active Mining and Emplacement area in the 2010/11 year is 15%.

As this is the first time the value has been calculated we can not determine a trend, however, because the indicator includes previous years data it does show that there has been a significant increase in the mining foot print.

The Rehabilitation to Clearing Ratio is the ratio of rehabilitated area to cleared area. In any given year land is cleared for new mining and land is rehabilitated when mining is completed. Where the land cleared over the Shire is greater than the land rehabilitated, more land is being disturbed and exposed to erosion than is being stabilised and returned to a sustainable landform. It is considered that a ratio above 1 represents positive efforts in rehabilitating mining landscapes.

The Rehabilitation to Clearing Ratio is 0.1:1 which is halved since the previous period. Significantly more land is being cleared each year than is being rehabilitated.

**Table 11 Area of Mining in Muswellbrook Shire**

<b>Mining land domain</b>	<b>2009/10</b>	<b>2010/11</b>
Cleared (sqkm)	6.88	8.53
Active Mining (sqkm)	14.92	17.95
Emplacement (sqkm)	19.01	20.94
Rehabilitated (sqkm)	1.16	0.96
Change in total active mining		15%
Rehabilitation to clearing ratio	0.2	0.1
Total active mining and emplacement (sqkm)	33.93	38.89
Approved for disturbance (sqkm)	173	174.09

While rehabilitation takes significant time, the land can be stabilised and grass cover established reasonably quickly. Therefore any land identified as rehabilitated, may still require maintenance such as weeding or replanting of grasses, shrubs or trees. Long term monitoring of the success of any rehabilitation is not reported in the State of Environment Report.

Further information on environmental issues relating to mining can be sourced from individual mine's AEMR available from the mining company, usually on their website.

## **Bushfires**

Due to a wet spring and wet early summer it was a very quiet bushfire season. The NSW Rural Fire Service attended 61 bush and grass fires calls and performed 47.2 hectares of hazard reduction burns. The amount of land affected by bushfire during the reporting period was negligible.

## **Future Projects**

Council is continuing to develop its Contaminated Land Information System to provide greater extent of information about contaminated Land Management in the Shire,

Council will further investigate what information can be provided in an efficient and effective manner to inform the community about other land related environmental indicators.

# Atmosphere

## Management Plan Goals

- Monitor air quality by participating in a weekly air quality monitoring program run by ANSTO and by liaising with local industries who conduct their own air quality monitoring.
- Participate in Upper Hunter Cumulative Impact Study.

## Indicators

Indicator	08/09	09/10	10/11	Trend
Average PM <sub>2.5</sub> total weight nanograms per cubic metre	5393	6572	4939	✓
Number of PM <sub>2.5</sub> sampling days above NEPM 24 hour reporting threshold	0	2 - 3	0	✓

### Key for trends:

- ✓ Towards sustainability
- ✗ Away from sustainability
- No trend
- ? No data

## Discussion

### Air Sampling

Council participates in a PM<sub>2.5</sub> air quality monitoring program with the Australian Nuclear Science and Technology Organisation (ANSTO). The data from this monitoring is available at the [ANSTO](#) website.

The program analyses particulate matter less than 2.5 micrometres in diameter for a 24 hour period twice weekly. The air sampling unit is located at the Water Treatment Plant in Scott St, Muswellbrook.

The data has been compared with previous results and the National Environmental Protection (Ambient Air Quality) Measure PM<sub>2.5</sub> Equivalence Program Advisory Reporting Standards.

The results indicate that the fine particulate matter concentrations are below the NEPM Advisory Reporting Standards. Ambient air quality in the 2010/2011 reporting period has improved when compared to the previous reporting period which was affected by statewide dust storms.

Figure nine shows the monthly average total weight of PM<sub>2.5</sub> samples for each month July 2010 to June 2011. The data shows the average of samples for each month, except those in July and May, were below 7,000 ng/m<sup>3</sup>. The maximum daily reading was 16,600 ng/m<sup>3</sup> on 22 May 2011.

All twelve months of the reporting period were close to or below the long term PM<sub>2.5</sub> average for each month.

