

Muswellbrook Shire Council

State of the Environment Report

2004/2005



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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 SoE reporting template developed by Twyford Consulting for the Lower Hunter and Central Coast Regional Environmental Management Strategy (2003).

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1. Towards Sustainability

Management Plan Goal: To develop an environmentally sustainable community; 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.

1.1. Introduction

The issue: What is sustainability?

Ecologically Sustainable Development principles are an integral part of the decision making process of Local Government with all matters relating to the community and the environment managed so as to reduce the impact on the environment. Various programs have been devised to assist in the implementation of sustainable objectives such as water sensitive urban design, integrated water cycle management and energy and water efficient housing.

The NSW Government has also formulated the Building Sustainability Index (BASIX) which will become mandatory for new residential dwellings across the state following the 1st July 2005. The BASIX program requires the achievement of a nominated index rating for each residential dwelling which is submitted to Council's with development applications. This program aims to increase the efficiency of homes in regards to energy and water through various methods such as rainwater tanks, solar hot water systems, indigenous landscaping, dwelling design and energy and water efficient fittings.

Monitoring progress toward ESD

State of the Environment (SoE) Reporting is a tool which actively monitors the assessment and progress of environmental, economic and social indicators each year in regards to the objectives of sustainability. The SoE Report for the Muswellbrook Shire aims to report on the effectiveness of the implementation of the key objectives of Council's Management Plan and their progress in moving towards sustainable outcomes.

Environmental & socioeconomic data

SoE reporting in NSW focuses on the condition of natural systems, the pressures placed on them via human activities, and the actions or responses under way to minimise the impacts of such pressures. Through this Pressure – State – Response model, environmental and socioeconomic data is used to provide an indication into the state of the environment, pressure put upon it and the effectiveness (or not) of actions being implemented to address the issue.

Approach taken with this SoE report

This SoE Report (2004/2005) provides an assessment of the state of the Muswellbrook Shire environment for the reporting period from 1st July 2004 to 30th June 2005, in accordance with the Local Government Act 1993.

This SoE Report has been developed similarly to last years 2003/2004 SoE Report based on the regional template and indicators developed through the LHCCREMS SoE regional reporting process. Through the use of the SoE Report template direct comparisons can be made each year regarding the consistency of data and indicators.

1.2. Key determinants

Environmental sustainability and change is influenced by a number of key determinants, which can be described as those induced by the physical environment (such as climatic change), and those caused through human activities (such as population growth). These key determinants can both negatively and positively influence economic, social and environmental factors which relate to the ability to achieve sustainability objectives.

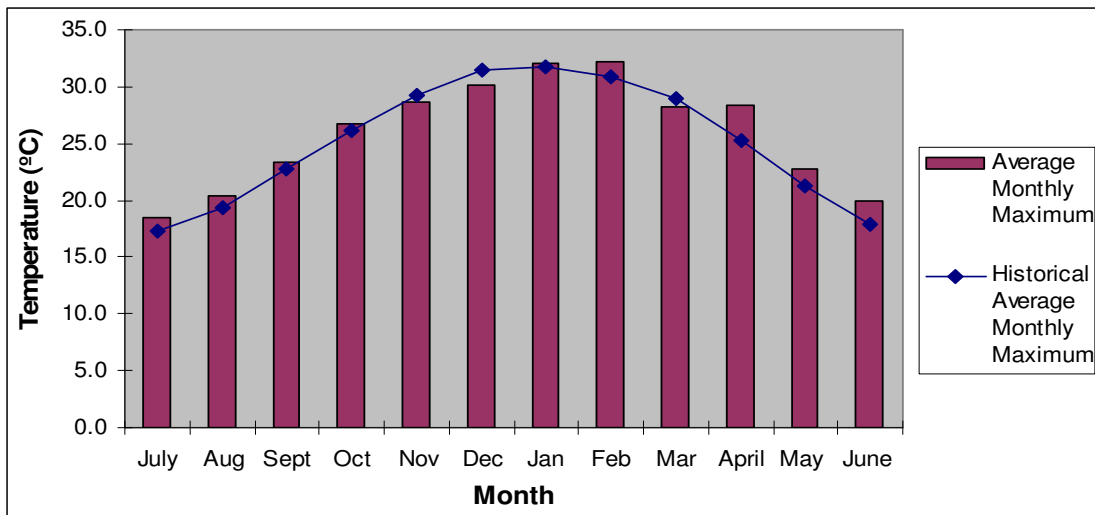
The physical environment

The climate of the Upper Hunter Region and specifically Muswellbrook is characterised by warm dry summers and cool dry winters. In summer, the weather is influenced by high pressure systems which alternate with low pressure systems – ‘southerly busters’ every three to five days. Rainfall is highest in the summer months usually as a result of thunderstorms.

