



*Muswellbrook Shire
Council*

***State of the
Environment
Report***

2006/2007

Muswellbrook Shire Council



Supplementary State of the Environment Report 2006/2007

This report has been prepared by the Environmental Services Department, Muswellbrook Shire Council to fulfil the requirements of the Local Government Act 1993.

The report is generally consistent with the regional State of the Environment reporting template developed by Twyford Consulting for the Lower Hunter and Central Coast Regional Environmental Management Strategy (2003).

Any enquires into the matters presented and discussed in the report should be directed to:

Muswellbrook Shire Council
PO Box 122
MUSWELLBROOK NSW 2333
Ph: (02) 6549 3700
Fax: (02) 6549 3701

Table of Contents

1. Towards Sustainability	4
<u>1.1. Introduction</u>	<u>4</u>
<u>1.2. Key determinants</u>	<u>4</u>
<u>1.3. Implementing ESD</u>	<u>9</u>
<u>1.4. Future directions in environmental reporting</u>	<u>14</u>
2. Human Settlements	14
<u>2.1. At a glance</u>	<u>14</u>
<u>2.2. Population & settlement patterns</u>	<u>16</u>
<u>2.3. Drinking water quality and consumption</u>	<u>18</u>
<u>2.4. Energy</u>	<u>24</u>
<u>2.5. Transport</u>	<u>27</u>
<u>2.6. Waste Management</u>	<u>29</u>
<u>2.7. Tranquillity and noise</u>	<u>33</u>
<u>2.8. Community Lands</u>	<u>35</u>
3. Land	37
<u>3.1. At a glance</u>	<u>38</u>
<u>3.2. Land-use changes</u>	<u>39</u>
<u>3.3. Soil erosion</u>	<u>40</u>
<u>3.4. Induced soil salinity (including sodic soils)</u>	<u>41</u>
<u>3.5. Contaminated land</u>	<u>42</u>
4. Atmosphere	45
<u>4.1. At a glance</u>	<u>45</u>
<u>4.2. The Enhanced Greenhouse Effect</u>	<u>46</u>
<u>4.3. Air quality</u>	<u>48</u>
<u>4.4. Odour</u>	<u>50</u>
5. Water	52
<u>5.1. At a glance</u>	<u>52</u>
<u>5.2. Freshwater ecosystem health</u>	<u>53</u>
<u>5.3. Surface water extraction and water consumption</u>	<u>57</u>
<u>5.4. Groundwater issues</u>	<u>59</u>
6. Biodiversity	61
<u>6.1. At a glance</u>	<u>61</u>
<u>6.2. Terrestrial and aquatic ecosystems (including native vegetation communities)</u>	<u>62</u>
7. Heritage	68
<u>7.1. At a glance</u>	<u>68</u>
<u>7.2. Aboriginal heritage</u>	<u>69</u>
<u>7.3. Non-Aboriginal heritage</u>	<u>70</u>

1. Towards Sustainability

Management Plan Goals:

- *To protect and improve the environment by developing an environmentally sustainable community, to achieve world best practice standards in the rehabilitation of mines and extractive industries, to promote wildlife corridors, to reduce mainstream flooding, to 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 manage growth, development and construction that recognises environmental standards, particularly clean air and waterways and promotes energy and water efficiency.*
- *To provide a comprehensive planning framework to protect the environment, satisfy legislative requirements, to meet community needs and to involve the community in the decision making process.*

1.1 Introduction

The issue: What is sustainability?

Principles of Ecologically Sustainable Development (ESD) are today of primary consideration in a wide array of applications and activities. Local Government is required to consider the sustainability of all activities or proposals which relate to the community or environment.

Ecologically Sustainable Development relates to the management of human interactions with the environment and anthropogenic use of resources in such a way so as to avoid the restriction of future generations to meet their own needs.

Monitoring progress toward ESD

State of the Environment (SoE) Reports are a common tool used by Local Government to monitor and report identified environmental indicators which consider the impacts and level of sustainability that a community or Council has on the environment. Once these impacts have been assessed an organisation such as Council can manage their activities to improve their environmental performance.

Environmental and socioeconomic indicators are assessed and reported in the “Pressure – State – Response model” which provides a clear indication of the issue at hand, the current state of the indicator and the responses proposed to address the level of impact identified.

Approach taken with this SoE report

This SoE Report (2006/2007) is a supplementary report which provides an assessment of the state of the environment in the Muswellbrook Shire for the financial reporting period from 1st July 2006 to 30th June 2007, in accordance with the *Local Government Act 1993*. The last Comprehensive SoE report for the Muswellbrook Shire was completed for the 2003/2004 reporting period.

1.2 Key determinants

To consider the state of the environment, an assessment of the main factors or determinants which do or have potential to impact on the environment and natural resources is undertaken. These factors can be separated into two main groups such as those which originate from the physical environment and those which originate from human interactions. This SoE report identifies those indicators which were nominated in the last Muswellbrook Shire comprehensive report (2003/2004) and updates the information regarding the Pressure, State and Response relevant to that indicator.

The physical environment

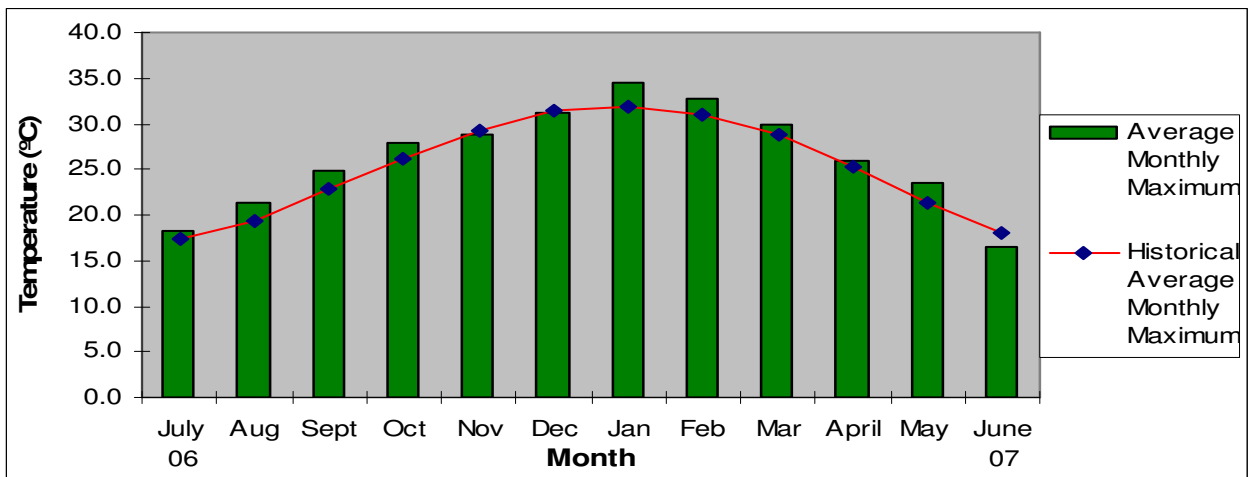
The typical climate of the Upper Hunter region is characterised by warm dry summers and cool dry winters. Generally in summer, the weather is influenced by high pressure systems which alternate with low pressure systems every three to five days. This trend however has been impacted by the ongoing drought conditions which have caused the region to be increasingly dry with little respite from the 'southerly blusters' which once frequented the local weather patterns.

In winter, westerlies and high pressure systems alternate with cold fronts. The prevailing winds are typically north-westerly and are created via cold air drainage flows associated with the terrain. Winter is drier than summer, with regular frosts and fogs occurring from mid – autumn to late spring.

The temperature and rainfall data recorded by the Bureau of Meteorology at the Jerry’s Plains Post Office for the reporting period are detailed below. Figures 1.1 and 1.2 represent the maximum and minimum monthly temperatures respectively which are compared with historical data. Figure 1.3 details the total monthly rainfall with comparison to historical averages.

Figure 1.1

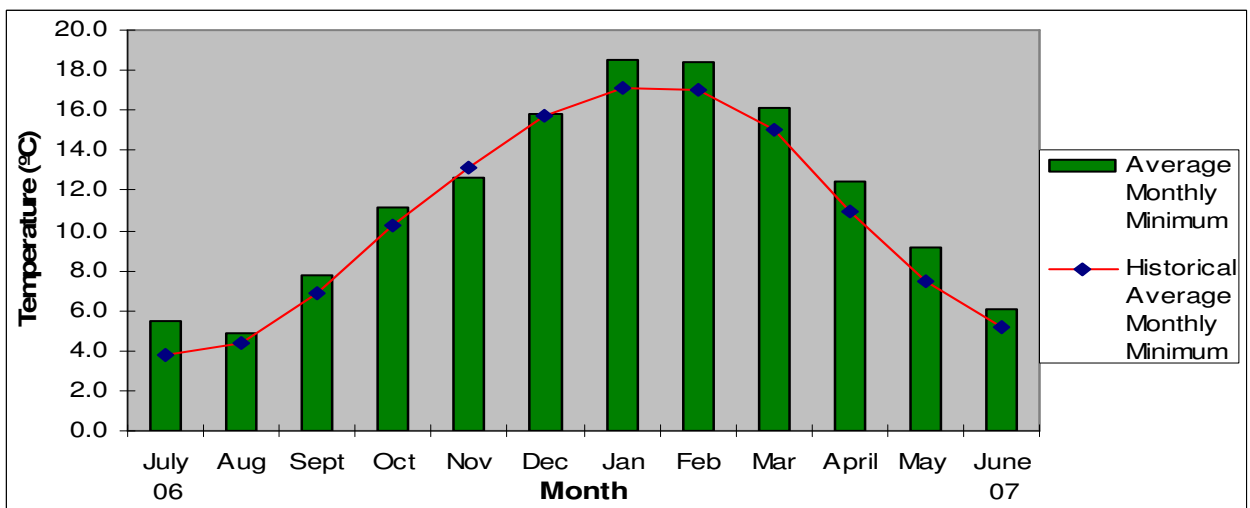
Indicator: Average Maximum Monthly Temperatures for July 2006 to June 2007 compared with historical averages



Source: Bureau of Meteorology, 2007

Figure 1.2

Indicator: Average Minimum Monthly Temperature for July 2006 to June 2007 compared with historical averages

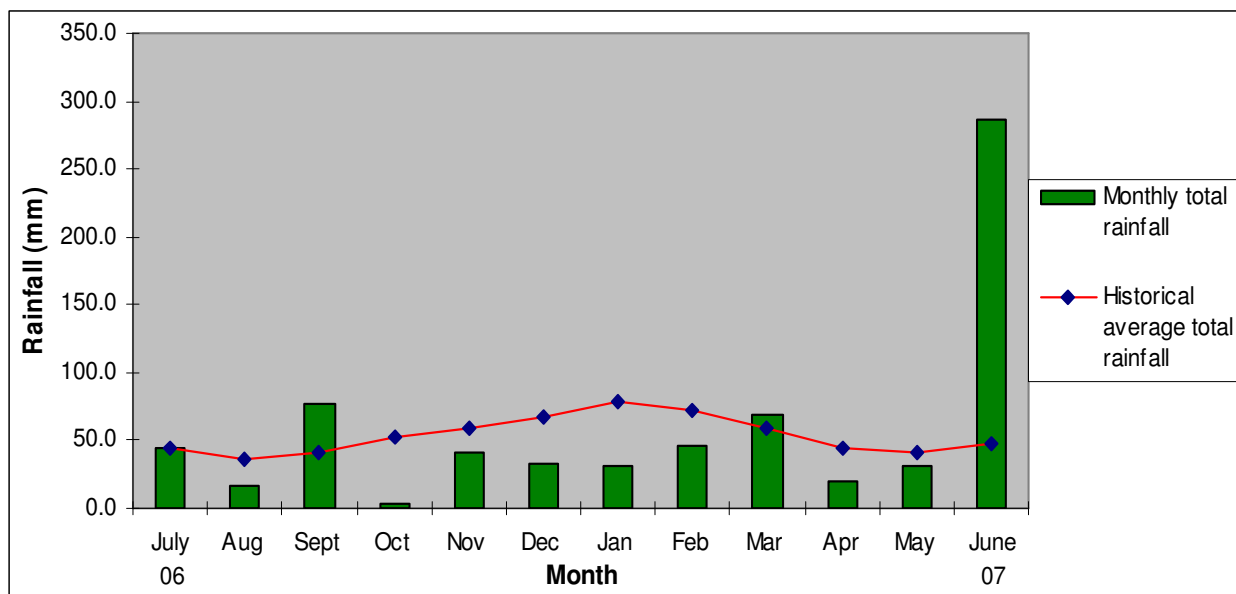


Source: Bureau of Meteorology, 2007

Figures 1.1 and 1.2 indicate that the average temperatures received during the reporting period are generally typical for the area as they follow a similar trend to the historical data collected by the Bureau of Meteorology since 1884.

Figure 1.3

Indicator: Total Monthly Rainfall for July 2006 to June 2007 compared with historical monthly average total rainfall



Source: Bureau of Meteorology, 2007

The rainfall data represented by Figure 1.3 generally indicates below average rainfall in the area for the majority of the reporting period, followed by a significant increase in rainfall during the month of June 2007. The majority of this rainfall was received during a significant storm event which occurred over the 8th and 9th June. This rain event involved a large amount of precipitation which fell during a relatively short period of time.

Due to the intensity of the rainfall, several impacts of damage and erosion occurred as a result in a number of areas across the Shire. One such area was related to the Muscle Creek region which experienced high rapid flows which also carried large quantities of debris. The velocity of the water, transported debris, and previously dry conditions eventuated in a number of significant areas being impacted by the storm. This included areas of Muscle Creek and the Hunter River which were impacted by erosion and slumping of the banks and the removal and damage of riparian vegetation. Associated with the impacts on the natural water courses were those received by neighbouring properties which included the cracking of buildings, the destabilisation of footings and flooding of some buildings.

During this event, stormwater infiltration caused significant issues with sewerage pumping stations causing pumps to be discontinued. A carrier main located at Muscle Creek was also damaged during the flood which discharged for a period of time before repairs could be undertaken.

Below is a photograph taken during the storm on the 8th June which shows the flow of Muscle Creek over Bridge St/ the New England Highway.



The human environment

Human activities have the potential to have a significant impact on the environment through the unsustainable use of resources, alterations to natural systems, pollution and the disposal of waste materials. This section involves the identification of potential human influences on the local environment through the nomination of indicators, the current status of the indicator and the response(s) proposed to address the issue.

Population Profile

A recent census was undertaken in 2006 by the Australian Bureau of Statistics. The population data collected during this census found that the Muswellbrook Shire population has increased from the data collected in the 2001 census from 14,796 in 2001 to 15,236 in 2006. This growth in population however remains below the level recorded in 1996 which found that the total population of the Muswellbrook Shire was 15,562.

Figure 1.4

Indicator: Total Population – Muswellbrook Shire 1986 - 2006

1986	1991	1996	2001	2006
14,892	15,111	15,562	14,796	15,236

Economic Profile and Economic Development

The economic profile of the Shire of Muswellbrook can be described as an area which is predominantly a rural community relying on agricultural ventures such as stock and crop farming, viticulture and horse breeding, which is also dominated by industrial activities such as mining, power generation and support industries. The currently growing economic climate within the Shire, as a result of the expansion of a number of industrial mining developments, has seen the influx of commercial and residential developments. These developments include the following:

- **Blackhill Tourist Development (DA 146/2002)**

The Blackhill Tourist Development involves the development of land surrounding the old Blackhill Service Station located on the New England Highway at the south east of Muswellbrook. The application was approved by Council in 2003 and the developer commenced construction of the Villa/cabin section (consisting of 30 villas and 10 cabins) in

January 2006 which has now been completed. The remaining development proposed in the original application (which includes the conference centre) is yet to be completed.

- **Muswellbrook Fair (DA 408/2004)**

Construction of the development has been completed with a number of major retailers and specialty shops occupying the shop space.

- **Northview Estate – Stages 1 and 2 (DA 358/2004)**

Stages 1 and 2 of the Northview Estate subdivision comprising of 50 residential lots, have been completed and the land registered with the new lot numbers. Council is currently receiving development applications for new dwellings within these stages.

- **Northview Estate – Stage 3 (DA 390/2006)**

Stage 3 of the Northview Estate subdivision has been approved by Council and comprises of forty-seven (47) lots – including seven (7) rural residential lots and forty (40) residential lots. Construction of roads and infrastructure is yet to commence under this application.

- **Eastbrook Links Estate (DA 263/2004)**

Eastbrook Links Estate subdivision is located adjacent to the New England Highway south east of Muswellbrook. The Masterplan approved for the overall development permits the development of 1189 residential lots. The applicant has completed stages one (1) to nine (9), which have now been registered with the Department of Lands. Stage ten (10) is currently under construction.

- **St Mary's Estate (DA 237/2002, DA 392/2005 and DA 393/2005)**

St Mary's Estate subdivision encompasses the area located between the Skellatar Stock Route and Osborn Avenue, Muswellbrook. This land was originally owned by the Catholic Church who has since sold the land for development. The applicant has received approval for the construction of 147 residential lots divided into seven stages. The applicant has completed the construction of Stage One and Stage Two (A).

The lots for Stage 1 have been registered with the Department of Lands and Stage 2A is currently with the department for registration. The applicant has commenced construction of Stage Two (B) which involves the extension of Osborn Avenue.

- **Woodlands Ridge (DA 112/2003)**

Woodlands Ridge Estate is off Muscle Creek Road, located south of Muswellbrook. The subdivision was approved by Council in 2004 and comprises 58 rural residential lots. The applicant has completed the construction of Stage 3 which comprised of 23 lots. Council has released the Linen Plan for the subdivision which is now being registered with the Lands Title Office. The applicant has not yet commenced on the development of Stage 4, which will be the last stage of the Estate.

- **Almond Street (DA 258/2005)**

The Almond St development relates to the land located at the corner of Bell and Almond Streets, Denman. Council has issued approval for Stage 1 which comprises of twenty-one (21) residential lots however the applicant does not currently have approval to commence construction of roads and infrastructure associated with the subdivision.