The National Environmental Protection (Ambient Air Quality) Measure includes a PM<sub>2.5</sub> Equivalence Program to determine appropriate monitoring protocols for measuring PM<sub>2.5</sub> concentrations. Included in the measure are Advisory Reporting Standards. These standards do not provide any particular health guideline value but rather are a reference for the State Government to report to the National Environmental Protection Council. Further information on the NEPM is available at [www.ephc.gov.au](http://www.ephc.gov.au)

The Advisory Reporting Standards for PM<sub>2.5</sub> are 25,000 ng/m<sup>3</sup> for 1 day and 8000 ng/m<sup>3</sup> for the annual average.

During the twelve months to June 2011 the monthly average PM<sub>2.5</sub> concentrations for Muswellbrook has been below the annual average reporting Standards.

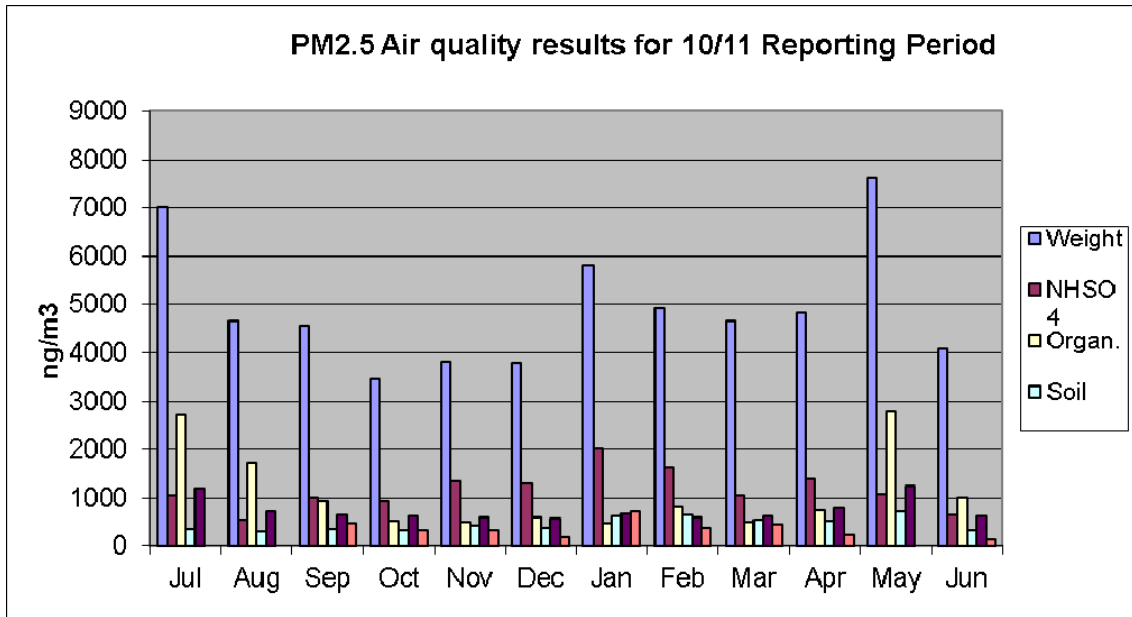


Figure 12 Average monthly results for 10/11 reporting periods by parameters

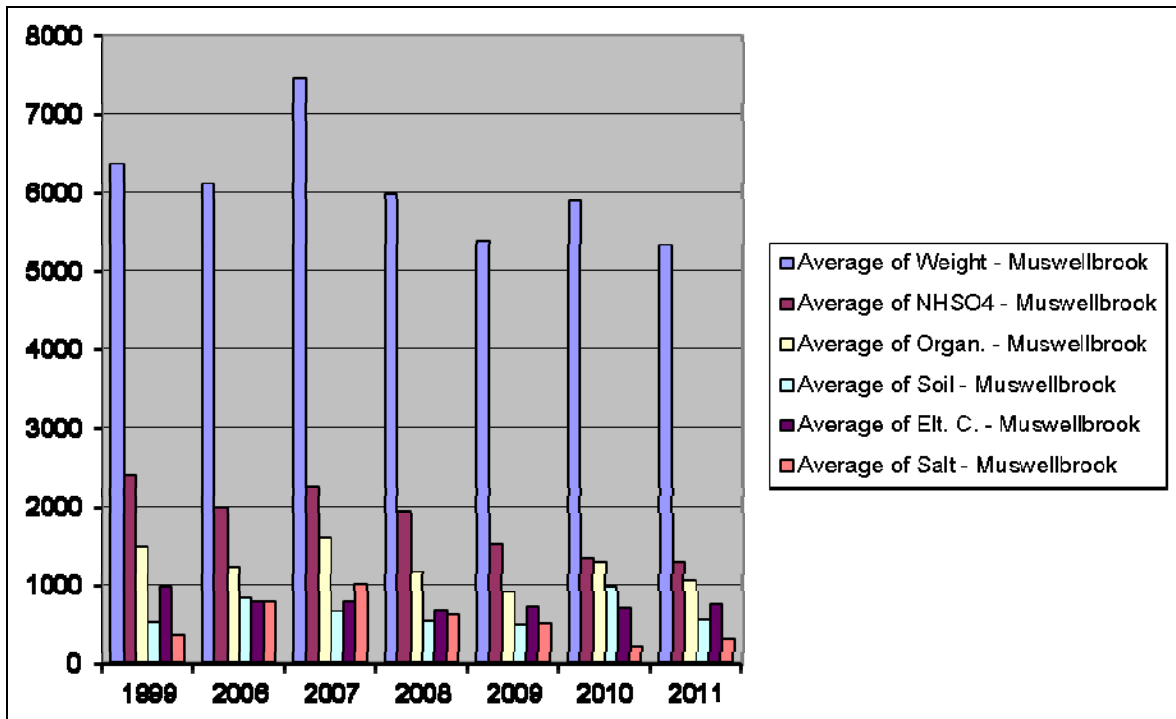


Figure 13 Average Annual results for 2005 to 2011 reporting periods by parameters

**Table 12 Comparison of Air Sampling Results**

<b>Average ng/m<sup>3</sup></b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>
Weight	6870	5608	5393	6572	5327
NHSO <sub>4</sub>	1982	1803	1523	1504	1298
Organics	1342	860	911	1357	1056
Soil	640	436	503	1268	567
Elemental C	796	676	731	705	754
Sea Salt	687	471	516	225	321

Table 12 shows the annual average value for total weight, ammonium sulphate, organics, soil, elemental carbon and sea salt. When compared to the previous reporting period there has been an increase in the annual average values for salt and elemental carbon. When compared to the previous reporting period there has been a decrease in total weight, ammonium sulfate, organics and soil.