In winter, the mid latitude westerlies and high pressure systems alternate with cold fronts. The prevailing winds are 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.

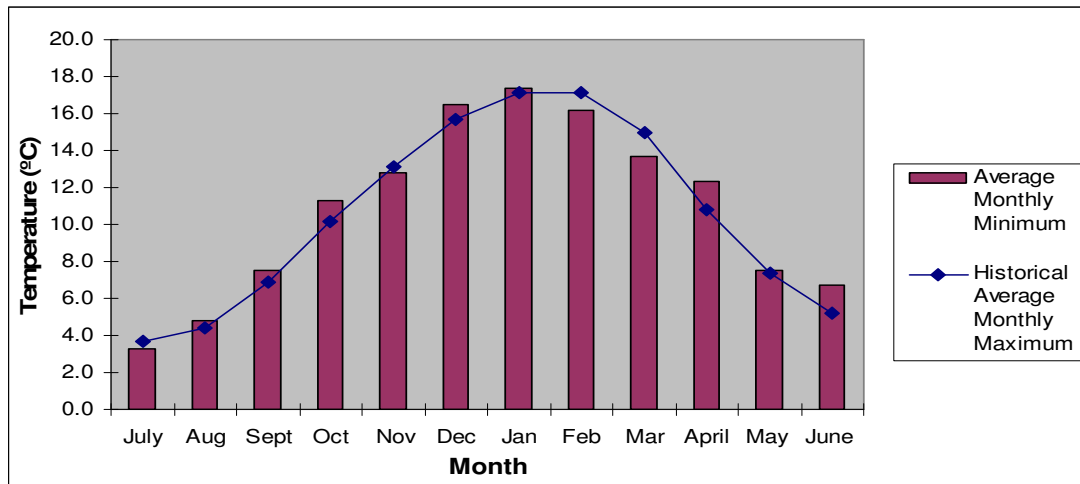
The temperature and rainfall data recorded at the Jerry’s Plains Post Office for 1st July 2004 to 30th June 2005 period are detailed in Figures 1.1, 1.2 and 1.3. Temperature records for maximum and minimum values for the period, when compared to the historical data indicate a similar trend (see Fig 1.1 and 1.2).

Figure 1.1 Average Maximum Monthly Temperatures for July 2004 to June 2005 compared with historical averages



Source: Bureau of Meteorology, 2005

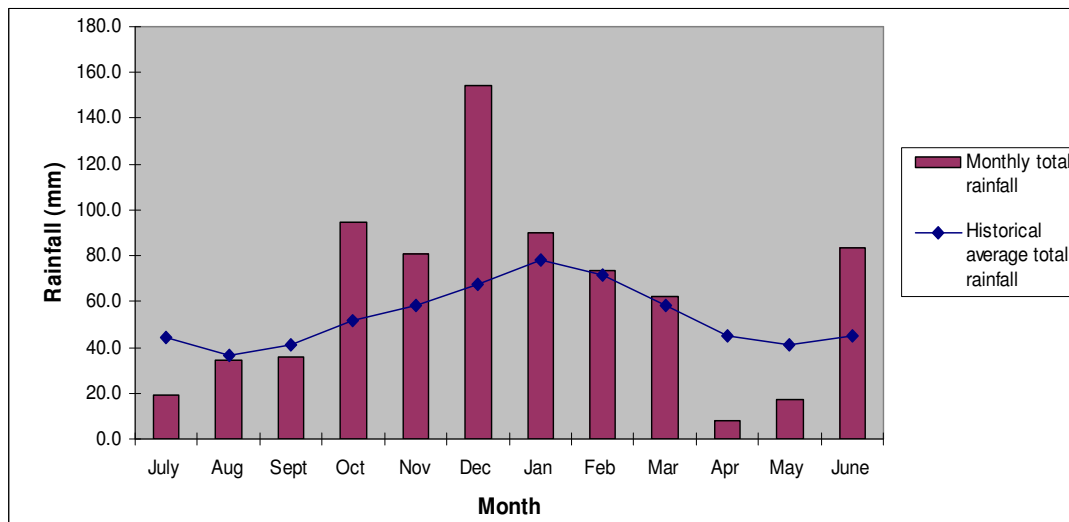
Figure 1.2 Average Minimum Monthly Temperature for July 2004 to June 2005 compared with historical averages



Source: Bureau of Meteorology, 2005

Data recorded for rainfall events were irregular, indicating little correlation to historical averaged total data (see Fig 1.3).