- **Extension of Glen Munro Industrial Estate (DA 266/2005)**

Council granted an approval in 2005 for the extension of Glen Munro Road and the associated industrial estate, involving the development of an additional 22 industrial lots. This industrial subdivision is located in Glen Munro Rd which is situated in the Thomas Mitchell Industrial

Estate. The construction phase of the development has been completed and Council is finalising the release of the Linen Plan of Subdivision.

- **Muswellbrook Industrial Park (DA 238/2005)**

This application was lodged by Caverstock and is located adjacent to Energy Australia on Thomas Mitchell Drive. The development proposes the construction of 25 industrial lots and a new road off Thomas Mitchell Drive. The application has been approved and construction is nearing completion. The Linen Plan of Subdivision has not yet been released.

1.3 Implementing ESD

Management Plan Goal:

- *Develop strategies to properly manage, protect, restore, enhance and conserve the environment in a manner that is consistent with and promotes the principles of Ecologically Sustainable Development.*

The Council's Role

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*, the *Environmental Planning and Assessment Act* and the *Protection of the Environment Operations Act*.

These Acts provide a range of tools which can be used by Council to address breaches of the legislation. The most effective tools to address environmental breaches are those listed by the *Protection of the Environment Operations Act* which includes infringement notices, Clean Up Notices and Prevention Notices. These tools can be issued in a variety of circumstances for a number of applications such as matters relating to water, air, noise and odour pollution which are deemed to be an offence under the Act. The number of infringement and clean up and prevention notices are listed below in Figures 1.5 and 1.6.

Figure 1.5

Indicator:	Number of Penalty Infringement Notices issued in relation to the Protection of the Environment Operations Act for 2006/2007
Number issued 2006/2007:	3

Figure 1.6

Indicator:	Number of Clean Up and Prevention Notices issued in relation to the Protection of the Environment Operations Act for 2006/2007
Number issued 2006/2007:	0

Other tools listed under the *Local Government Act* relate to the maintenance of properties in a healthy manner which relate to such circumstances as wastewater management. Tools provided under the *Environmental Planning and Assessment Act* relate predominantly to the compliance with conditions of consent issued for the management of a development.

The Environmental Impact of Council Activities

Council activities include the provision of facilities and services to the community; the construction and maintenance of roadways, infrastructure, recreational areas and facilities; and the regulation of activities concerning the public, businesses and organisations. The execution of Council's activities has associated environmental impacts (real or potential) 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 (electricity and fuels), water, stationary, chemicals and building materials.

Measures implemented by Council during the reporting period 2006/2007

Council has implemented a number of programs during the reporting period to enhance the environmental and sustainability performance of the Shire. These include:

- A triple bin waste program was introduced during the reporting period for all properties serviced by Council's municipal waste system. The triple bin system involves the separation of general household garbage, green wastes and recyclables.
- Ongoing energy and water efficiency programs including energy audits of Council buildings and lighting and showerhead retrofits to reduce energy and water use
- Maintenance of the worm farm at the Council Administration Building to remove food waste from the waste stream.
- Continuing investigations into the use of energy resources by Council activities, such as the vehicle fleet and the heating / cooling efficiency of the administration building.

Environmental Project Funding

Opportunities for external funding exist from a variety of sources which include the Catchment Management Authority, Environmental Trust, Natural Heritage Trust and other organisations. During the 2006/2007 reporting period Council received funding from a range of local companies and organisations which has facilitated a number of environmental projects. The Council projects funded during the reporting period include- the Upper Hunter Enviro Youth Forum and the construction of the Sustainability Exhibition Trailer. Figure 1.7 details the funding received by Council, the Upper Hunter Weeds Authority and funding provided by the Catchment Management Authority within the local area.

Figure 1.7

**Indicator: Environmental Funding received for Muswellbrook Shire 2006/2007
(Including regional environmental funding)**

Group / Individual	Project Description	Funding body	Amount Received
Upper Hunter Weeds Authority	Noxious plant control in the Upper Hunter Region	NSW Dept Primary Industries (DPI)	\$10,880
Upper Hunter Weeds Authority	Noxious weed control in the Upper Hunter Region	Upper Hunter County Council – Singleton, Muswellbrook and Upper Hunter Council	\$10,880
Muswellbrook Council	Enviro Youth Forum 26 th April 2007	Muswellbrook, Singleton and Upper Hunter Councils, Muswellbrook Community Services, Bengalla Mining Co, Mount Arthur Coal, Anglo Coal- Dartbrook, Muswellbrook Coal and Macquarie Generation	\$3720
Muswellbrook Council – Sustainability Committee	Funding received from the Coal and Allied Community Trust to develop and construct a Sustainability Exhibition Trailer	Coal & Allied Community Trust	\$24,000

Small Projects:- Private landholder	2 projects involving the protection of riparian areas	Catchment Management Authority (CMA)	Total \$24,000
Private Landholder	1 project involving biodiversity enhancement works		
Local Aboriginal Land Council	project involving the protection of riparian areas		

Information received from Upper Hunter Weeds Authority, Muswellbrook Council and the Catchment Management Authority. Note: that all environmental funding obtained by businesses or organisations are not included.

Community Involvement - Participation in environmental programs

Local Environmental Events organised by Council and held during the reporting period:

- National Tree Day held on the 30th July 2006 – was supported by Mt Arthur Coal who provided a BBQ lunch for all volunteers which was cooked by the local Rotary Club. A donation to Rotary for cooking the BBQ was also donated by Mt Arthur Coal.
- Clean Up Australia Day held on the 4th March 2007 – was supported by Centennial Coal through the supply of equipment, machinery and volunteers to the clean up of the Denman Lookout area.
- The Upper Hunter Enviro Youth Forum held on the 26th April 2007 – the Youth Forum is an annual event which involves local high school students participating in a day long event at the Muswellbrook Indoor Sports Centre. The Forum provides students the opportunity to gain practical experience in a variety of environmental applications. Workshops were conducted by a variety of organisations including: Mt Arthur Coal, Bengalla Mining Co, Muswellbrook TAFE, the Catchment Management Authority, Total Health Education Centre, NSW Rural Fire Service, Upper Hunter Weeds Authority The event is held to correspond with National Youth Week and is organised by Muswellbrook and Singleton Councils. Sponsors of the event were: The Bengalla Mining Company, Mt Arthur Coal, Anglo Coal – Dartbrook, the Muswellbrook Coal Company, Macquarie Generation, Muswellbrook Community Services, Upper Hunter Shire Council, Singleton Council and Muswellbrook Council.

Local Events organised by other organisations and held during the reporting period:

- Conservation Volunteers Australia – Muswellbrook High School – 2 project days held involving 14 volunteers. 50 trees in an area of 40m² were planted and mulched with a 25m fence constructed.
- Conservation Volunteers Australia – Lake Liddell – 2 project days held involving 21 volunteers. A total of 1000 trees were planted in an area of 2000m².

Figure 1.8 below lists the level of community participation in the environmental events detailed above which were undertaken throughout the 2006/2007 reporting period. A comparison to the participation numbers received in 2005/2006, 2004/2005, 2003/2004 and 2002/2003 for each event is also provided. The overall participation numbers for each event have increased during the reporting period which may be attributed to the extra efforts for advertising and organisation participation, for example the Denman District and Development Association who participated in the Clean Up Australia Day activities at the Denman Lookout.

Figure 1.8**Indicator: Participation in Environmental Programs, Muswellbrook Shire 2006/2007**

Event	Numbers participating 2006/2007	Numbers participating 2005/2006	Numbers participating 2004/2005	Numbers participating 2003/2004	Numbers participating 2002/2003
National Tree Day	33	10	10	41	62
Clean Up Australia Day	102	57	60	87	51
Upper Hunter Enviro Youth Forum	126	120	140	97	87

Regional Environmental Programs –

Hunter & Central Coast Regional Environmental Management Strategy (HCCREMS)

The Hunter and Central Coast Regional Environmental Management Strategy (HCCREMS) is a collaborative initiative involving 14 Councils of the Hunter, Central and Lower North Coast regions of NSW. Projects undertaken during the reporting period by HCCREMS include the following:

- Regional Water Program
- Regional Weeds Program
- Regional Biodiversity Program
- Regional Climate Change Project
- Roadside Environment Project
- Rural Residential Sustainability Education Project

Details regarding specific activities of HCCREMS and Hunter Councils Environment Division can be found in the HCCREMS Annual Report 2006/2007 included in Appendix A.

Hunter Waste Education Group (HWEG)

The Hunter Waste Education Group is a collaborative organisation of waste educators from the Department of Environment & Climate Change, Cessnock Council, Newcastle Council, Port Stephens Council, Singleton Council, Lake Macquarie Council, Maitland Council and Muswellbrook Shire Council. During the reporting period the Hunter Waste Education Group organised the annual 'Waste As Art' (WAA) competition and exhibition.

The 'Waste as Art Community Art Competition & Exhibition' (WAA) is an annual Hunter event sponsored and coordinated by the Hunter Waste Education Group (HWEG). WAA is a partnership project with coordination, resourcing and budget duties shared by HWEG representatives. WAA has been held annually in the Hunter since 2000.

WAA aims to promote the waste-to-resource concept through encouraging the use of recovered waste products and materials in the creation of art. WAA is open to all members of the community and entry is free. Winners of the various categories are determined by three independent judges from art and waste management backgrounds. The artworks are divided into the following categories- Functional, 3D/ Sculpture Art, Letterbox Art and Design, Junior/ Primary age group and Secondary age group.

All entries in WAA are guaranteed inclusion in the six-week exhibition hosted by the Newcastle Regional Museum. The exhibition is free to the public, to encourage as many patrons as possible to receive the 'waste-to-resource' message by exposure to tangible examples in a professional exhibition. Additionally, a number of artworks are professionally photographed. These photographs are used in other education activities and in linked projects. A series of brochures, surveys and

posters were developed to promote the 2007 event.

The photograph below is the overall winning entry 'Tyred Buggy' entered by Mr Steven Jankovic.



The WAA project for 2007 commenced in April 2007 with the first call for entries for the competition, and finished in July 2007 with the collection of artwork and the transport of unclaimed works to their respective Council offices. The exhibition of works has held at the Newcastle Regional Museum from the 13th May to the 1st July 2007. Participation details for WAA 07 are included below in Figure 1.9.

Figure 1.9

Indicator: Participation in Waste As Art 2007

Event	Number of works in WAA 07 exhibition	Number of participants in WAA 07 exhibition	Community numbers who visited exhibition	Number of works in WAA exhibition from Upper Hunter region (Muswellbrook, Upper Hunter Shire and Singleton)
Waste As Art 07	223	204	7,302	19

The Hunter Waste Educators Group also developed a HWEG website during the reporting period to support the facilitation of future projects including Waste As Art. Further information regarding HWEG can be found at www.hweg.com.au

1.4 Future directions in environmental reporting

Environmental matters and the condition of environmental indicators relevant to the Muswellbrook Shire will continue to be reported in the annual State of the Environment Report as per the Local Government Act. State of the Environment Reports will continue to be completed utilising the template produced by HCCREMS to maintain consistency across the region.

2. Human Settlements

2.1 At a glance

Issue	Summary (Status)
<p><u>POPULATION & SETTLEMENT PATTERNS:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Recent increase in population figures from 2006 Census • Continued economic and population growth placing pressure on the environment • Review of Muswellbrook LEP • Review and Implementation of DCP's etc • Implementation of relevant SEPP's and REP's • Mine Rehabilitation Synoptic Plan • Bushfire prone land planning
<p><u>DRINKING WATER QUALITY:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Recent reduction in water consumption • Water quality of drinking water • Water quality concerns • Climatic variations (drought) • Water restrictions • Increase in potable water pricing • Hunter River Salinity Trading Scheme • Effluent reuse schemes • Water efficiency measures (including the Water Campaign) • Council's Sustainability Committee • HCCREMS Regional Projects • BASIX
<p><u>ENERGY:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • High consumption of energy resources obtained primarily from coal fired power stations • Requirement for energy by everyday activities • Large scale industries using significant amounts of energy • Cities for Climate Protection • Greenhouse reduction strategy • Energy efficient initiatives within Council • BASIX
<p><u>TRANSPORT:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Large number of vehicles in the Shire • Limitation of public transport systems in the Shire • Spread of Shire population across landscape making public transport difficult to provide • Bicycle / walkway development • Cities for Climate Protection • Council initiatives
<p><u>WASTE MANAGEMENT:</u></p> <p>State</p>	<ul style="list-style-type: none"> • Consumption of products and resources resulting in waste generation

<p>Pressure Response</p>	<ul style="list-style-type: none"> • Significant increase in community recycling rates • Unsustainable use of resources and materials, discarding of unused material • Compost Production • Triple bin waste system introduced • Clean Up Australia Day • Drum Muster
<p><u>NOISE:</u></p> <p>State Pressure Response</p>	<ul style="list-style-type: none"> • Noise complaints received from the community • Public entertainment licences granted by Council • Increasing industrial developments in close proximity to urban centres • Neighbourhood noise sources raised by community • Complaints Protocol • Noise Guide for Local Government • NSW Industrial Noise Policy • Noise Monitoring Programs
<p><u>COMMUNITY LANDS:</u></p> <p>State Pressure Response</p>	<ul style="list-style-type: none"> • Areas of open space under threat from urban encroachment • Increase in urban and industrial/commercial developments threatening open space areas • Illegal dumping polluting open space areas • Management of open space • Requirement for open space in new residential subdivisions • Review of controls relating to subdivisions contained in DCP

2.2 Population & settlement patterns

Management Plan Goal:

- *Ensure that residents continue to have access to community services when needed;*
- *provide opportunities for disadvantaged residents of Muswellbrook Shire to improve their well being;*
- *improve links between community services and the Aboriginal community; To improve the environmental status and knowledge of the community.*

1. What are the issues for sustainability? And how are they changing? (state)

Settlement Patterns in the Muswellbrook Shire

The most current population census was recently undertaken in 2006. The data obtained from the census indicates that the local population of the Muswellbrook Shire has increased from recent years to 15,236 residents. This growth brings the population to a level nearing the data recorded for 1996 which recorded 15,562 residents. This increase in population figures may be attributed to the economic growth occurring within the Shire due to the expansion of some local major industries such as mining sites. The growth of the economy is also reflected in the continuing progress of residential developments such as the series of subdivisions currently being developed as described in Section 1.2.

2. Why is it happening? (driving forces, pressure)

Growth in the Muswellbrook Economy

Economic growth within the Muswellbrook Shire has continued over past years contrary to a historic decline in population numbers (see Figure 1.4). As detailed in Section 1.2, the recent growth in population is expected to further enhance the economic advancement of the area.

Figure 2.1 below provides a general description of the development application types received for the 2006/2007 period. An increase in the number of development applications received and approved by Council further indicates the favourable economic climate of the Shire.

Figure 2.1

Indicator: Development Applications Received by Muswellbrook Council for the 2006/2007 reporting period compared to the 2005/2006 reporting period.

Application Type	DA's Received		DA's Cancelled / Refused	
	2006/2007	2005/2006	2006/2007	2005/2006
Home Improvement	184	207	0	2
New Dwellings	122	77	0	2
Rural	61	37	0	1
Commercial	31	45	0	3
Industrial	20	20	0	0
Subdivisions	39	35	3	0
Coal Mining	1	1	0	0
Section 96 Amendments	37	41	2	5
Demolitions	6	10	0	0
Public Works	0	0	0	0
Signage	13	9	0	0

Boundary Adjustments	3	2	0	0
Tourism	1	1	0	0
Rezoning	0	0	0	0
Extractive Industries (excluding coal mining)	0	1	0	1
Total Development applications	518	486	5	14

3. What are the responses and how effective are they? (response)

Strategies utilised by Council to manage the planning of developments within the Shire aim to provide consistency with surrounding land uses, ensure land uses are appropriate for the specific land characteristics and ensure that land development planning is undertaken in a sustainable manner. The following strategies are incorporated as basic elements of the development planning process:

- **Muswellbrook Local Environmental Plan – under review**

The review of the existing Muswellbrook Local Environmental Plan (LEP) 1985 is continuing with the document nearing completion. The draft LEP, which will be exhibited during the next reporting period, has been completed to be consistent with the LEP template introduced by the NSW Department of Planning.

The Local Environmental Plan identifies the zoning and corresponding permissible land uses for all parcels of land within the Shire. This information provides the basis for development planning throughout the Shire.

- **Development Control Plans**

Council is currently reviewing all of the existing DCP's adopted by Council and amalgamating them into a single document as per a direction from the NSW Department of Planning. This process is nearing completion with the draft document to be placed on public exhibition in conjunction with the draft LEP document. The exhibition of both documents is expected to occur and the final document produced during the next reporting period.

- **State Environmental Planning Policies (SEPP's)**

State Environmental Planning Policies are documents developed by the NSW State Government for a range of specific development types or planning issues. Criteria listed by SEPP's are applied by Council during the planning and development assessment process for developments including or involving (but not limited to): traffic generating developments, contaminated sites, seniors living facilities, advertising and the BASIX (Building Sustainability Index) program.

- **Hunter Regional Environmental Plan (Hunter REP)**

The Hunter REP provides a strategic planning framework for the Hunter region and prescribes certain matters that must be considered by Council in the preparation of draft LEPs and prior to determining applications for development.

- **Synoptic Plan – Integrated Landscapes for Mine Site Rehabilitation**

The Synoptic Plan produced by the Department of Primary Industries aims to provide a basis for development of long termed strategies for the rehabilitation of mine sites. The Synoptic Plan provides information on the current practices and trends in mine rehabilitation; regional initiatives in vegetation management; emerging environmental issues and their implications on mine rehabilitation; a comprehensive analysis of mine rehabilitation plans; principles for an integrated approach towards landscape management for the coalfield.

The Synoptic Plan is utilised by mining companies, organisations and authorities to incorporate long term rehabilitation strategies into final land form plans and progressive rehabilitation programs to produce a cohesive final design of vegetated corridors across the Upper Hunter region.