Muswellbrook Council has limited resources to analyse and assess the data collected through this monitoring program; however, this data has been a useful resource for identifying changes in ambient air quality for fine particulates.

Overall it is considered that the data indicates that the 2010/2011 reporting period had reduced levels for fine particulates in comparison to the 2009/2010 reporting period which was affected by statewide dust storms.

This data is made available to a range of research facilities studying the effects of fine dust in mining related regions.

## **Upper Hunter Air Quality Monitoring Network**

In response to extensive community concerns about air quality, the Office of Environment and Heritage has developed the Upper Hunter Air Quality Monitoring Network. The Network will ultimately include 14 sites across the Upper Hunter with 3 sites in the Muswellbrook Shire area.

More information on the Upper Hunter Air Quality Monitoring Network can be found at <http://www.environment.nsw.gov.au/aqms/upperhunterQnA.htm>

Current air quality data can be found at <http://www.environment.nsw.gov.au/aqms/hourlydata.htm>

The network has only been established during the 2010/2011 reporting period and therefore comparative data is not available.

The Office of Environment and Heritage are continuing to develop data on air quality in the region to allow for a range of health and other studies to be conducted. As more data become available, they will be provided in the State of Environment Report.

## **Future Projects**

Council will continue to support this air quality monitoring program and make the data available to a range of research facilities studying the effects of fine dust in mining related regions.