Figure 1.3 Total Monthly Rainfall for July 2004 to June 2005 compared with historical monthly average total rainfall



Source: Bureau of Meteorology, 2005

The human environment - population & resource consumption

The consumption of natural resources, the efficiency of production and the waste produced by human society are contributing factors relating to the level of impact inflicted onto the environment.

As recorded by the 2001 Census, the population of the Muswellbrook Shire was 14,796. Comparing this with the 1996 Census data, the population in the Shire has experienced a decline. Anecdotal evidence suggests that whilst the Shire appears to be growing in an economic sense, the increased efficiencies of the mining and power generation industries have not resulted in an increase in the Shire's population predominantly through the emigration of workers to the industries.

Economic profile and economic development

The economy and population of Muswellbrook enjoys an array of rural industries including agriculture, dairy, meat farming, horse breeding and award winning wine making industries. The region has developed into a major industrial area over recent years mainly through the increase in coal mining activities and associated companies.

To accommodate this economic development, Muswellbrook has developed a number of residential subdivision areas which include:

- North Muswellbrook residential development has been approved for the development of approximately 250 lots in two stages involving residential and rural residential land.
- Stages 1 to 6 of the Eastbrook Links Estate is currently being constructed which provides for approximately 250 residential lots.
The master plan for a further 1049 lots involved in Stages 7 to 16 has also been approved.
- St Mary's Catholic Church Subdivision located off the Skellatar Stock Route, at South Muswellbrook involves the development of 132 residential lots. The application for the remaining 3 stages is currently being assessed.
- Council is currently considering the rezoning of land off Bell St, Denman which will yield approximately 65 residential lots within the Denman North Subdivision.
- Woodlands Ridge Rural Residential subdivision (Stages 1 and 2), located at South of Muswellbrook has been completed and has provided approximately 90 rural residential lots.

1.3. Implementing ESD

Council's Role

During the 2004/2005 period, Council, groups and individuals have sought environmental funding to enable specific environmental projects to be implemented throughout the Shire. Council has also supported a number of community and regional based funding applications for the implementation of community / regional based environmental projects.

Table 1.1

Indicator: Environmental Funding received for Muswellbrook Shire 2004/2005 (including regional environmental funding)

Group / Individual	Project Description	Amount Received
Council	Community Sustainability Education Program – Industry Cleaner Production (received 2004 but program completed in reporting period)	\$20,000
HCCREMS (Regional Project)	Woodsmoke Reduction Program (funding received 2003/2004, however project conducted during 2004/2005 reporting period)	\$80,000
Upper Hunter Weeds Authority (Regional Projects)	Weed Eradication Programs for the Upper Hunter Region conducted by the Upper Hunter Weeds Authority	\$8,292
UHRRI	UHRRI Project Implementation	~ \$1.77 Million*
Landholders	A range of projects conducted by landholders throughout the Muswellbrook Shire- funded by CMA and NHT	\$19,337

* Note: Funding for UHRRI projects comes from a range of sources to be spent over a number of years on the UHRRI project

Environmental legislation (for example the *Local Government Act*, the *Environmental Planning and Assessment Act* and the *Protection of the Environment Operations Act*) is enforced by Council to manage the effect of industry, business, government agencies and the community on the environment. Through the enforcement of the relevant Acts, Council can actively direct the interaction and impact of the human population on the natural environment. Council Officers have the authorisation to impose infringement notices, clean up notices and prevention notices as per the requirements of the relevant legislation. These notices may be issued due to non compliance with matters such as water, air, noise and odour pollution which are deemed to be an offence under the *Protection of the Environment Operations Act*. The number of infringement and clean up and prevention notices are listed below.

Indicator:	Number of Penalty Infringement Notices issued in relation to the Protection of the Environment Operations Act, 2004/2005
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Number issued 2004/2005:	5
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Indicator:	Number of Clean Up and Prevention Notices issued in relation to the Protection of the Environment Operations Act, 2004/2005
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Number issued 2004/2005:	0
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During the period from 1st July 2004 to 30 June 2005, authorised Council officers issued a number of Penalty Infringement Notices namely for repeat or significant offences. A warning and educational approach was undertaken for the management of offences that may warrant Clean up or Prevention Notices.