- **Planning for Bushfire Protection**

A Bushfire Prone Land map has been supplied by the Rural Fire Service as a tool for the assessment of development applications under the Integrated Development Approvals process pursuant to Section 90 of the Environmental Planning and Assessment Act, and in conjunction with the Planning for Bushfire Protection Guidelines 2006.

4. What more could be done? (future directions)

Council Action

The basis of strategic development planning in the Muswellbrook Shire is supported by the documents and guidelines detailed above. The underlying aim of these documents is to provide for sustainable use of land which is consistent with the land characteristics and surrounding land uses.

The review of all existing Development Control Plans (DCP's) and Local Environmental Plan will enhance the Council's ongoing achievements towards sustainable development. This in conjunction with the adoption of other development strategies such as Integrated Water Cycle Management, Water Sensitive Urban Design and location specific development plans will improve Council's performance in sustainable development and settlement patterns.

2.3 Drinking water quality and consumption

Management Plan Goals:

- *To provide environmentally sustainable Water and Sewerage services that- are customer orientated, meet present and future needs, are efficient and cost- effective and follow best practice management;*
- *Reuse 100% of effluent in Muswellbrook and Denman excluding peak wet weather conditions;*
- *To improve water quality within the Catchment System.*

1. What are the issues for sustainability? And how are they changing? (state)

Muswellbrook Shire Council as the local water authority undertakes the ownership, operation and management of three (3) water supply systems which operate within the towns of Muswellbrook, Denman and Sandy Hollow. An augmentation was recently undertaken to improve the quality of the potable water available from the Denman water supply.

Monitoring the Quality of Drinking Water

The maintenance of drinking water at a quality appropriate for human consumption is managed by the relevant water authority (i.e. Muswellbrook Shire Council) through the adherence to the Drinking Water Quality Guidelines (NHMRC & ARMCANZ). In this regard Council undertakes bacterial, pesticide, physical and chemical analysis of samples sourced from the drinking water supply.

Figure 2.2 details the compliance of water samples as per the NHMRC 2000 Drinking Water Guidelines and as compared to the 2005/2006 reporting period.

Figure 2.2

Indicator: Percentage Compliance with NHMRC Drinking Water Guidelines 2006/2007

Parameter / Type	Period 2006/2007			Period 2005/2006		
	Muswellbrook	Denman	Sandy Hollow	Muswellbrook	Denman	Sandy Hollow
Water Consumption (ML)	1808	258	32	2583	248	35
Physical and Chemical:						
Physical	100%	68%	54%	99%	67%	47%
Chemical	100%	95%	95%	99%	99%	94%
Key Characteristics:						
Turbidity	96%	36%	71%	98%	2%	91%
pH	100%	84%	98%	98%	41%	91%
Colour	100%	100%	100%	100%	100%	100%
Microbiological:						
E. coli	100%	100%	99%	100%	98%	99%
Total coliforms	99%	89%	95%	100%	98%	96%

Instances of non compliance in regards to turbidity results were experienced by all water treatment facilities following the June 2007 storm event which increased the levels of turbidity for all water sources.

Other site specific non compliance incidences are as follows:

- Muswellbrook – the non compliance experienced in regards to total coliforms was recorded due to sampling error.
- Denman – the dirty status of the river during June 2007 increased the incidence of non compliance in regards to total coliforms, physical and chemical characteristics. The lack of treatment facilities at the Denman plant limited the methods available to rectify these results.
- Sandy Hollow – Hardness, total dissolved solids (TDS) and some inorganic compounds were recorded as above the guideline criteria due to the hardness of the water source and lack of softening treatment. Coliforms were also above the guidelines due to the low readings of chlorine.

Current Water Consumption

As indicated in Figure 2.3 below, water consumption within the Shire has in past years been steadily increasing however the current 2006/2007 reporting period indicates that a marked decrease in the consumption of water resources has occurred. The introduction of water restrictions, an increase in potable water pricing, the BASIX program and additional community education in regards to the sustainable use of water resources may be attributable to the reduction in water consumption.

Figure 2.3

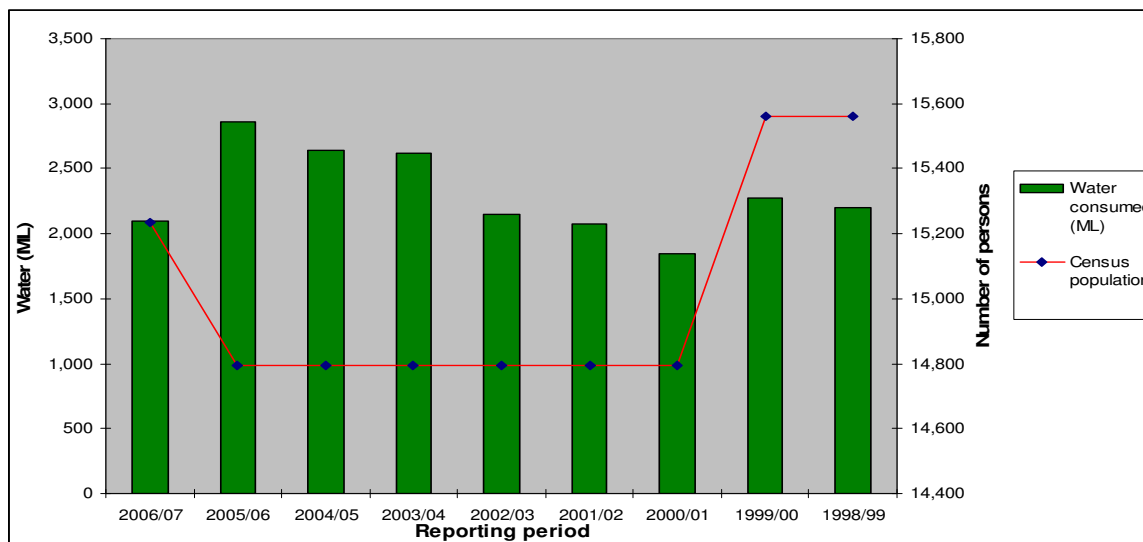
Indicator: Total potable water consumption (ML) of the Muswellbrook Shire

2006/07	2005/06	2004/05	2003/04	2002/03	2001/02	2000/01	1999/00	1998/99
2,098	2,866	2,644	2,624	2,150	2,076	1,845	2,277	2,196

Previous annual records have shown a steady increase in the consumption of water which has warranted the management of any unsustainable use of water throughout the Shire during the reporting period. Figure 2.4 below represents the consumption of water resources relevant to the per capita usage based on census data for each financial/ reporting year.

Figure 2.4

Indicator: Total potable water consumption (ML) compared to population growth (Census data)



2. Why is it happening? (driving forces, pressure)

Climatic Variations

Climatic conditions are known to affect the consumption rates of water and energy resources. In regards to water usage, an increase in precipitation generally corresponds with a decrease in potable water consumption, whilst dry or drought conditions increase the reliance of the community and businesses on potable water sources.

During the reporting period there was no significant relief from the long standing drought conditions. It is felt that the reduction in water usage was contributed to in this respect more as a result of a heightened public awareness of the chronic shortage of water across the nation than any overabundance of supply.

Water Quality Issues

The quality of the water resources sourced for potable purposes significantly impacts the ability for Council to treat the water to a level suitable for human consumption. These existing water quality issues may then have flow on effects which may not be rectified by the treatment process, for example turbidity, hardness and some chemicals.

During the reporting period an augmentation of the Denman water supply was commenced which is expected to improve the ability to supply water to the Denman community and improve water quality.

Council will however seek to implement demand management practices in Denman to ensure that this improvement in level of service is matched by a reduction in consumption.

3. What are the responses and how effective are they? (response)

Water Restrictions

During the reporting period water restrictions were introduced by Council in the Muswellbrook Shire to address the over consumption of potable water from the diminishing resources. Figure 2.5 below details the levels and number of days relevant to water restrictions in the three key areas of the Shire.

Figure 2.5

Indicator: Water Restrictions 2006/2007		
Muswellbrook:	Level 1	365 days
Sandy Hollow:	Level 1	365 days
Denman:	Level 1	340 days
	Level 2	3 days
	Level 3	22 days

The Muswellbrook Shire Council water restriction levels imposed for the duration of the reporting period are detailed as follows:

Level 1	<ul style="list-style-type: none"> • Limitation of domestic external use to 1 hour only morning or afternoon between 7am and 10am or 5pm and 8pm • Micro- irrigation systems for gardens 1 hour only morning or afternoon between 7am and 10am or 5pm and 8pm • Swimming pools can be topped up only 6.30am to 7.00 am and 6.30pm to 7.00 pm • Washing of paved areas etc by bucket only and hose rinse • Washing of vehicles – bucket wash and hose rinse only on lawn
Level 2	<ul style="list-style-type: none"> • Limitation of domestic external use for half hour only in afternoon after 4pm - odds and even days relevant to house number • Micro- irrigation systems for gardens half hour afternoon only after 4pm - odds and even days relevant to house number • Swimming pools can be topped up only in afternoon only after 6.30pm - odds and even days relevant to house number • No washing of paved areas etc unless required via health requirements • Washing of vehicles – bucket wash and hose rinse only on lawn for half an hour between 5.00pm and 5.30pm only - odds and even days relevant to house number
Level 3	<ul style="list-style-type: none"> • No domestic external use other than household reuse water • No use of Micro- irrigation systems • No filling or topping up of swimming pools • No washing of paved areas etc unless required via health requirements • No washing of vehicles unless required via health requirements

Restrictions also exist for:

- Council irrigation of public sporting fields, parks and gardens
- Nurseries and commercial gardens
- Bowling greens
- Water cartage operators.

Water Pricing

The pricing of potable water was increased essentially in line with CPI increases by Council as the water authority during the reporting period, however the increase in water charges from the 2004/05 to the 2005/06 financial years is likely to have been the primary impetus to ongoing reductions in water usage. These latter increases amounted to an approximately 50% increase in the top tier of water usage charge and an increase of approximately 20% in the access charge.

Hunter River Salinity Trading Scheme

The Hunter River Salinity Trading Scheme (HRSTS) was introduced by the NSW government to regulate the discharge of saline mine water into the Hunter River. The scheme has been effective in reducing associated pollutants from being discharged in times of low flow and has improved the efficiency of water usage on mine sites.

Effluent Reuse Scheme

Council has established effluent reuse agreements with Mt Arthur Coal, Muswellbrook Golf Course and Denman Golf Course to utilise reclaimed water for irrigation, dust suppression and coal washing purposes. The scheme reduces the need for the golf courses and the mine to pump water from the river to meet their water needs and reduces the need for the treatment facilities to discharge treated effluent into the Hunter River.

In previous reporting periods 100% of the treated effluent produced by the sewerage treatment facilities was reused. Unfortunately during the 2006/2007 reporting period the flooding event which occurred from the 8th to the 12th June 2007 required that some treated effluent was discharged to the Hunter River.

In the reporting period 100% of the treated effluent produced by the sewerage treatment facilities was reused.

Figure 2.6 below details the quantities supplied to each receiver of treated effluent for reuse.

Figure 2.6

Indicator:	Volume of Treated Effluent Reused 2006/2007
Mt Arthur Coal:	655 ML
Muswellbrook Golf Club:	180 ML
Denman Golf Club:	94 ML

Water Campaign

The Water Campaign was developed by the International Council for Local Environmental Initiatives (ICLEI) which assists local governments to identify and evaluate current water resource management at the corporate, community and catchment levels. By joining the campaign, Council has undertaken a commitment to develop and implement water saving programs thus improving the consumption and quality of water. Council has previously completed Milestone 1 of the campaign and is currently undertaking Milestone 2 through the development of the Integrated Water Cycle Management Strategy (IWCM).

Sustainability Committee

The Sustainability Committee was established by Muswellbrook Council to assist with the implementation of sustainable outcomes for the Shire, including water efficiency measures. This Committee consists of community representatives, Councillors and Council staff and is currently

overseeing Council's progress through the Milestones of the Water Campaign and assisting in the development of Council's water saving initiatives.

Hunter & Central Coast Regional Environmental Management Strategy (HCCREMS)

The Regional Water Program has been developed by Hunter Councils to mainstream urban Integrated Water Cycle Management (IWCM) throughout the Hunter, Central Coast and Lower North Coast Region. The HCCREMS annual report is included as Appendix A.

BASIX

The implementation of BASIX (Building Sustainability Index) requires that all new dwellings achieve reductions in energy and water consumption. BASIX came into effect during the 2005/2006 reporting period which effectively reduces the consumption of water resources by making dwellings more sustainable.

The program commenced on the 1st July 2005 and has been incorporated into all new dwellings granted development approval after this date. The BASIX program may have also been a contributing factor to the reduction in water consumption during the 2006/2007 reporting period.

4. What more could be done? (future directions)

Educational Programs

Additional educational programs are currently being developed for a range of environmental and sustainability topics. The main program which is expected to be implemented during the next reporting period is a local school education program which will utilise Council's Sustainability Exhibition Trailer. This program will focus on the main topics of - water, energy, recycling and waste.

Water Campaign

The completion of Council's Integrated Water Cycle Management Plan is expected to address the requirements of the Water Campaign for Milestone 2. Following the achievement of Milestone 2, Council will continue to be committed to the water reduction and quality goals of the Campaign and will progress through to Milestone 5.

IWCM and WSUD

With the completion of the Integrated Water Cycle Management Plan (IWCM) and plans which incorporate Water Sensitive Urban Design (WSUD), the ability to manage water resources and plan the built environment to incorporate water efficiency principles would be achievable. The IWCM is currently nearing completion and is expected to be finalised during the next reporting period.

Management Plan Goals:

- To complete the Greenhouse Milestone Program;
- To reduce reliance on energy consumption.

1. What are the issues for sustainability? And how are they changing? (state)

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.

The combustion of fossil fuels such as coal generates large quantities of greenhouse gas emissions such as carbon dioxide, methane and nitrous oxide. Additional hazardous emissions also include oxides of nitrogen, sulphur dioxide and particulate matter. The production of energy via coal fired power stations is generally inefficient due to the amount of energy lost in the conversion, and is therefore considered unsustainable.

Figure 2.5 below details the amount of energy resources consumed and respective greenhouse gas emissions (shown as carbon dioxide equivalent CO₂-e) produced by Council activities during 2006/2007.

Figure 2.7

Indicator: Energy Use by Council by Type and Equivalent Tonnes of Carbon Dioxide Emitted 2006/2007

Emissions Inventory						
Fuel/process	Quantity used 2006/2007		Emissions 2006/2007 – Tonnes CO₂-e	Quantity Used 2005/2006		Emissions 2005/2006 – Tonnes CO₂-e
Electricity	4,458,272	kWh	4346.82	4,370,000	kWh	4260.75
Petroleum Products						
Petrol/Gasoline	109.10	kL	272.74	75.92	kL	189.80
Automotive Diesel Oil	135.19	kL	365.00	108.13	kL	291.96
LPG - transport	13.96	kL	22.34	11.74	kL	18.79
Net Emissions	5006.9			4762.05		

* The net CO₂-e emissions are calculated using the emission factors listed by the Australian Greenhouse Office in the 'AGO Factors and Methods Handbook'.

Figure 2.7 above indicates that the consumption of energy resources by Council activities is increasing. This increase in energy use (in particular fuel usage) may be attributable to the expansion of Council operations which has required the employment of additional staff resources. The increase in electricity consumption will be a focus of the next reporting period to educate staff and attempt to address the growth in electricity use by staff.

Figure 2.8 below details the amount of energy consumed by the community (both residential and non residential) and the corresponding carbon dioxide emissions for the Muswellbrook Shire.

Figure 2.8

Indicator: Electricity Usage, Muswellbrook Local Government Area 2006/2007

Emissions Inventory						
Fuel/process	Quantity Energy Used 2006/2007		Emissions 2006/2007 - Tonnes CO₂-e	Quantity Energy Used 2005/2006		Emissions 2005/2006 - Tonnes CO₂-e
<i>Electricity:</i>						
Residential	110,158,000	kWh	98,371.1	84,123,000	kWh	82,019.9
Non Residential	273,302,000	kWh	244,058.7	306,965,000	kWh	299,290.9
Net Emissions	342,429.78			381,310.8		

* Note that the emission figures are affected by revised emission factors listed by the Australian Greenhouse Office. This was due to a change in the mixture of fuel types reported, for example the increased usage of fuels which produce less CO₂ emissions than electricity produced by coal fired power stations.

Figure 2.9

Indicator: Total number of electricity customers in the Muswellbrook Shire 2006/2007	
Residential:	11,959
Non Residential:	2,228

Figures from Energy Australia 2007

Figure 2.10

Indicator: Total electricity consumption per customer (kWh)	
2005/2006	
Residential:	11,609.58
Non Residential:	235,764.21
2006/2007	
Residential:	9,211.31
Non Residential:	122,666.97

Figures from Energy Australia 2007

The data represented in Figure 2.8 indicates that total residential electricity consumption has increased during the reporting period whilst total non- residential consumption has decreased. Figure 2.9 details the customer numbers for the 2006/2007 reporting period which indicates that customer numbers are significantly greater than the 2005/2006 reporting period.

Figure 2.10 utilises the customer numbers for both the 2005/2006 and 2006/2007 reporting periods to interpret the individual customer electricity consumption. As detailed in Figure 2.10 the electricity consumption for residential and non- residential customers has decreased significantly. This reduced electricity consumption is likely to have been produced by increased community awareness in relation to electricity use.

2. Why is it happening? (driving forces, pressure)

Australia's society and economy rely on the production of goods and services to progress the country's level of economic development. This growth requires the input of resources which include raw materials and energy resources to produce goods and services which can be traded. The use of energy resources is therefore an essential element to economic development.

The generation of electricity in NSW continues to be predominantly through coal fired power stations as previously described by this report. Therefore the sustainable use of energy produced through the combustion of fossil fuels is a major focus for local government and businesses alike.

As represented above the electricity consumption of the community (residential and non-residential) has decreased whilst the consumption of energy resources by Council activities has increased. Though this increase in Council usage may be attributable to the expansion of Council staffing and operations, there exists room for improvement and therefore warrants further educational programs targeted at Council activities to be conducted during future reporting periods.