# Biodiversity

## Management Plan Goals

- To promote the re-establishment of native vegetation.
- To protect the natural resources of the Muswellbrook Shire through the provisions of the Environmental Protection Agency to promote the principles of Ecologically Sustainable Development.
- To protect and maintain natural vegetation corridors and parcels of remnant vegetation
- Support the control of noxious weeds within the Shire

## Indicators

Indicator	08/09	09/10	10/11	Trend
Records of endangered species, populations and vulnerable species listed in the Wildlife Atlas (flora)	147	202	244	✓
Records of endangered and vulnerable species listed in the Wildlife Atlas (fauna)	1044	1273	1211	✓

### Key for trends:

- ✓ Towards sustainability
- ✗ Away from sustainability
- No trend
- ? No data

## Discussion

Biodiversity is the variety of life, the different plants, animals and micro-organisms, their genes and the ecosystems of which they are part. Australia is one of the most diverse countries on the planet. It is home to more than one million species of plants and animals, many of which are found nowhere else.

## Monitoring Biodiversity

There are two databases that are used to monitor biodiversity in the Muswellbrook LGA. One database is a federal database while the other is a state database.

The Environment Protection and Biodiversity Conservation Act (1999) is the federal government's main legislation for the Environment. It provides for the protection and management of nationally important flora, fauna, ecological and heritage sites. The Environment Protection and Biodiversity Conservation website contains a [Protected Matter Search Tool](#) which allows users to enter their Local Government Area and generate a report on the flora, fauna and ecological communities found in their Local Government Area. The [Wildlife Atlas](#) is a database of sightings and observations of plants and animals in NSW. Anyone can report a sighting to the Atlas. While not all occurrences of the threatened or endangered species will be represented on the atlas, it is considered somewhat representative. Council is reporting on the listing in the atlas in an attempt to understand what information is available about threatened and endangered species in the Shire.

Both the Protected Matter Search Tool and The Wildlife Atlas are important resources for discovering information about a range of species in the shire. Maps of sights can be produced and further information about the species is available. Only a summary of the data is presented here.

For this reporting period the number of records for each all species has been highlighted. The number of species is not expected to change significantly as the Atlas holds records from earliest observations. Change in the classification of the species may be reflected in the data. However the number of records for any species may increase with time. Any increase in the number of records may indicate more sightings and therefore it may be

assumed that there are more individuals of the species. Decreases in numbers may also reflect changes in classifications of species. Alternatively, additional records may reflect activity in ecological assessment and therefore the identification of a threatened or vulnerable species may indicate that some form of conservation activity is likely to take place

Table 13 details records of species listed on the NPWS Wildlife Atlas for Muswellbrook LGA and Table 14 details records of species listed on the Protected Matter Search Tool.

**Table 13 Numbers of records and species listed on NPWS Wildlife Atlas for Muswellbrook LGA**

Listing	Number of Species	Number of Records/ species
<b>FLORA</b>		
Endangered - TSC Act (E1)	8	31/8
Endangered - TSC Act (E2)	4	141/4
Vulnerable - TSC Act (V)	15	72/15
<b>FAUNA</b>		
Endangered - TSC Act (E1)	8	57/8
Endangered - TSC Act (E2)	0	0/0
Vulnerable - TSC Act (V)	45	1154/45

**Table 14 Numbers of records and species listed on Protected Matters database for Muswellbrook LGA**

Listing	Number of Species
World Heritage Properties	1
National Heritage Places	1
Wetlands of International Significance	1
Great Barrier Reef Marine Park	0
Commonwealth Marine Areas	0
Threatened Ecological Communities	4
Threatened Species	47
Migratory Species	15

Listing	Number of Species
<b>Threatened Ecological Communities</b>	
Critically Endangered	2
Endangered	2
Vulnerable	0
<b>FAUNA</b>	
Critically Endangered	0
Endangered	6
Vulnerable -	15
<b>FLORA</b>	
Critically Endangered	3
Endangered	6
Vulnerable	19





Visit  
[muswellbrook.nsw.gov.au/Council-services/Environment/State-of-environment-reports](http://muswellbrook.nsw.gov.au/Council-services/Environment/State-of-environment-reports)  
for detailed information on the State of Environment

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