3. What are the responses and how effective are they? (response)

The reduction in energy consumption has been a major focus of projects developed by Muswellbrook Shire Council in recent years. Council has therefore implemented a range of programs to address the use of energy resources within Council and the community. These programs/ projects include:

- Involvement of Council in the Cities for Climate Protection Program and progression to the CCP Plus Program
- Completion of energy audits of the Council Administration Centre
- Modifying the Council Administration Centre in response to the findings of the energy audit
- Down sizing of some Council vehicles from six (6) cylinder to four (4) cylinder vehicles
- Use of dedicated LPG vehicles within Council's Works Fleet
- Retrofitting lighting within key Council Community Centres
- Installation of AAA rated shower heads within Council Community Centres
- Implementation of the Muswellbrook Shire Greenhouse Reduction Strategy
- Implementation of the BASIX (Building Sustainability Index) program
- Introduction of low energy computer monitors
- Distribution of climate change packs to the community during the previous reporting period

4. What more could be done? (future directions)

Educational Programs

Educational programs for community sectors and for Council staff will be implemented during the next reporting period (2007/2008) to enhance the achievements in relation to the reductions in energy use. These programs will be developed in conjunction with Council's Sustainability Committee and will invite input from the relevant sectors and groups for example a school program is to be developed which is expected to cover a range of topics including sustainable energy use.

Retrofitting council buildings

A range of works have been undertaken in the past to improve the energy efficiency of Council's Administration Building, however further improvements would continue the achievements Council has made in reducing its overall consumption. These improvements could include:

- The continued replacement of fluorescent light tubes with tri-phosphorous fluorescents;
- Continued installation of compact fluorescents in lieu of standard light globes;
- Installation of sensor lighting;
- Installation of timer units on light switches;
- Structures or vegetation which are implemented to address the absorption of light and heat energy by the Administration Building which will increase the capacity for the air conditioning unit to control internal temperatures.

2.5 Transport

Management Plan Goal:

- *To provide and maintain assets which allow the sustainable delivery of selected services to a standard which is understood and accepted by the community.*

1. What are the issues for sustainability? And how are they changing? (state)

Methods of transportation are a major consumer of a variety of energy resources including petrochemical products (petrol, oil, ethanol etc) and electricity. The majority of transportation vehicles rely on the combustion of some type of fuel which can contribute to air pollution through the emission of particulate matter, greenhouse gases and noxious fumes.

Figure 2.11 lists the numbers of vehicle registrations and fuel types relevant to the Muswellbrook Shire. This data indicates that the total number of vehicles registered with the RTA during the 2006/2007 reporting period have increased from the previous reporting period 2005/2006.

Figure 2.11

Indicator: Vehicle registrations for the Muswellbrook Shire 2006/2007 compared to 2005/2006 reporting period

Vehicle Type	2006/2007					2005/2006				
	Unleaded Petrol	Leaded Petrol	Diesel	LPG	Other/ unknown	Unleaded Petrol	Leaded Petrol	Diesel	LPG	Other/ unknown
Passenger	6521	290	512	57	59	6414	363	476	51	4
Bus	27	19	87	1	0	23	20	91	2	0
Motor homes	1	1	13	1	1	0	2	8	3	0
Motorcycle	519	76	0	0	2	433	77	0	1	2
Light Truck	1138	206	1497	51	17	1131	229	1409	51	20
Heavy Truck	5	9	370	0	4	3	10	336	1	4
Prime Mover	0	0	45	0	1	0	0	45	0	1
Plant vehicles	0	2	88	0	1	0	2	91	0	1
Trailer	0	0	0	0	3246	-	-	-	-	3161
Other vehicles	4	0	0	0	0	2	0	0	0	0
Total Vehicles	14,871					14,467				

Information obtained from RTA 2007

Figure 2.12 details the fuel consumption of Council vehicles which are utilised in Council activities and normal operations. The data indicates that an overall increase in the use of all types of energy resources has occurred during the reporting period in relation to transportation. This increase may be attributable to the expansion of Council's staff and operations which have warranted the

purchase of additional vehicles.

Figure 2.12

Indicator: Council transport fuel usage and CO₂ emissions 2006/2007 compared to 2005/2006 reporting period

Fuel	Quantity Used 2006/2007		Emissions 2005/2006 – Tonnes CO₂-e	Quantity Used 2005/2006		Emissions 2004/2005 - Tonnes CO₂-e
Petroleum Products						
Petrol/Gasoline	109.10	kL	272.74	75.92	kL	189.80
Automotive Diesel Oil	135.19	kL	365.00	108.13	kL	291.96
LPG - transport	13.96	kL	22.34	11.74	kL	18.79
Net Transport Emissions	660.08			500.55		

* The net CO₂-e emissions are calculated using the emission factors listed by the Australian Greenhouse Office in the 'AGO Factors and Methods Handbook'.

2. Why is it happening? (Driving forces, pressure)

The typical Australian township is generally a cluster of settlements which are spread sparsely across the landscape making the linkage by public transport an extremely difficult task. As characterised in the Muswellbrook Shire the spread of the population across the area from Muswellbrook to Denman, Wybong, McGullys Gap and Sandy Hollow means that public transport is not a viable option for local transportation. This spread of settlements requires a reliance on private transport to link residents to essential infrastructure and services.

3. What are the responses and how effective are they? (response)

Bicycle Plan - Cycleway / Walkway development

The construction of cycle ways and walkways within newly developed areas within the Muswellbrook Shire is introduced by Council to promote the use of sustainable transport methods within the local community. As public transport is not a viable solution, Council continues to expand the linkage of cycle ways to encourage the use of bicycles to provide low cost, sustainable transport. The information detailed by Figure 2.13 represents the works undertaken during the reporting period as detailed by Council's Bicycle Plan. The development of cycleway infrastructure is continuing.

Figure 2.13

Indicator: Public cycleway construction in Muswellbrook Shire 2006/2007	
Total length of cycleway constructed:	200m
Approximate cost of cycleway construction:	\$40,000

Council energy consumption

Council continues to assess and alter its vehicle fleet to those which produce fewer emissions and use more sustainable energy resources.

4. What more could be done? (future directions)

Council Vehicle Fleet

Council will continue to review the vehicles within its fleet and, where appropriate, incorporate energy efficient vehicles and / or smaller size vehicles which use less fuel and produce fewer emissions.

Cycleway / Walkway Development

Council will continue to implement the Bicycle Plan which has aims to develop cycle ways which link the urban areas of the Shire.

Cities for Climate Protection (CCP) Plus - Sustainable Transport Program

Council has initiated involvement in the CCP Plus – Sustainable Transport Program which investigates and promotes the use of sustainable transportation options. This program is expected to be developed and implemented during the next reporting period.

2.6 Waste Management

Management Plan Goal:

- *To achieve a self-funding, efficient and environmentally sustainable waste management service to meet community needs and legislative requirements;*
- *Increase focus on waste avoidance and resource recovery;*
- *Investigate future waste disposal option, regional landfill opportunities and partnerships; Implement waste reduction strategies to increase lifespan of the landfill;*
- *Maximise the recovery, reprocessing, reuse and recycling of all waste materials;*
- *To improve recycling within the community;*
- *Increase public awareness of waste reduction and recycling.*

1. What are the issues for sustainability? And how are they changing? (state)

One of Council's main functions is the provision of waste disposal services and facilities to the community. The sustainable reuse and/ or disposal of waste products has therefore become a major focus of resources for all local governments. The typical method of bulk waste disposal is through the placement of materials into large landfill cells, however this method is becoming increasingly less sustainable as communities expand escalating demand for land.

Muswellbrook Council provides a waste disposal service to the population of the Shire through the collection of general waste, green waste and recyclable collection systems within urban areas. To facilitate this Council administers the Muswellbrook Waste Depot and the Denman Transfer Station which collect and receive the waste products of the Shire.

During the reporting period a new system of waste collection was introduced which utilises a triple bin system which effectively separates the waste streams of general waste, green waste and recyclables. The introduction of the triple bin system improves the ability for the Council facilities to handle, process, reuse, recycle and/ or dispose of specific waste streams.

Figure 2.14 details the amount of recyclables collected and diverted from landfill during the 2006/2007 period compared to that of the 2005/2006 and 2004/2005 reporting periods.

Figure 2.14

Indicator: Total Waste Recycled by Type (ie paper, aluminium, plastics etc)

Product	Amount Recycled 2006/2007 (tonnes)	Amount Recycled 2005/2006 (tonnes)	Amount Recycled 2004/2005 (tonnes)
Paper	1183	488	426
Glass	418	187	176
Plastic	96	36	30
Aluminium Cans	17	7	5
Steel	26	8	9
Total Recycled	1740*	726	646

* Note that due to contamination of some recyclable materials a total of 580 tonnes of mixed recyclables were disposed to landfill during the reporting period. Therefore a total of 1160 tonnes of total waste was recycled.

The rates of recycling within the Shire have in previous years (i.e. prior to the 2004/2005 reporting period) been in decline which has prompted Muswellbrook Council to introduce programs to improve the capture of recyclable materials. The dramatic increase in recycling rates from the 2005/2006 reporting period to the 2006/2007 reporting period is believed to have been achieved through the introduction and distribution of the triple bin system established by Council during the reporting period.

As per the requirements of the environmental protection licence issued by the Department of Environment & Climate Change (formerly the Dept of Environment and Conservation), the Muswellbrook Waste facility is required to implement an approved monitoring program of the landfill site. This monitoring program involves periodical monitoring of groundwater, landfill cell leachate and gas emissions. For the reporting period 1st July 2006 to the 30th June 2007 all reporting guidelines were adhered to. The existing landfill facility in Muswellbrook is projected to have the capacity to receive waste material for a period of ten to fifteen years.

2. Why is it happening? (Driving forces, pressure)

As economic and population growth continues the demand for land resources increases causing the built environment to spread into areas not previously valued for urban development. This has prompted the focus on the use of land by communities and authorities to investigate the sustainable land use practices.

Waste disposal is becoming a highly prioritised issue in most local government areas due to the increasing awareness of the unsustainable nature of depositing large quantities of waste into landfill sites. Some local governments are also addressing the issue of old landfill site redevelopment which has also enhanced the focus on the sustainable use of landfill sites. The basis for sustainable landfill management relies on the removal of all possible waste streams which could be reused or recycled rather than being deposited into land fill sites.

Figure 2.15 below details the total quantity of material disposed to landfill and the estimated source percentages of waste received by the Muswellbrook landfill site. As indicated by the percentages the vast majority of waste to landfill is produced by the domestic/ municipal sector.

Figure 2.15

Indicator: Total Waste disposed of into Muswellbrook Landfill by Source (ie domestic/ municipal, commercial/ industrial)

Total Waste disposed during reporting period:	14,000 T
Percentage total waste domestic/ municipal:	68%
Percentage total waste commercial/ industrial:	32%

3. What are the responses and how effective are they? (response)

Council facilitates a range of waste programs which have been introduced to address the issue of goods over consumption and waste disposal. These programs implemented by Council include:

Drum Muster Program

The Drum Muster Program involves the collection of empty agricultural drums by Council at the Denman Waste Transfer Station and Muswellbrook Waste Depot. These drums are then collected and disposed of by the Drum Muster program.

The data represented by Figure 2.16 below indicates a decline in the containers received during the 2005/2006 reporting period (total 2444). The cause of this reduction in response is unknown.

Figure 2.16

Indicator: Quantity of empty chemical containers collected Drum Muster 2006/2007

Muswellbrook Waste Facility and Denman Transfer Station:	2125 containers
--	-----------------

Triple Bin Waste Collection System

A triple bin waste collection service was introduced during the reporting period following the change in contract for the waste management facilities. The new system involves the management of the facilities by Council whilst the collection and processing of the waste is undertaken by the contractor – JRR Richards. This system enables Council to have more control of the facilities and collection process.

The implementation of the triple bin system involved the distribution of three unique bins which are colour coded to separate general waste, green waste and recyclables. The separation of these waste streams enhances the ability for Council to manage specific waste streams and reuse or recycle waste types where possible.

Compost and Mulch Production

In the past greenwaste has been mulched at the Muswellbrook Waste Facility and transported to the Muswellbrook Sewage Treatment Plant where it was combined with solid effluent waste to create compost. This process continues to be under review which resulted in no production of compost during the reporting period.

Mulch is however produced through the collection of green waste at the Denman Transfer Station and Muswellbrook Waste Depot. The introduction of the triple bin waste collection system has enhanced the ability for Council to collect the green waste from the community and reuse the material as mulch. Figure 2.17 details the quantity of mulch produced during the reporting period.

Figure 2.17

Indicator: Compost production from green waste disposal 2006/2007

Greenwaste received and reprocessed into mulch: 2298 tonnes

Clean Up Australia Day

Events for Clean Up Australia Day are organised each year by Council in conjunction with other businesses and organisations. The Clean Up Australia Day event held during the reporting period on the 4th March 2007 involved the collection of waste from a variety of locations which included a focussed effort on the Denman Lookout. Information regarding the event and participant numbers is included in Section 1.3.

4. What more could be done? (future directions)

Other Waste Types

The disposal of other waste types remains an issue for the entire Hunter region, not just the Muswellbrook Shire. Waste types which are difficult to dispose include hazardous wastes including electronic items, household chemicals and agricultural chemicals. Though programs have been implemented in the region in the past to address these waste types, the participation rates and finances required to undertake such programs have not warranted the continuation of the programs. Further investigation in organising events which address these waste types will continue in the future.

2.7 Tranquillity and noise

Management Plan Goal:

- To ensure that outputs are controlled within established licensing criteria.

1. What are the issues for sustainability? And how are they changing? (state)

Included in Council's functions is the regulation of some community activities which can require the resolution of complaints and issues relating to the activities of the community or other organisations. One of the most common complaints received by Council are complaints which relate to matters concerning noise. Figure 2.18 below details the number and types of noise complaints received by Council during the reporting period.

Figure 2.18

Indicator: Number of noise complaints received by Muswellbrook Council 2005/2006 with comparisons of total noise complaints from 2001 to 2007

Source of noise	Number of complaints
Industrial	3
Transport (including roads, rail, aircraft)	1
Residential (including pets, air con, power tools etc)	7
Recreational	2
Other	2
Total 2006/2007	15
Total 2005/2006	15
Total 2004/2005	15
Total 2003/2004	19
Total 2002/2003	30
Total 2001/2002	87

The total number of complaints received during the 2006/2007 reporting period remains consistent with the total numbers of noise complaints received during the 2004/2005 and 2005/2006 reporting periods. The total numbers of noise complaints have decreased consistently since 2001 possibly indicating that – noise emissions have reduced; residents are becoming more accustomed to noise; complaints to Council aren't seen as resolving the problem; members of the community are contacting the coal mine hotlines directly.

The allocation of public entertainment licences is also an indicator of potential noise impacts on the local community. Premises which are granted a public entertainment licence are reviewed by Council each year to assess the suitability for that premises to hold entertainment events.

Figure 2.19 lists the number of public entertainment licences granted during the reporting period from 1st July 2006 to 30th June 2007. Though entertainment premises may create noise issues for the community, no complaints received by Council were regarding public entertainment.

Figure 2.19

Indicator: Number of Premises with Public Entertainment Licences 2006/2007

Number of premises: 21

2. Why is it happening? (driving forces, pressure)

Typical sources of noise complaints in the Muswellbrook Shire are:

- Industrial noise - including noise associated with blasting, mining equipment and vehicles
- Road traffic noise
- Rail noise – including mine railway loops
- Domestic pets
- Air conditioners
- Lawn mowers, tools etc
- Noisy neighbours
- Building contractors

As can be seen in Figure 2.18, the majority of noise related complaints received by Council relate to residential noise sources such as pets, power tools, swimming pool pumps, air conditioners etc. The receipt of noise complaints from residential sources is consistent with the data collected for previous years.

3. What are the responses and how effective are they? (response)

Noise complaints are addressed by Council through the continued implementation of a number of tools, which include:

- **Complaints Protocol**- enables Council to adequately deal with and monitor complaints.
- **Noise Guide for Local Government** - Council undertakes responses to and management of noise complaints as per the recommendations of the Noise Guide for Local Government.
- **NSW Industrial Noise Policy** - used in the management of industrial noise emissions and the determination of noise limits for operations or activities.
- **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.

4. What more could be done? (future directions)

Matters relating to community noise management are largely addressed by Council on an as needs basis. The management of noise in relation to industrial sources is however an ongoing management issue which Council must consider when undertaking land use planning and development assessments.

2.8 Community Lands

Management Plan Goals:

- *To provide facilities commensurate with community needs and the ability of Council to provide, maintain and operate.*
- *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.*
- *To effectively manage and maintain Council owned property.*

1. What are the issues for sustainability? And how are they changing? (state)

Community land is land which is managed by Council as vacant areas within the urban landscape which may include recreational parks, reserves, gardens, and other open spaces such as nature strips. Community land is often referred to as 'open space' and provides a range of social, cultural, economic and environmental benefits for the community including recreational opportunities, contributing to the aesthetics of the environment, improving air quality, enhancing biodiversity, and performing water management functions.

2. Why is it happening? (driving forces, pressure)

Council manages the majority of open space areas requiring land management practices such as mowing and weed control activities. Open space areas are constantly under threat due to the encroachment of the urban environment and the constant need for more land to accommodate settlement expansion.

3. What are the responses and how effective are they? (response)

Management Plans

Under the Local Government Act all councils in NSW must classify open space areas and develop management plans with the community for their ongoing use and maintenance.

New Subdivision Areas

Council ensures that new residential subdivisions in the Shire contain adequate open space areas for the population that will eventually reside in the area.

Subdivision DCP

Council has reviewed all Development Control Plans as per a direction received from the NSW Department of Planning to consolidate all individual DCP's into a single document. This review has developed a draft DCP document which is expected to be adopted during the next reporting period. The consolidated DCP will provide criteria required to be applied for all subdivisions to ensure the adequate provision of community open space.

4. What more could be done? (future directions)

Management of open spaces

Adequate maintenance programs must be implemented to ensure the aesthetic value and biodiversity is maintained, such as through controlling weed infestations and protecting threatened species occurring in the areas.

Human Settlements: Responses developed for consideration in the development of Council's Management Plan.

Responses	Action to date	New action for Council's consideration
<u>Population & settlement patterns:</u>	<ul style="list-style-type: none"> • Review of the Muswellbrook LEP and Development Control Plans • Implementation of DCP's for environmental controls of development (Erosion and Sediment control, contaminated lands, Trade Waste) • Consideration of Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation in development assessment for mining developments • Consideration of relevant SEPP's and REP's for development assessment • Planning for Bushfire Protection provisions in development assessment 	<ul style="list-style-type: none"> • Development and implementation of policies and strategies to include: Water sensitive urban design, Integrated Water Cycle Management and energy efficiency measures
<u>Drinking water quality and consumption:</u>	<ul style="list-style-type: none"> • Implementation of water restrictions • Introduction of increased pricing for potable water supply • Implementation of Hunter River Salinity Trading Scheme amongst industry • Effluent Reuse Scheme – recycle 100% of effluent • Water Campaign – Milestone 2 • Sustainability Committee to oversee Council's progress in sustainability matters • Implementation of HCCREMS regional projects 	<ul style="list-style-type: none"> • Water Campaign – set reduction goals and develop and implement Water Reduction Strategy • Educational programs - schools • Completion and implementation of the Integrated Water Cycle Management Strategy • Implementation of BASIX
<u>Energy:</u>	<ul style="list-style-type: none"> • Council energy efficiency initiatives • The Cities for Climate Protection Program and progression to the CCP Plus Program • Implementation of Greenhouse Reduction Strategy • BASIX program 	<ul style="list-style-type: none"> • Further investigate retrofitting of Council buildings • Implement energy efficiency educational programs
<u>Transport:</u>	<ul style="list-style-type: none"> • Implementation of the bicycle / walkway plan • Council initiatives • CCP Program- transport matters 	<ul style="list-style-type: none"> • Continue to review Council's fleet • Continue the development of bicycle paths / walkways throughout the urban areas. • Cities for Climate Protection – Sustainable Transport program
<u>Waste management:</u>	<ul style="list-style-type: none"> • Participation in DrumMuster program • Introduction of triple bin system • Production of mulch using green waste • Clean Up Australia Day • Recycling programs at Council facilities 	<ul style="list-style-type: none"> • Investigation of the management of other waste streams
<u>Noise:</u>	<ul style="list-style-type: none"> • Implementation of Council's Complaints Protocol • Noise Guide for Local Government • Implementation of NSW Industrial Noise Policy • Monitoring of industrial noise 	<ul style="list-style-type: none"> • Ensure noise impacts are assessed in the planning stages of developments.
<u>Community open space:</u>	<ul style="list-style-type: none"> • Management Plans being prepared for community lands • Consideration of open space when assessing and managing subdivisions 	<ul style="list-style-type: none"> • Proper maintenance of open space • Inclusion if Subdivision DCP currently under review

3. Land

3.1 At a glance

Issue	Summary (status)
<p><u>LAND-USE CHANGES:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Land degradation predominantly caused by large scale clearing • Soil erosion, loss of remnant vegetation, water pollution, salinity, land contamination • Land clearing • Urban development and encroachment • Industrial development • Review of the Muswellbrook LEP • Native Vegetation Clearing approvals – Dept Natural Resources/ CMA • Subdivision DCP review
<p><u>SOIL EROSION:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Soil erosion caused by the motion of wind, water and mechanical means degrading the quality of the environment • Inappropriate agricultural land use practices • Urban development and expansion • Removal of vegetation • industry • Agriculture • pests • Bushfires • Droughts • Floods • Review and implementation of Erosion and Sediment Control DCP • Complaints protocol
<p><u>INDUCED SOIL SALINITY:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Deposition of salt on soils due to changes in hydrology • Removal of native vegetation cover • Heavy industry – potential discharge of saline waters • Hunter River Salinity Trading Scheme
<p><u>CONTAMINATED LAND:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Land contamination threatens human health and the environment • There are a large range of land uses that have the potential to result in land contamination if not managed appropriately • Increased demand for land resulting in proposals to rezone / change land use activities • DCP review for the determination of rezoning and development applications involving contaminated land • Contaminated Sites Register • Identification of contamination issues on 149 Certificates

3.2 Land-use changes

Management Plan Goal:

- *Our vision for the future is a Community with a strong, diversified, vibrant and expanding economy; i) a place where people choose to live, work, and play; ii) that works together toward the development of sustainable industries and employment opportunities now and for our future generations;*
- *To effectively manage and maintain Council owned property.*

1. What are the issues for sustainability? And how are they changing? (state)

The development of land has involved the clearing of vast areas of vegetation since Australia's settlement in 1788. The typical land management practice of clearing all vegetation including ground cover has become evident as an unsustainable practice due to the large areas of land which remain significantly degraded due to this activity.

The removal of native vegetation species and the alteration of normal ecosystems have resulted in a range of impacts which threaten the health of the natural Australian environment. A range of threats affect the management of land and the environment within the Muswellbrook Shire.

These threats include:

- the clearing of native vegetation and loss of remnant vegetation
- soil erosion and water pollution
- air pollution from soil particulates
- natural water course sedimentation and eutrophication
- urban development and the encroachment of settlements into non-urban lands
- soil acidification
- soil nutrient decline
- salinity
- land contamination

2. Why is it happening? (Driving forces, pressure)

The clearing of land in Australia has typically been completed as a means to provide vacant land for agricultural, development and access purposes. The removal of vegetation from the earth's surface and the development of land invites the opportunity for soil to become eroded by wind and water movement, the deposition of salts, modifications to natural water flows and groundwater, depletion of soil nutrients, transport of nutrients to aquatic ecosystems and the accumulation of contaminants from land uses.

3. What are the responses and how effective are they? (response)

Review of the Muswellbrook LEP

Council has reviewed the Muswellbrook Local Environment Plan (LEP) adopted in 1985. The review includes an assessment of current land uses to develop a strategic plan to ensure that future development is appropriately regulated. The draft LEP document has been developed in accordance with the NSW Department of Planning's LEP template and is expected to be exhibited and adopted during the next reporting period.

Native Vegetation Clearing Approvals – Catchment Management Authority (CMA)

All Catchment Management Authorities (CMA's) have been allocated the task by the Department of Water and Energy (formerly the Department of Natural Resources) to provide assessment and approval of land clearing under the Native Vegetation Act 2003. Any vegetation clearing proposed on land which is encompassed by the Native Vegetation Act 2003 requires CMA approval through the Property Vegetation Plan or development approval processes.

During the reporting period no approvals were granted under the Native Vegetation Act 2003 by the Hunter Central Rivers Catchment Management Authority for the clearing of areas relevant to the Muswellbrook Shire.

Revision of the Subdivision DCP

Council has revised and consolidated all DCP's into a single draft DCP document which is expected to be exhibited and adopted during the next reporting period. The review of the draft DCP document includes matters relating to vegetation management relating to the sensitivity of the design of the subdivision and the protection of remnant vegetation.

4. What more could be done? (future directions)

Council as the local government authority is required to undertake thorough assessments of development applications and proposed land use activities. The strategic planning of development and land uses is essential to Council's coordinated approach to development assessment and is supported by the implementation of Development Control Plans (DCP) and the Local Environmental Plan (LEP).

Council has undertaken a review of all DCP's and the LEP for the Muswellbrook Shire which are expected to be exhibited and adopted during the next reporting period. The update of these documents provides Council with the strategic planning framework which is applied to developments to achieve sustainable land use objectives.

3.3 Soil erosion

Management Plan Goal:

- *To improve the environmental status and knowledge of the community;*
- *To improve water quality within the Catchment System.*

1. What are the issues for sustainability? And how are they changing? (state)

The erosion of soil is a natural occurrence that is predominantly caused by wind, water and mechanical movement on the earth's surface. This natural process however has increased exponentially since Australia's settlement, largely through the clearing of land, unsustainable agricultural practices and inappropriate management of water resources.

The erosion of soil removes nutrients which are often deposited as sediment in downstream areas of water courses or water infrastructure. The increase in soil and nutrients in surface waters can cause a range of impacts including turbidity of water, eutrophication (increased algal blooms from elevated nutrient loads), detrimental impacts on aquatic life and alterations to existing stream flows.

Figure 3.1

Indicator: Number of complaints regarding soil erosion matters received by Council during the reporting period 2006/2007

Number of complaints: 1

The regulation of land use activities by Council focuses on a range of variables however the control of soil erosion is relevant to all actions that remove or reduce the existing vegetation cover. In this regard Council regularly monitors developments and activities to ensure that adequate controls are implemented to manage the erosion of soil and nutrients.

Council is supported in this role by legislation under the *Protection of the Environment & Operations Act* which provides for orders and infringements notices which can be issued by Council under delegation in response to the failure to adequately manage the issues of soil erosion and sedimentation.

Figure 3.1 above represents the total number of complaints received by Council during the reporting period concerning soil erosion issues. This low number of soil erosion complaints may be attributable to Councils frequent monitoring of land use activities.

2. Why is it happening? (driving forces, pressure)

A variety of factors may contribute to the erosion of soil including; land development, agricultural practices, the introduction of pest species, clearing of native vegetation and groundcover, grazing, climatic conditions, bushfires, industry and traffic movement.

The drought conditions that the Upper Hunter Region have been experiencing for a number of years has reduced the soil's moisture content which increases the friability of soil and promotes the ability for it to be eroded. The extreme climatic conditions relevant to the drought, exacerbates the other methods of erosion causing significant issues for soil management.

3. What are the responses and how effective are they? (response)

Erosion and Sediment Control Development Control Plan

Council has undertaken a review of the Erosion and Sediment Control Plan during the reporting period which has been included in the single draft DCP document. The Erosion and Sediment Control Regional Policy and Code of Practice remains as the basis for the revised DCP section however additional controls have been incorporated to improve the documents enforcement.

Complaints Protocol

Council has a complaints protocol which is used to consistently respond to complaints received from the community for matters concerning mining and quarry operations in the area. A proportion of the complaints received by Council are regarding dust or air quality concerns which originate from a number of sources such as agriculture, development or industrial activities.

4. What more could be done? (future directions)

The monitoring and management of land use practices in relation to soil erosion and sediment control will continue in the future and is expected to be enhanced by the additional controls included in the reviewed sediment and erosion control section of the draft DCP. Information will also continue to be distributed with Council adopting an educational approach where possible to ensure that the erosion of soil is managed appropriately.

3.4 Induced soil salinity (including sodic soils)

Management Plan Goal:

- *To improve the environmental status and knowledge of the community*

1. What are the issues for sustainability? And how are they changing? (state)

Additional to the issues related to soil erosion detailed above, the removal of vegetation from the earth's surface can also alter soil hydrology due to the reduction in absorption rates. This change in hydrology can result in the elevation of the groundwater table which is typically more saline than surface waters. The introduction of a perched water table can therefore lead to salt deposition on the soil surface causing the further degradation of the soil structure and decline in vegetation cover.

2. Why is it happening? (driving forces, pressure)

The geomorphology of the Hunter River catchment includes a large proportion of salt bearing sedimentary rocks and soils. Surface and underground drainage which encounter saline geology contributes to the natural salinity of the river and other water bodies.

The natural salinity levels of water courses can be additionally impacted by human activities such as industry, mining, power generation and agriculture.

3. What are the responses and how effective are they? (response)

Hunter River Salinity Trading Scheme

The Hunter River Salinity Trading Scheme is an ongoing program which was developed in response to the need to control saline water discharges into the Hunter River. The Scheme was originally developed and introduced by the NSW Department of Land and Water Conservation, the Environment Protection Authority and with the cooperation of other organisations. The initiative aims to effectively reduce the level of salt in the river through the management of discharge events from industry to periods of high flow only.

The main objective of the scheme is to maintain salinity levels in the Hunter River in particular at Denman below 600 Electrical Conductivity (EC) and 900EC at Glennies Creek/ Hunter River Junction at Singleton. The program works via a method of discharge 'credits' which determine the level of discharge of each industry participating in the scheme.

4. What more could be done? (future directions)

Priority areas of salinity impact need to be adequately identified and managed, with funding made available to assist in the implementation of appropriate rehabilitation measures.

3.5 Contaminated land

Management Plan Goal:

- *To improve the environmental status and knowledge of the community*

1. What are the issues for sustainability? And how are they changing? (state)

Land contamination refers to the elevated concentration of natural or man-made elements in the environment that is caused through activities such as human land use activities or the alteration of natural systems. Human activities can cause the contamination of land through a number of ways however it generally involves the accumulation of nutrients or chemicals within the soil. The primary concern relating to contamination is the potential for immediate or long term adverse impacts on human health and the environment. The leaching of contaminants into soils and nearby ground or surface waters, as well as their direct uptake by plants and animals are some of the main environmental impacts associated with contamination.

Council is obligated under the Contaminated Land Management Act and State Environmental Planning Policy 55 (SEPP 55) to assess the potential for contamination to be evident on parcels of land which are the subject of development applications.

2. Why is it happening? (Driving forces, pressure)

As human settlements spread over the landscape, the demand for vacant land to accommodate population and economic growth, increases. Due to this trend, the expansion of developments into areas which have been contaminated by previous land uses becomes more apparent and the issue of land remediation becomes an issue.

Council as the manager of extensive areas of land and as a public authority becomes increasingly involved in the assessment and management of parcels of contaminated land. Figure 3.2 below details the number of development applications concerning activities which are potentially contaminating. The applications indicated are those relating to activities such as industrial, commercial and extractive industry land uses. Figure 3.3 indicates that no industrial or commercial contaminated sites were rezoned for residential purposes during the reporting period.

Figure 3.2

Indicator:	Number of Development Applications for potentially contaminating activities 2006/2007
Number of development applications:	21

Figure 3.3

Indicator:	Number of industrial or commercial contaminated sites rezoned to residential during the 2006/2007 reporting period
Number of sites:	0

3. What are the responses and how effective are they? (response)

Determination of rezoning and development applications

Council has during the reporting period undertaken a review of all Development Control Plans relating to a variety of issues concerning the Muswellbrook Shire. These DCP's have been consolidated into a single document as per a direction from the NSW Department of Planning.

Included in this review was the revision of Council's DCP for Contaminated Land. This document details legislative requirements in regards to the investigation, assessment and remediation of contaminated sites.

Contaminated Sites Register

Council has developed a Contaminated Sites Register for Council assessment purposes which identifies sites throughout the Shire which may be potentially contaminated as a result of previous land uses. This register ensures sites are identified prior to any redevelopment being undertaken.

Contamination Issues on 149 Certificates

Council identifies land which may be potentially contaminated on all Section 149 Planning Certificates issued. This ensures that potential contamination issues are detailed up front and demonstrates Council's duty of care regarding contamination issues.

4. What more could be done? (future directions)

In addition to the responses detailed above, Council may enhance these actions via further education of land holders in regards to potentially contaminating activities and the repercussions of inappropriate land management. Opportunities also exist through educational courses supported by the Department of Environment & Climate Change directed to specific activities and types of businesses e.g. landscape gardeners, golf courses, market gardeners.

Land: Responses developed for consideration in the development of Council's Management Plan.

Responses	Action to date	New action for Council's consideration
<u>Land-use changes:</u>	<ul style="list-style-type: none"> Review of the Muswellbrook LEP HCCREMS programs – remnant vegetation mapping Review of Subdivision DCP 	<ul style="list-style-type: none"> Improve land management practices
<u>Soil erosion:</u>	<ul style="list-style-type: none"> Review of Erosion and Sediment Control DCP Complaints Protocol 	<ul style="list-style-type: none"> Improve land management practices Council ongoing monitoring of development sites
<u>Induced soil salinity:</u>	<ul style="list-style-type: none"> Hunter River Salinity Trading Scheme 	<ul style="list-style-type: none"> Identification of priority areas with appropriate allocation of funding from the NSW government to implement appropriate remediation measures
<u>Contaminated Land:</u>	<ul style="list-style-type: none"> Review of DCP concerning the Determination of Rezoning and Development Applications involving Contaminated Land Contaminated Sites Register Identification of contamination issues on 149 Certificates 	<ul style="list-style-type: none"> Educational programs

4. Atmosphere (air)

4.1 At a glance

Issue	Summary (status)
<p><u>THE ENHANCED GREENHOUSE EFFECT:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • continued emission of greenhouse gases and clearing of vegetation • Land clearing • Emission of greenhouse gases • Electricity production from coal fired power stations • Council to continue to review efficiency initiatives • Cities for Climate Protection Program and CCP Plus Program • Implementation Muswellbrook Greenhouse Reduction Strategy • Construction of bicycle / walkways • BASIX
<p><u>AIR QUALITY:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Air pollution as a result of both human induced and natural processes • Council's PM_{2.5} monitoring program indicates particulate matter (less than 2.5 micrograms) has been relatively steady over the last few years and is below the USEPA criteria and the proposed NEPM goal • Natural factors such as droughts and bushfires can cause particulate emissions • Human factors such as the combustion of fuels, industry, motor vehicles and agriculture • Woodsmoke Reduction Program • ANSTO Air Monitoring Program • Protection of the Environment Operations (Clean Air) Regulation 2002 • Industrial Site Monitoring
<p><u>ODOUR:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Odour complaints lodged with Council • Odour emissions from a variety of sources • Complaints Protocol • Protection of the Environment Operations Act • Local Government Act

4.2 The Enhanced Greenhouse Effect

Management Plan Goal:

- to complete the Greenhouse Milestone Program;
- to reduce reliance on energy consumption

1. What are the issues for sustainability? And how are they changing? (state)

The Enhanced Greenhouse Effect

The term 'greenhouse effect' relates to a natural phenomenon which involves the natural heating of the earth's atmosphere through trapped radiation. This natural occurrence is however exacerbated by human activities which increase the levels of green house gases within the atmosphere, effectively trapping more heat. As more gases are expelled into the atmosphere the natural ability for the earth to remove this heat becomes increasingly difficult.

Human activities which produce 'greenhouse gases' include power generation, motor vehicles, various industries, vegetation burning, agriculture and waste decomposition. These activities all emit gases which contribute to the enhanced greenhouse effect and the increased heating of the earth known as 'global warming'. Greenhouse gases (natural and anthropogenic) which absorb heat energy include water vapour, carbon dioxide (CO₂), methane (CH₄), ozone (O₃), nitrous oxide (N₂O) and halocarbons.

Impact on the Environment

The heating of the earth's atmosphere through the accumulation of greenhouse gases is becoming more apparent and it is believed that impact on climates and the environment will also become more evident as time continues. The effects of global warming are slowly becoming more obvious to the population through the increase in 'natural' occurrences such as long periods of drought, tsunamis, cyclones, flooding, storms, the melting of the ice caps and changes to landscapes. These episodes in turn affect the ability for the population to produce food, resources and materials thus having socio- economic impacts.

2. Why is it happening? (driving forces, pressure)

A successful industrialised society is expected to continue its growth through its population, and economy. This expectation that people have in developed countries of the world increases the consumption of resources, the production of waste materials and the emission of greenhouse gases.

The majority of Australia's electricity production is from the combustion of fossil fuels through coal fired power stations. This type of electricity generation is known to be an inefficient way of producing electricity and one that emits large quantities of greenhouse gases.

Figure 4.1 below details the amount of greenhouse gases emitted from the fuel and electricity consumption of Council operations. Whilst Figure 4.2 details the amount of equivalent greenhouse gases produced from the community consumption of electricity.

Figure 4.1

Indicator	Total amount of greenhouse gases emitted (carbon dioxide equivalent) by Council operations (electricity use only*) 2006/2007
Total amount CO ₂ equivalent emitted:	4,346.82 tonnes

* Total includes emissions generated from electricity, gas and fuel usage - refer to Section 2.4 for specific information

Figure 4.2

Indicator	Total amount of greenhouse gases emitted (carbon dioxide equivalent) for the Muswellbrook Shire Community (electricity use only*) 2006/2007
------------------	--

Total amount CO ₂ equivalent emitted:	342,429.78 tonnes
--	-------------------

* Total includes emissions generated from electricity use only. Does not include emissions from community fuel and gas use etc - refer to Section 2.4 for specific information. Information received from Energy Australia 2007

As indicated by the data represented in Figures 4.1 and 4.2 the consumption of electricity by Council operations has increased whilst the consumption of the Muswellbrook Shire community has decreased. As previously detailed in Section 2.4, the per capita consumption of electricity by the Muswellbrook Shire community has markedly decreased.

3. What are the responses and how effective are they? (response)

Section 2.4 includes actions currently being implemented by Council to reduce the consumption of energy resources and address the issue of the enhanced greenhouse effect and global warming. In summary, the programs being implemented include:

- Council involvement in the Cities for Climate Protection Program and progression to the CCP Plus Program
- Completion of energy audits of the Council Administration Centre
- Modifying the Council Administration Centre in response to the findings of the energy audit
- Down sizing of some Council vehicles from six (6) cylinder to four (4) cylinder vehicles
- Use of dedicated LPG vehicles within Council's Works Fleet
- Retrofitting lighting within key Council Community Centres
- Installation of AAA rated shower heads within Council Community Centres
- Implementation of the Muswellbrook Shire Greenhouse Reduction Strategy
- Implementation of the BASIX (Building Sustainability Index) program
- Introduction of low energy computer monitors
- Distribution of climate change packs to the community during the previous reporting period

4. What more could be done? (future directions)

As listed in Section 2.4 Council proposes future initiatives to reduce the consumption and improve efficiency of energy use. These actions include:

- Retrofitting of Council buildings
- Distribution of educational information
- Introduce residential home audits
- Continue the distribution of climate change packs
- Continue to downsize council vehicle fleet / purchase energy efficient vehicles
- Continue to implement cycleway / walkway development

4.3 Air quality

Management Plan Goal:

- To reduce pollution levels;
- To ensure that outputs are controlled within established licensing criteria.

1. What are the issues for sustainability? And how are they changing? (state)

The quality of the air we breathe is affected by a range of natural and human contributing factors. These factors include climate and weather patterns (e.g. seasons, temperature, and precipitation), human pollutants (e.g. industrial emissions) and natural pollutants (e.g. dust, sea salt). The most significant pollutants are however those produced in large quantities by human activities such as gaseous emissions and particulate matter.

Air Quality Monitoring Program

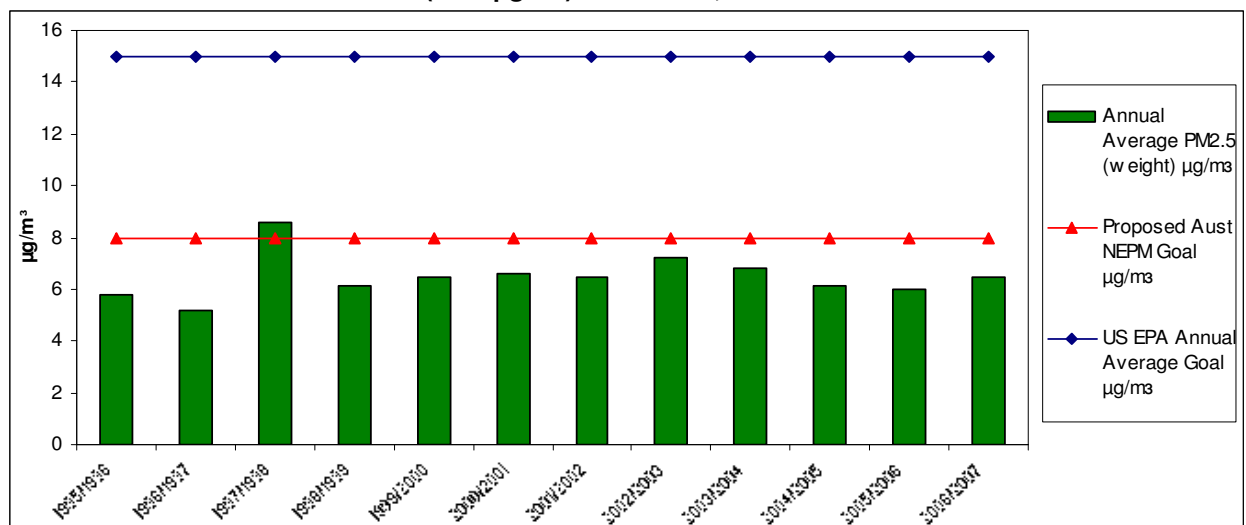
Council continues its participation in a PM_{2.5} air quality monitoring program in collaboration with the Australian Nuclear Science and Technology Organisation (ANSTO). The program commenced in 1996 which analyses particulate matter less than 2.5 micrograms in size for a 24 hour period twice weekly. The air sampling unit is positioned behind the Water Treatment Plant in Scott Street, Muswellbrook.

The ANSTO program studies the elemental composition of fine particles in the atmosphere by assessing the total weight of particles and a breakdown of the main elements within the sample. The results of the tests are compared with USEPA standards and the proposed National Environment Protection Measures (NEPM) which have not yet been formally endorsed.

Figure 4.3 below represents the annual average PM_{2.5} sampled for the 2006/2007 period compared with previous years. It indicates that particulate matter (PM_{2.5}) in the Muswellbrook atmosphere is consistently lower than the proposed NEPM limit (8µg/m³) and the established US EPA average limit (15µg/m³), but is however higher than the previous reporting period. This increase in particulate matter is presumably attributable to the continuing drought conditions relevant to the Shire.

Figure 4.3

Indicator: Particulate Matter (<2.5 µg/m³) Emissions, Muswellbrook Shire 1995 - 2007



Information obtained via the air sampling program in association with ANSTO - 2007

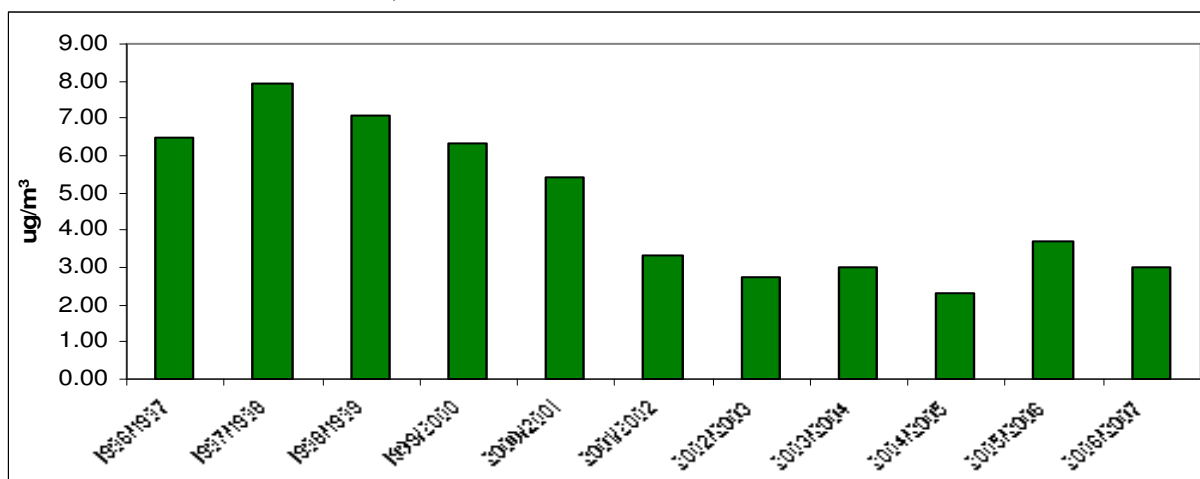
* Note that the high levels of PM_{2.5} sampled in 1997/1998 are result of severe regional bushfires in late 1997.

Figure 4.4 details the results of the samples taken for the air sampling program regarding lead levels in the Muswellbrook atmosphere. The results indicate a consistent decrease of lead levels within the atmosphere since 1996 to 2005. However the lead results for the 2005/2006 period indicate that this pollutant type has increased in recent years.

Though the levels decreased again during the current reporting period the source of the increase remains unknown, however as lead fuels have been phased out for some time the most likely source is from industrial emissions.

Figure 4.4

Indicator: Lead Emissions, Muswellbrook 1996 - 2007



Information obtained via the air sampling program in association with ANSTO - 2007

Figure 4.5 details the number of air quality complaints received by Council during the reporting period. The majority of the complaints received were regarding visible dust emissions produced by a number of sources including developments, mines, industry and agriculture. The total number represented below is an increase from the 2005/2006 reporting period which may indicate an elevation in air quality pollutants or that the population are becoming more attuned to air quality issues.

Figure 4.5

Indicator: Number of Air Quality Complaints received by Council, 2006/2007

Number of Air Quality Complaints: 31

2. Why is it happening? (driving forces, pressure)

From the interpretation of the ANSTO monitoring data and the industrial monitoring undertaken by all mines within the Shire, air pollution in the Muswellbrook Shire can be attributed to sources such as coal extraction, power generation, industrial emissions, developments, sea salt, motor vehicles and agriculture.

The persistent drought conditions enhance the ability for soil particles to be eroded by the wind which contributes to the particulate matter in the atmosphere. As indicated by Figure 4.3, bushfires can also have a significant impact on particulate matter through the emission of soot and ash particles, as shown by the 1997/1998 results.

3. What are the responses and how effective are they? (response)

Woodsmoke Reduction Program

The Woodsmoke Reduction Program was originally a regional initiative developed by HCCREMS in 2003, which focused on the education and enforcement of reducing the instances of smoky chimneys which may cause localised air pollution.

During the reporting period the Woodsmoke Reduction Program was not funded by this project however inspections were still undertaken and complaints addressed. Those chimneys deemed to be smoking excessively were followed up with letters and educational material detailing how to maintain and use a wood heater efficiently.

The data recorded during the program is detailed below in Figure 4.6.

Figure 4.6

Indicator: Number of smoky chimney complaints and those found to be smoking excessively 2006/2007

Number of smoky chimney complaints	Number of smoky chimney inspections conducted	Number of excessively smoky chimneys (Education pack sent to resident)
5	7	5

ANSTO Air Monitoring Program

As detailed above, Council undertakes PM_{2.5} monitoring in Muswellbrook on a weekly basis. This program samples and assesses the quantity and types of particulates contained in Muswellbrook's atmosphere.

Protection of the Environment Operations (Clean Air) Regulation 2002

Under the Protection of the Environment Operations (Clean Air) Regulation, backyard burning is controlled in urban areas throughout the Shire. Approvals can be obtained with conditions in place for the burning of material in all areas of the Shire. The Regulation also prohibits burning in the open of certain items such as coated wire and tyres.

Industrial Air Sampling Programs

Many industries such as coal mines undertake air sampling programs as per requirements of the specific approvals to assess the volume and extent of particulate matter leaving the site. The number of industries which undertake these monitoring programs provides a large amount of information regarding air particulates.

4. What more could be done? (future directions)

Woodsmoke Reduction Program

Council should continue the implementation of the Woodsmoke Reduction Program where possible during the winter season. No future funding of the program is anticipated so the inspection of excessively smoky chimneys and distribution of educational material is undertaken by Council to address complaints and increase community awareness of the matter.

4.4 Odour

Management Plan Goal:

- *To improve the environmental status and knowledge of the community*

1. What are the issues for sustainability? And how are they changing? (state)

Another of Council's regulatory areas is the control of offensive odours which may be emitted by a variety of activities. As the quantification of an offensive odour is subjective to the receptor, Council is presented with a range of enforcement issues. Matters raised concerning odours considered to be offensive are addressed by Council on an individual basis.

The numbers of odour complaints received by Council during the 2006/2007 period are detailed below in Figure 4.7.

Figure 4.7

Indicator:	Number of Odour Complaints received by Council, 2006/2007
Number of Odour Complaints:	4

The origins of odour complaints represented by Figure 4.7 are primarily from industrial and agricultural sources which produce associated odours. These complaints were resolved by Council on an individual basis.

2. Why is it happening? (Driving forces, pressure)

The emission of odours can be produced by a variety of sources such as agriculture, industries, businesses, vehicles, domestic animals, wastewater treatment systems, sewer infrastructure and residences.

3. What are the responses and how effective are they? (response)

Complaints Protocol

Council has adopted a Complaints Protocol which details the procedure for the receipt and resolution of complaints received. The protocol ensures that matters reported by the community are adequately dealt with in a timely and objective manner and that the details are recorded for monitoring purposes.

Protection of the Environment Operations Act 1997

The POEO Act provides legislative framework for a range of environmental issues including odours. Under the POEO Act it is an offence for the operator of any facility to cause air pollution, including odour, through failure to maintain or operate equipment or to deal with materials in a proper and efficient manner.

Local Government Act

The Local Government Act contains provisions for the management of public nuisances under which Council can take action against odours.

4. What more could be done? (future directions)

During the reporting period Council has undertaken a review of all DCP's and the LEP relevant to the Muswellbrook Shire. This review has been undertaken to incorporate further strategic planning framework to enhance the management of land use activities throughout the Shire.

Atmosphere: Responses developed for consideration in the development of Council's Management Plan.		
Responses	Action to date	New action for Council's consideration
<u>The Enhanced Greenhouse Effect:</u>	<ul style="list-style-type: none"> • Review of Council vehicle fleet • Cities for Climate Protection Program and CCP Plus program • Implementation of Muswellbrook Greenhouse Reduction Strategy • Energy Audit of Administration Centre • Review of all DCP's • Construction of bicycle / walkways • BASIX program implemented 	<ul style="list-style-type: none"> • Investigate further retrofitting of council buildings • Develop and implement educational programs • Continue to review the Council vehicle fleet and initiatives • Continue to implement bicycle / walkway development
<u>Air quality:</u>	<ul style="list-style-type: none"> • Woodsmoke Reduction Program • ANSTO Air Monitoring Program • Protection of the Environment Operations (Clean Air) Regulation • Industrial Site Monitoring 	<ul style="list-style-type: none"> • Continue air monitoring program • Continue Woodsmoke Reduction program annually
<u>Odour:</u>	<ul style="list-style-type: none"> • Complaints Protocol • Protection of the Environment Operations Act • Local Government Act 	<ul style="list-style-type: none"> • Council review of DCP's and LEP to strategically plan land use activities

5. Water

5.1 At a glance

Issue	Summary (status)
<p><u>FRESHWATER ECOSYSTEM HEALTH:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Freshwater ecosystems in a degraded state • Large areas of vegetation cleared • Increased demand for water • Salt, nutrients and bacteria accumulating in water courses • Drought conditions limiting available water • Land use impacts from agriculture, clearing of native vegetation, runoff of sediments, on site sewerage management systems • Urban impacts – increasing urbanisation, stormwater containing pollutants • Current drought conditions • Water Quality Monitoring program • Effluent Reuse Schemes • Auditing program for On-Site Sewerage Management Systems • Trade Waste Approvals • Upper Hunter River Rehabilitation Initiative • Hunter River Salinity Trading Scheme • Water Campaign
<p><u>SURFACE WATER EXTRACTION / WATER CONSUMPTION:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • High demand for water resources – rate of extraction not sustainable • Current drought conditions • Agricultural and industrial demand for water • Potable water demand in urban areas • Water restrictions imposed • Increased pricing for potable water • Effluent Reuse Scheme • Water Campaign (water efficiency measures) • HCCREMS programs • Sustainability Committee • BASIX Program
<p><u>GROUNDWATER ISSUES:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • Increasing use of groundwater resources particularly to supplement potable water in response to limited surface water • Over extraction can result in a decrease of the amount of water available to other groundwater dependent ecosystems; altered water quality; reduced amount of groundwater available for future use • Climatic variations • Limited surface waters due to drought conditions • Increased demand for water and over allocation of surface waters • Increasing pressure from agriculture, urban developments and industry • Inappropriate management of on-site sewerage management systems • Contamination as a result of diffuse and point source pollution • Water Management Act

5.2 Freshwater ecosystem health

Management Plan Goals:

- To improve water quality within the Catchment System;
- To improve attitudes to recycling and reuse of waste water;
- To improve the environmental status and knowledge of the community.

1. What are the issues for sustainability? And how are they changing? (state)

The sustainable management of water resources throughout Australia has become a major focus for all populations and organisations, due to the apparent lack of resources for the majority of the country. As the majority of the country continues to be drought declared, the issue of water supply to communities, industries and the environment becomes an ever increasing challenge. This restriction of surface water resources has also caused an increased reliance on other water sources which have been previously under utilised due to water quality and quantity issues such as groundwater and reuse water such as grey water.

Impacts of human activities such as agriculture, industry, goods production, development, settlement and recreation can be major contributors to poor water quality. As water becomes increasingly scarce the community and industries alike are identifying the need to become more water efficient.

Figure 5.1 details the results of the sampling program conducted by Council regarding identified locations on the Hunter River and its major tributaries within the Muswellbrook Shire.

Figure 5.1

Indicator: Water Quality Guidelines and Mean Results of Water Sampling for the Muswellbrook Shire - 1st July 2006 to 30th June 2007 compared to the 2005/2006 reporting period

Site	2006/2007				2005/ 2006			
	Turbidity (ntu)	Salinity (µs/cm)	Faecal Coliforms	pH	Turbidity (ntu)	Salinity (µs/cm)	Faecal Coliforms	pH
Kayuga Bridge	5.9	315.7	1157.5	8.4	24.1	303.2	1017.1	7.7
Ford Street Pump Station	8	317.8	682.5	8.4	20.2	318.8	1288.0	7.6
Hunter River between Mbk & Denman	8.7	351.0	121.0	8.4	20.0	348.6	382.6	7.6
Denman Pump Station	14.6	403.8	237.8	8.4	18.0	370.8	511.0	7.6
Muscle Creek	7.8	1175.5	374.0	7.8	7.5	1436.8	608.4	7.2
Hunter River – Aberdeen Golf Course	2.7	280.2	134.5	8.5	6.0	272.2	113.6	7.8
Hunter River – Broad Crossing Aberdeen	5.3	285.5	149.7	8.5	12.3	320.8	587.0	7.7

Note that the sample results represented above are related only to the months July 2006, August, September, October 2006, April 2007, May due to limited resources to conduct the sampling program.

Water Quality Guidelines (ANZECC/ARMCANZ)

Parameter	Lower Limit	Upper Limit
Turbidity (ntu)	5	50
Salinity (µs/cm)	280	1500
Faecal coliforms (cfu/100ml)	150	1000
pH	6.5	8.5

Though some of the averaged results indicate water quality exceedances most samples are within the guideline limits represented above. The comparison of results from the 2005/2006 and the 2006/2007 reporting periods indicates that the turbidity of the river has improved which may be due to precipitation patterns.

2. Why is it happening? (Driving forces, pressure)

Landuse Impacts

Poor water quality results can be as a result of a range of factors including:

- Agriculture – sediment, stock effluent, pesticides/ herbicides, chemicals,
- Clearing of vegetation - particularly riparian vegetation, leads to bank erosion and runoff of sediment into the river system
- Industrial contamination of drainage lines, stormwater systems and water courses
- Runoff of sediments and pollutants from industrial / commercial developments
- Inefficient management of on site sewage treatment systems may lead to the runoff of effluent that has not been adequately treated.

Urban Development Impacts

Urban developments have a significant impact on water quality through the following mechanisms:

- Increased urbanisation results in greater runoff from land which once would have naturally infiltrated the ground.
- The extraction of water from natural water courses for human consumption is having a significant impact on the availability and quality of water. As urban developments spread over the landscape the demand for water is increasing placing considerable pressure on natural water resources and water supply infrastructure.
- Stormwater – transports pollutants from the catchment to its collecting waterway through natural drainage lines such as gullies and creeks and via stormwater infrastructure such as gutters, channels and drains. Pollutants in stormwater originate from a range of sources such as the clearing of vegetation in the catchment, litter, application of fertilisers, pesticides and herbicides, contaminated runoff from industrial / commercial premises, insufficient sediment and erosion controls, hosing of leaf litter and grass clippings into drains in urban areas, washing cars on the street.

Figure 5.2 details the quantity of material that Council operations have removed from gross pollutant traps installed to manage pollutants collected by stormwater. This material would traditionally be transported to the natural water courses located downstream.

Figure 5.2

Indicator: Quantity of material removed from stormwater gross pollutant traps

Total quantity of material removed and disposed: 46 m³

*Note that the quantities listed above are estimates only recorded at the time of waste removal

Figure 5.3

Indicator:	Number of sewer overflows and surcharges
Muswellbrook:	75
Denman:	9

Figure 5.3 details the number of sewer overflows and surcharges applicable to the reporting period. The reasons for the overflows or surcharges listed above include impacts from tree roots and foreign objects obstructing or damaging sewer pipework and pipe breaches.

3. What are the responses and how effective are they? (response)

There are a range of programs and actions which have been implemented by Council to identify and address freshwater ecosystem health issues. These programs include:

Water Quality Monitoring

Council undertakes a monthly water sampling program originally established in 1998, which samples the Hunter River and major tributaries such as Muscle Creek (see sample results for reporting period in Figure 5.1). A number of parameters are analysed in the program, including pH, phosphates, electrical conductivity (salinity), hardness, coliforms, nitrates, temperature and turbidity. Results are reported in the local newspaper indicating the health of the river in relation to the various uses, such as recreational, drinking, irrigation and stock watering.

Effluent Reuse

Council has established effluent reuse programs for Muswellbrook and Denman sewerage treatment works. These programs utilise treated effluent from the Muswellbrook and Denman STP being reused at mine sites and golf courses, for irrigation and dust suppression purposes. This program addresses sustainable reuse of reclaimed water, prevents treated effluent from being discharged under licence into the Hunter River and alleviates pressure on the Hunter River to supply all water requirements.

Audit Program for Onsite Wastewater Management Systems

The audit of all wastewater treatment systems within the Shire is continuing. This audit commenced during 1999, involves the inspection and assessment of all registered systems within the Shire to ensure the satisfactory operation of the onsite systems.

Figure 5.6 below details the performance of the systems registered and inspected to date. During the reporting period a total of 42 existing systems which have been registered by the property owner were inspected. A total of 1228 systems have been registered with Council since the audit commenced with a total of 1209 systems inspected to date. It is not known how many systems exist which have not been registered. This issue will be investigated during the next reporting period.

Figure 5.4

Indicator: Registered and Inspected Onsite Wastewater Management Systems

System Type	Number Compliant	Number Non-Compliant
AWTS	242	39
Septic	691	157
Modified Septic	18	2
Decommissioned	60	0
Compliance status	1011	198

The systems listed as non-complaint are those which are found at first inspection to be unsatisfactory and are then pursued further by Council to ensure that they become satisfactory.

During the reporting period a total of 29 systems were approved and installed, which are detailed in Figure 5.5 below. As detailed by the data the majority of new systems continue to be aerated wastewater treatment systems (AWTS) which involve the irrigation or absorption of primarily treated effluent to the environment rather than untreated effluent involved in standard septic systems.

Figure 5.5

Indicator: Wastewater system installation and operation applications 2006/2007

System Type	Number
AWTS	20
Septic	8
Reed Bed Wastewater treatment system	1
Compliance status	29

Trade Waste Approvals

Council continues to undertake an approval process for the issuing of Trade Waste Permits in accordance with the development control provisions. The issuing of permits ensures that trade waste source control measures are installed and the amount of pollutants being discharged into the sewer is maintained at a minimum. The installation and operation of trade waste measures are essential to ensure that trade wastes are not disposed of inappropriately.

The number of trade waste approvals and inspection details are represented by Figure 5.6 below. Those systems which are deemed to non-complaint (i.e. 5 systems) are then resolved by Council through enforcement procedures.

Figure 5.6

Indicator: Number of trade waste approvals granted during 2006/2007 reporting period	
Number of new trade waste approvals:	1
Number of trade waste system inspections undertaken:	30
Number of trade waste systems identified as compliant:	25
Total number of trade waste systems within the Shire:	135

Upper Hunter River Rehabilitation Initiative

The Upper Hunter River Rehabilitation Initiative (UHRRI) was a joint venture project which was completed in June 2007. The project was developed in association with Macquarie University, DIPNR and the Hunter-Central Rivers Catchment Management Authority with the support of a range of industry partners and community stakeholders. The aims of UHRRI were to experimentally rehabilitate an 10 kilometre stretch of the upper Hunter River near Muswellbrook (downstream of Keys Bridge) which involved revegetation to establish a self-sustaining, largely indigenous, riparian community on both sides of the river, together with the reinstatement of large woody debris instream.

Hunter River Salinity Trading Scheme

Through the Hunter River Salinity Trading Scheme the level of saline emissions from industrial sources on the Hunter River are managed via a program to avoid discharges of saline water during periods of low flow. Section 3.4 details further information regarding the scheme.

Water Campaign

Council is involved in the ICLEI Water Campaign which requires the investigation of goals regarding water consumption and also targets for water quality. These targets are yet to be assessed and established.

4. What more could be done? (future directions)

Community Education

Educational programs are an effective way of improving the performance of community and business interaction with the environment for a range of topics. During the next reporting period Council proposes to develop and implement a school based education program regarding a variety of environmental topics. One of the major focuses of this program is envisaged to be water quality and consumption.

Revegetation and Rehabilitation Programs

Continued efforts in obtaining funding from Government Departments should be undertaken by Council and various land holders and environmental groups, to carry out revegetation and rehabilitation projects to improve the health of the riparian vegetation and bank stability of the Hunter River and tributaries. Ongoing community group consultation can ensure that available funds are allocated in a strategic manner utilising the funds to maximum capacity.

5.3 Surface water extraction and water consumption

Management Plan Goal:

- *To provide environmentally sustainable Water and Sewerage services that- are customer orientated, meet present and future needs, are efficient and cost- effective and follow best practice management;*
- *Reuse 100% of effluent in Muswellbrook and Denman excluding peak wet weather conditions;*
- *To improve water quality within the Catchment System;*
- *To improve attitudes to recycling and reuse of waste water;*
- *To improve the environmental status and knowledge of the community.*

1. What are the issues for sustainability? And how are they changing? (state)

The availability of good quality water resources has in recent years become a major focus for a range of sectors within society ranging from politicians, business owners, students, various organisations, government departments and the general community.

The major pressure on the limited water resources caused by the existing drought conditions is the consumption of the available water supplies. The Upper Hunter region (similarly to the majority of NSW) is currently enduring drought conditions which causes water resources to become more scarce placing additional pressures on the limited resources available.

Figure 2.3 above (which is reproduced below as Figure 5.7) details annual water consumption rates from 1998 until 2007. As indicated by Figure 2.3 and 5.7, consumption rates have increased over recent years within the Muswellbrook Shire which prompted efforts by Council to reduce the consumption and unsustainable increase in water usage. Therefore during the current reporting period Council introduced an increase in water pricing and also imposed water restrictions which have both effectively reduced the consumption of water.

Figure 5.7

Indicator: Total potable water consumption (ML) of the Muswellbrook Shire

2006/07	2005/06	2004/05	2003/04	2002/03	2001/02	2000/01	1999/00	1998/99
2,098	2,866	2,644	2,624	2,150	2,076	1,845	2,277	2,196

Further information regarding the current consumption patterns and Council's responses to water consumption are detailed above in Section 2.3 of this report.

2. Why is it happening? (driving forces, pressure)

The main contributor to the unsustainable consumption of water is the high demand on the limited water resources by the local population and land uses/ industries. The expansion of the local economy and population causes additional pressure on the existing water resources which are limited by the climatic drought conditions.

Section 2.3 details consumption patterns and information relevant to water usage within the Shire.

3. What are the responses and how effective are they? (response)

As detailed in Section 2.3 the responses being implemented by Council to address the issue of water consumption and quality include:

- Water restrictions imposed by Council
- Increase in water pricing from Council as the water authority
- Hunter River Salinity Trading Scheme (HRSTS)
- Effluent Reuse Scheme
- Water Campaign (water efficiency measures)
- HCCREMS regional programs
- Sustainability Committee to assist in water sustainability measures
- BASIX the Building Sustainability Index requires the achievement of efficiency standards in regards to water and energy consumption

4. What more could be done? (future directions)

Further actions available to Council and the community to limit the usage of water resources as detailed in Section 2.3 include:

- Water Campaign – set reduction goals and develop and implement Water Reduction Strategy
- Implementation of educational programs to raise community awareness
- Completion of the Integrated Water Cycle Management Plan to manage water resources
- Plans incorporating Water Sensitive Urban Design
- Continue to impose water restrictions across the Shire to enforce reduced consumption

5.4 Groundwater issues

Management Plan Goals:

- *To improve water quality within the Catchment System;*
- *To improve the environmental status and knowledge of the community.*

1. What are the issues for sustainability? And how are they changing? (state)

As surface waters become increasingly scarce, reliance on other sources of water have become more important. In the Muswellbrook Shire the township of Sandy Hollow accesses groundwater as their main water supply. The extraction of this water from the groundwater is a current solution however without the recharge of the groundwater system from available surface water flows this resource is finite.

2. Why is it happening? (driving forces, pressure)

The most significant impacts associated with groundwater resources relate to the availability and contamination of groundwaters relevant to the following factors:

- Climatic variations – during drought periods, the lack of surface water results in increased pressure on groundwater
- Increased demand for surface water and the allocation of available resources results in increased pressure on groundwater
- Increasing pressure from agriculture, urban developments and industry placing greater demands on water, resulting at times in the use of groundwater as a substitute water supply.
- Inappropriate management of on-site sewerage management systems impacting on groundwater quality
- Contamination as a result of diffuse (nitrates and pesticides from agricultural activities) and point sources of pollution (hydrocarbons from underground storage tanks, leachate from landfills, nitrates, pathogens, bacteria from onsite sewerage management systems, coal tars and ash from gas works etc).

3. What are the responses and how effective are they? (response)

Water Management Act

Groundwater resources are predominantly managed through the NSW State Government by the Department of Water and Energy (formerly the Dept of Natural Resources) who regulate the allocation of groundwater resources through the implementation of extraction licences and water sharing plans. Under the Water Management Act, all aquifers are required to be managed within their yield capacities. Groundwater sharing plans are being developed and implemented in areas of significant groundwater use or where groundwater requires protection. At present, there are no groundwater sharing plans in the Muswellbrook Shire.

4. What more could be done? (future directions)

Water Reduction

Though the rate of consumption of total water resources within the Shire has decreased during the current reporting period (see Figures 2.3 and 5.7), the persistent drought and uncertainty of future rain requires the enhancement of this performance to continue to improve the level of sustainable

water usage. This may be sought through a variety of ways including further education of sustainable water use and the continued enforcement of water restrictions.

BASIX

Through the Building Sustainability Index program, new developments are required to include water saving methods which achieve a water efficiency target of 40%. This program promotes the implementation of factors such as drought tolerant landscaping, rainwater tanks and water efficient devices, which contribute considerable savings in the consumption and demand for water.

Water: Responses developed for consideration in the development of Council's Management Plan.		
Responses	Action to date	New action for Council's consideration
<u>Freshwater Ecosystem Health:</u>	<ul style="list-style-type: none"> • Water Quality Monitoring program • Effluent Reuse Schemes • Auditing program for On-Site Sewerage Management Systems • Trade Waste Approvals • Upper Hunter River Rehabilitation Initiative • Hunter River Salinity Trading Scheme • Water Campaign 	<ul style="list-style-type: none"> • Revegetation / Rehabilitation Program • Community education
<u>Surface water extraction and consumption:</u>	<ul style="list-style-type: none"> • Effluent Reuse Scheme • Water restrictions imposed • Increased water pricing • Water Campaign (water efficiency measures) • HCCREMS Programs • Hunter River Salinity Trading Scheme • BASIX • Sustainability Committee to investigate Council Initiatives 	<ul style="list-style-type: none"> • Water Campaign – progress through Milestones • Implementation of educational programs • IWCM and WSUD
<u>Groundwater issues:</u>	<ul style="list-style-type: none"> • Water Management Act 	<ul style="list-style-type: none"> • Water use reduction measures • BASIX

6. Biodiversity

6.1 At a glance

Issue	Summary (status)
<p data-bbox="252 427 587 488"><u>TERRESTRIAL AND AQUATIC ECOSYSTEMS:</u></p> <p data-bbox="252 539 304 562">State</p> <p data-bbox="252 651 341 674">Pressure</p> <p data-bbox="252 949 352 972">Response</p>	<ul style="list-style-type: none"> <li data-bbox="616 539 1018 562">• Limited native and remnant vegetation <li data-bbox="616 573 1027 595">• Threatened species listed by legislation <li data-bbox="616 607 919 629">• Noxious weed management <li data-bbox="616 640 900 663">• Key threatening processes <li data-bbox="616 674 903 696">• Inappropriate development <li data-bbox="616 707 823 730">• Land use changes <li data-bbox="616 741 951 763">• Urbanisation and encroachment <li data-bbox="616 775 906 797">• Fire management practices <li data-bbox="616 808 815 831">• Altered hydrology <li data-bbox="616 842 730 864">• Pollution <li data-bbox="616 875 715 898">• Salinity <li data-bbox="616 909 1082 931">• Establishment of reserves and National Parks <li data-bbox="616 943 986 965">• Voluntary conservation agreements <li data-bbox="616 976 895 999">• Introduction of Biobanking <li data-bbox="616 1010 1278 1032">• Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation <li data-bbox="616 1043 855 1066">• HCCREMS Programs <li data-bbox="616 1077 935 1099">• Revision of Muswellbrook LEP

6.2 Terrestrial and aquatic ecosystems (including native vegetation communities)

Management Plan Goal:

- *To maintain natural vegetation corridors;*
- *control growth of noxious weeds within the Shire.*

1. What are the issues for sustainability? And how are they changing? (state)

Remnant Vegetation

A program of remnant vegetation mapping has been undertaken by the Hunter Central Rivers Catchment Management Authority (HCRCMA) and Hunter Central Coast Regional Environmental Strategy (HCCREMS) through the Hunter Remnant Vegetation Project. Appendix A includes the report completed by HCCREMS which covers the specifics of the Hunter Remnant Vegetation Project.

The project within the Muswellbrook Shire mapped significant existing parcels of remnant vegetation located specifically within the National Parks, Nature Reserve and military bases. A high diversity of vegetation was recorded within the area exhibiting very few connecting corridors, though opportunities exist for the establishment of corridors to connect vegetation fragments. Figure 6.1 below details the total areas of the local National Parks and Nature Reserves associated with the Muswellbrook Shire.

Figure 6.1

Indicator:	National Parks, Nature Reserves and State Conservation Areas in the Muswellbrook Shire	
Total Area of Wollemi National Park:		4934.81 km ²
Total Area of Goulburn National Park:		716.58 km ²
Total Area of Manobalai Nature Reserve:		37.59 km ²
No State Conservation Areas are in the Muswellbrook Shire		

Note that the total areas listed for the Wollemi and Goulburn National Parks are not entirely encompassed by the Muswellbrook Shire local government area.

Figure 6.2 below lists the number of flora and fauna species listed by the NSW Wildlife Atlas for the Muswellbrook Local Government Area. The figures from the Wildlife Atlas reported last year listed a total of 902 flora species and 372 fauna species. The information represented in Figure 6.2 therefore indicates a slight decrease in the number of flora species listed by State legislation.

Figure 6.2

Indicator: Number of threatened species, populations and endangered ecological communities as listed by NSW legislation for the Muswellbrook Shire

Classification	Listing	Number of species
FLORA		
• Endangered	Endangered - TSC Act (E1)	3
• Endangered	Endangered - TSC Act (E2)	4
• Vulnerable	Vulnerable - TSC Act (V)	13
• Protected Plants	Protected - NPW Act (P13)	48
• Unprotected	Unprotected (U)	806
Total number of species recorded for LGA		874
• Endangered Ecological Communities	EEC – TSC Act	6
• Endangered populations	TSC Act	3
FAUNA		
• Endangered	Endangered - TSC Act (E1)	6
• Endangered populations	Endangered - TSC Act (E2)	0
• Endangered	Presumed Extinct - TSC Act (E4)	0
• Vulnerable	Vulnerable - TSC Act (V)	36
• Protected	Protected - NPW Act (P)	309
• Unprotected	Unprotected (U)	20
Total Number of Species recorded		371

Information obtained from the Department of Environment & Climate Change 2007

Weeds

The management of weed species can have a significant impact on the ability to enhance or maintain biodiversity and native species populations as they often out compete with the endemic vegetation. Weed management within the Muswellbrook Shire is undertaken by both Council and the Upper Hunter Weeds Authority.

The Weeds Authority operates under the Regional Weeds Program which encompasses a number of local government areas and focuses on species listed by legislation as noxious weeds. Council however manages weeds on a more local scale such as in road verges and open space areas.

During the reporting period the Upper Hunter Weeds Authority conducted weed eradication programs as detailed in Figure 6.3 below.

Figure 6.3

Indicator: Upper Hunter Weeds Authority projects within the Upper Hunter Region (Muswellbrook, Singleton and Upper Hunter LGA's) 2006/2007

Weeds Treated	Herbicides used	Herbicide Quantities used
African boxthorn	Roundup	28L
Prickly pear	Biological control (Prickly pear)	
Tiger pear		
Mother of Millions		
Total Area Treated for all projects of the Upper Hunter Weeds Authority		3462 sq/m

Information obtained from the Upper Hunter Weeds Authority 2007. Note that the area of the Upper Hunter Weeds Authority encompasses an area greater than the Muswellbrook Local Government Area and includes the LGA's of the Upper Hunter Shire, Singleton and Muswellbrook.

2. Why is it happening? (driving forces, pressure)

There are a range of factors threatening biodiversity. These include:

- Key threatening processes (as detailed in Schedule 3 of the Threatened Species Conservation Act 1995, including- alteration of flow regimes; alteration of habitat due to longwall mining; removal of dead wood and dead trees; loss of hollow bearing trees; anthropogenic climate change; bushrock removal; native vegetation clearing; competition and predation by introduced species; frequency of fires; infection by diseases)
- Inappropriate development
- Land use changes (resulting in land disturbance)
- Urbanisation and encroachment
- Fire management practices
- Altered hydrology
- Pollution
- Salinity

Approvals for the clearing of large areas of land are provided by the State Government under the Native Vegetation Act 2003. Information relating to these approvals is provided in Figure 6.4. As indicated no approvals for clearing land under the Native Vegetation Act were granted during the reporting period.

Figure 6.4

Indicator: Native Vegetation of the Muswellbrook Shire 2006/2007

No approvals were allocated for clearing under the Native Vegetation Act 2003

Area of existing vegetation: 205,402 ha

Percentage of vegetation coverage for LGA: 60.33%

Information provided by the Catchment Management Authority 2006 and 2007

Fire and hazard reduction activities also have a considerable impact on vegetation and biodiversity. Due to the continuing drought conditions the fire danger period was brought forward 2 weeks to commence on the 15th September 2006. During November 2006 a substantial fire was started in the Wollemi National Park due to lightning strikes. Information regarding fire activities relevant to the Muswellbrook Shire are included in Figure 6.5 below.

Figure 6.5

Indicator: Hazard Reduction Activity and Fire Restrictions for Muswellbrook Shire, 2006/2007

Area of Hazard Reduction Activity conducted by all agencies: 50 ha

Number of days Total Fire Ban for Greater Hunter Fire Weather Area: 15

Number of incidents requiring response by Rural Fire Service: 116

Number of hazard reduction activities by all agencies: 4

Total area burnt by hazard reduction and fire events: 39,278 ha

Information provided by Rural Fire Service 2007

3. What are the responses and how effective are they? (response)

Reserves and National Parks

The establishment of National Parks and Nature Reserves protects the level of biodiversity in specific areas from many of the threats (pressures) detailed above. Relevant to the Muswellbrook Shire, Wollemi National Park, Goulburn National Park and Manobalai Nature Reserve have been declared, protecting a large area of the Shire from development and many other threats.

Voluntary Conservation Agreements

Council has in the past established Voluntary Conservation Agreements with developers to offset the protection and management of biodiversity in conjunction with development.

Biobanking Agreements

Recently the NSW Government has introduced through the Threatened Species Conservation Act the provision for Biobanking sites to be established which produce Biobanking credits. These credits are then available for developers to purchase to offset threatened species impacts associated with development. This scheme is currently in a trial phase with more information to be available in the future.

Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation

As discussed in Section 2.2, the Synoptic Plan is a strategic planning instrument for the future rehabilitation and management of mine sites within the Upper Hunter. The plan, aims for the protection of biodiversity through the development of corridors to provide linkages for wildlife through previously mined areas which will connect up with natural landscapes.

Hunter & Central Coast Regional Environmental Management Strategy

The HCCREMS group continues its focus on biodiversity conservation and management at a regional scale. The Annual Report prepared by the Environmental Division of Hunter Councils is included in Appendix A of this report.

Revision of the Muswellbrook Shire Local Environmental Plan (LEP)

The Muswellbrook Shire LEP is currently under review and is expected to be placed on exhibition during the next reporting period. The LEP is designed to plan land uses throughout the Shire which also incorporates the linkage of areas which are important to maintaining overall biodiversity. These linkages are designed to allow for the movement of fauna species throughout areas of the Shire.

4. What more could be done? (future directions)

Biodiversity Corridors

The establishment of vegetative corridors linking areas of native and remnant vegetation will improve the ability of fauna species to move across the landscape and for endemic flora species to colonise protected areas. Findings of the HCCREMS mapping project indicate that few corridors currently exist isolating areas of remnant vegetation. The investigation and identification of the issue within the Hunter has been undertaken to promote a focus on enhancing the existing remnant vegetation by providing linkages.

The ongoing implementation of the Mine Rehabilitation Synoptic Plan within the Hunter region will address the provision of corridors between mine sites which have been rehabilitated to other nearby vegetation. This process however is limited by the extended life of mine sites which can be over a period greater than 20 years.

Biodiversity: Responses developed for consideration in the development of Council's Management Plan.

Responses	Action to date	New action for Council's consideration
<p><u>Terrestrial and aquatic ecosystems (including native vegetation communities):</u></p>	<ul style="list-style-type: none"> • Establishment of reserves and National Parks • Voluntary conservation agreements • Introduction of Biobanking • Revision of Muswellbrook LEP • Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation • HCCREMS Programs 	<ul style="list-style-type: none"> • Biodiversity corridors

7. Heritage

7.1 At a glance

Issue	Summary
<p><u>ABORIGINAL HERITAGE:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • A number of aboriginal sites and relics recorded in the Shire • Increased development placing pressure on the sites, at times leading to the destruction of sites in accordance with approvals from NPWS • Aboriginal Heritage Information Management System • National Parks and Wildlife Act – protection of sites and relics through consideration of heritage matters during development assessment • Section 90 consent to destroy required to alter aboriginal sites / relics
<p><u>NON-ABORIGINAL HERITAGE:</u></p> <p>State</p> <p>Pressure</p> <p>Response</p>	<ul style="list-style-type: none"> • A number of heritage items have been identified in the Shire • Increasing developments, particularly industrial developments, placing pressure on heritage items, notably homesteads located within mining lease areas etc • Lack of maintenance resulting in many heritage items becoming dilapidated and run down • Heritage Plans • Heritage Study Implementation • Engagement of Heritage Advisor

7.2 Aboriginal heritage

Management Plan Goal:

- Establish a competent Heritage assessment process.

1. What are the issues for sustainability? And how are they changing? (state)

As the native landholders of Australia, heritage of Aboriginal people is an important aspect of development assessment which must be considered by local government. Developments undertaken, predominantly by the descendents of European settlers, must consider and preserve where possible the sites and artefacts considered to be of cultural significance to the local Aboriginal tribes.

To facilitate this procedure during the development assessment process consultation must be undertaken with the Aboriginal community when an application has the potential to have an impact on Aboriginal Heritage. Additional to this process undertaken by developers, Council also consults with identified local Aboriginal groups by providing details of all developments received during a period. This provides an opportunity for local Aboriginal groups to become involved in a development which may affect items of cultural significance.

When artefacts or sites are identified through this process, the Department of Environment & Climate Change (formerly the Dept of Environment and Conservation) assesses the impact, provides the necessary licences and records the information. Below is a list of Aboriginal Heritage sites which have been added to the Department of Environment & Climate Change's Aboriginal Heritage Information Management System (AHIMS) in 2006/2007.

Figure 7.1

Indicator: **Aboriginal Sites and Relics recorded in the Muswellbrook Shire during reporting period 1st July 2006 to 30th June 2007**

Site Type	Number of Features 2006/2007
Aboriginal Resource and Gathering	0
Aboriginal Ceremony and Dreaming	0
Art (pigment or engraved)	0
Artefact	14
Burial	0
Ceremonial Ring (stone or earth)	0
Conflict	0
Earth Mound	14
Fish Trap	0
Grinding Groove	0
Habitation Structure	0
Hearth	0
Non-Human Bone and Organic Matter	0
Ochre Quarry	0
Potential Archaeological Deposit	0
Shell	0
Stone Arrangement	0
Stone Quarry	0
Modified Tree (Carved or Scarred)	0
Water Hole	0
Total Number of Features	28

Information provided by the Department of Environment and Climate Change 2007

The number of Aboriginal heritage sites allocated licences by the Department of Environment and Climate Change to alter, destroy or damage during 2006/2007 is listed in Figure 7.2.

Figure 7.2

Indicator:	Number of licences which permit activities in relation to Aboriginal heritage sites 2006/2007
Licences:	4

Information provided by the Department of Environment and Climate Change 2007

The number of development applications received by Council which have potential to impact on aspects of Aboriginal Heritage is detailed by Figure 7.3.

Figure 7.3

Indicator:	Number of approvals that impact on Aboriginal Heritage sites
Development Approvals:	1

2. Why is it happening? (Driving forces, pressure)

Impacts on Aboriginal heritage sites and relics can be caused by factors such as the increasing population, the spread of urban development, land use changes, inappropriate land use, industrial development and changes to water flow regimes.

Apart from investigations undertaken during the development assessment process, there is a lack of knowledge and certainty in the location of Aboriginal sites throughout the Shire. The majority of the sites identified have been as a result of systematic surveys undertaken as part of the environmental assessment for large developments. Those reported to the Department of Environment & Climate Change, which includes the National Parks and Wildlife Service - NPWS are listed in the Aboriginal Heritage Information Management System (AHIMS) maintained by the department.

3. What are the responses and how effective are they? (response)

Aboriginal Heritage Information Management System (AHIMS)

This is a database containing details of Aboriginal objects, places and other heritage values across NSW which have been reported to the Department of Environment & Climate Change - NPWS. Note that this does not include a list of all artefacts and sites within an area, only those reported. AHIMS includes listings, recording cards and archaeological reports for relics, sites and values reported to the National Parks & Wildlife Service (NPWS).

National Parks and Wildlife Act

The NPW Act protects all Aboriginal objects and Aboriginal places in NSW from destruction or disturbance without a permit approved under this Act. It is an offence to undertake any of the following activities without a permit:

- disturb or move an Aboriginal object
- excavate land for the purpose of discovering an Aboriginal object
- knowingly destroy, damage or deface an Aboriginal object or Aboriginal place

- knowingly cause or permit the destruction, damage or defacement of, an Aboriginal object or Aboriginal place.

A section 90 consent to destroy permit is required to be obtained from NPWS should a person wish to destroy an object of Aboriginal significance.

4. What more could be done? (future directions)

Ongoing investigations into the location of sites and relics of Aboriginal significance should be undertaken to assist in the assessment of developments which may impact on these matters. Management plans should also be developed to manage those items or areas of particular significance to the Aboriginal community.

7.3 Non-Aboriginal heritage

Management Plan Goal:

- *Establish a competent Heritage assessment process.*

1. What are the issues for sustainability? And how are they changing? (state)

Muswellbrook has had an extensive history of European settlement which has resulted in many sites and structures which have European Heritage value. The preservation of these sites and structures is therefore essential in preserving the regions history.

Figure 7.4 below details the number of development approvals which may have a potential impact on non- Aboriginal heritage sites. Figure 7.5 indicates the number of sites which are listed by the Muswellbrook LEP as having non- Aboriginal (European) Heritage value. Figure 7.6 then lists the number of sites which have been lost or added to the Heritage Inventory maintained by Council.

Figure 7.4

Indicator: Number of approvals during 2006/2007 which may impact on non- Aboriginal Heritage sites	
Number of development approvals:	19

Figure 7.5

Indicator: Total number of non- Aboriginal Heritage sites listed by the Muswellbrook Local Environmental Plan	
Known Non- Aboriginal heritage sites LEP:	134

Figure 7.6

Indicator: Number of non- Aboriginal heritage sites which have been added and lost from the Heritage Inventory 2006/2007

Number sites added:	0
Number sites lost:	0

2. Why is it happening? (driving forces, pressure)

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

A number of heritage homesteads in the Muswellbrook Shire are located in close proximity to open cut coal mining which are often subject to blasting vibrations. This may also, if not managed appropriately, result in a detrimental impact on the heritage item.

3. What are the responses and how effective are they? (response)

Heritage Plans

Council is preparing a draft Local Environmental Plan and a Development Control Plan containing heritage planning controls with the assistance of the Heritage Office, and Council's Heritage Committee (which incorporates Councillors, staff and members of the Muswellbrook Historical Society). To form the basis of the draft LEP and draft DCP a detailed heritage study has been developed by EJE architects (Muswellbrook Shire Wide Heritage Study 1996) which has updated the information from the Hunter (Heritage) Regional Environmental Plan (1989) regarding each item.

Progress to date since Council resolved to undertake the draft LEP has included the preparation of the document and provisions within the draft DCP, followed by adoption by the Heritage Committee.

Heritage Study Implementation

In terms of the above, Council uses the Hunter Regional Environmental Plan 1989 and Section 79(c) for assessment purposes under the Environmental Planning and Assessment Act. As Council has a draft Heritage LEP and DCP, items included in the draft lists are to be considered under Section 79(c) when determining a development application once the Draft LEP is publicly exhibited.

Any developments where heritage matters are apparent but the site is not listed in the Study, are still to be considered and addressed in Section 79(c) of the Environmental Planning and Assessment Act, 1979, as stipulated by the Department of Planning.

Engagement of a Heritage Advisor

In accordance with Council's adopted heritage strategy, Council will continue to engage a Heritage Advisor to visit Muswellbrook Shire once every two months to advise on matters to do with the preparation of the draft Heritage Development Control Plan. At each visit Council holds the Heritage Committee meetings to provide the Councillors and representatives of the Muswellbrook

Family and Historical Society with the opportunity to discuss issues with the Heritage Advisor along with normal business items.

During the bi-monthly visits the Heritage Advisor inspects sites in relation to development applications, development proposals/queries and to provide the public with advice concerning heritage issues/matters. In the past year the Heritage Advisor has also been engaged to comment on Main Street Proposals for Denman and Muswellbrook, and on the rehabilitation and ongoing maintenance of local cemeteries.

4. What more could be done? (future directions)

Council should encourage further investigations into the heritage significance of a number of sites throughout the Shire to gauge further information regarding heritage values. Also through the Heritage Committee and the DCP (once adopted), Council should promote the proper management of heritage items in the Muswellbrook Shire to ensure they are conserved for the future.

Heritage: Responses developed for consideration in the development of Council's Management Plan.

Responses	Action to date	New action for Council's consideration
<u>Aboriginal Heritage:</u>	<ul style="list-style-type: none"> Aboriginal Heritage Information Management System National Parks and Wildlife Act Investigation of sites and artefacts during development assessment Section 90 consent to destroy required to destroy aboriginal sites / relics 	Further research to be undertaken where possible by relevant stakeholders into the location of aboriginal sites and relics not currently identified
<u>Non-Aboriginal Heritage:</u>	<ul style="list-style-type: none"> Heritage Plans Engagement of Heritage Advisor Heritage Study Implementation 	Further research to be undertaken where possible by relevant stakeholders into the heritage values of identified heritage items

APPENDIX A

**HCCREMS Annual Report for Council State of the
Environment Reporting 2007**