The Environmental Impact of Council Activities

Muswellbrook Shire Council provides a range of services to residents of the Muswellbrook Local Government Area such as roads, drainage, water, sewer, recreational facilities and waste services. Council has the potential to have a negative impact on the environment and community through the inefficient management and development of these services.

Council as an administrator and regulator uses resources in the carrying out of various necessary functions. Resources utilised by Council include energy (including electricity, fuels, gas) water, stationary and building products. Council activities also have the potential to impact on the environment through the storage and use of oils, greases, fuels, pesticides, herbicides and fertilisers. Other potential impacts of Council operations include noise, water pollution, erosion and sediment control, dust, visual and lighting impacts.

Measures implemented by Council during the reporting period 2004/2005

Council has implemented a number of programs during the reporting period, to ensure all operations are conducted in a sustainable manner, including:

- Energy and water efficiency programs including energy audits of Council buildings and lighting and showerhead retrofits to reduce energy and water use

- The enforcement and review of DCP's which relate to the environment such as sediment and erosion control
- Waste recycling program to ensure recyclables are separated from the waste stream
- Investigations into the use of energy resources by Council activities, such as the vehicle fleet and the heating / cooling efficiency of the administration building
- Design of new buildings / facilities with energy efficiency and all of life costs being part of the decision making process (eg the Heated Swimming Pool, Library Extensions)

Community Involvement

Participation in environmental programs

Community groups, organisations and individuals in the Muswellbrook Shire regularly participate in environmental programs being held throughout the year, such as tree planting, clean up days, and environmental education days. Table 1.3 details the level of community participation in a range of environmental programs undertaken throughout 2004/2005, with a comparison to the number in 2002/2003 and 2003/2004 for the same event. From the data represented in the table an increase in respondents for the Upper Hunter Youth Forum has been consistent over the three (3) years. However a substantial decrease has been received in numbers for National Tree Day accompanied by a drop off on numbers for the Clean Up Australia Day. The reasons for the inconsistency in respondent numbers is not easily recognised as varying factors such as advertising, incentives and specific activities may be the cause.

Table 1.3

Indicator: Participation in Environmental Programs, Muswellbrook Shire

Event	Numbers participating 2004/2005	Numbers participating 2003/2004	Numbers participating 2002/2003
National Tree Day	10	41	62
Clean Up Australia Day	60	87	51
Upper Hunter Enviro Youth Forum	140	97	87

1.4 Future directions in environmental reporting

The State of the Environment report will continue to reflect the current state of the Muswellbrook Shire environment and trends (either positive or negative) towards sustainability. The report will continue to be undertaken as per the regional SoE template reporting in the Hunter Region (through REMS), to enable comparisons to be made between reporting periods and where able between regions. The ability to compare information collated for different regions will improve the capacity for environmental programs to achieve a regional perspective rather than specific small scale programs.

2. Human Settlements

2.1. At a glance

(a) Summary of state, pressure and response

Issue	Summary (status)
<u>Population & settlement patterns:</u>	
State	<ul style="list-style-type: none"> • Decrease in population in the Shire from 1996 – 2001. • Two main urban areas of Muswellbrook and Denman
Pressure	<ul style="list-style-type: none"> • Continued economic and population growth placing pressure on the environment
Response	<ul style="list-style-type: none"> • Review of Muswellbrook LEP and Shire Development Strategy • Implementation of DCP's etc
<u>Drinking water quality:</u>	
State	<ul style="list-style-type: none"> • Water consumption increasing
Pressure	<ul style="list-style-type: none"> • Water quality concerns • Climatic variations (drought)
Response	<ul style="list-style-type: none"> • Effluent reuse schemes • Water efficiency measures (including the Water Campaign)
<u>Energy:</u>	
State	<ul style="list-style-type: none"> • Energy production inefficient • High consumption of energy resources
Pressure	<ul style="list-style-type: none"> • Requirement for energy by everyday activities • Large scale industries using significant amounts of energy
Response	<ul style="list-style-type: none"> • Cities for climate protection • Greenhouse reduction strategy • Energy efficient car in council fleet • Downsizing of Council fleet to 4 cylinder vehicles
<u>Transport:</u>	
State	<ul style="list-style-type: none"> • Large number of vehicles in the Shire
Pressure	<ul style="list-style-type: none"> • Lack of public transport systems in the Shire
Response	<ul style="list-style-type: none"> • Bicycle / walkway development • Cities for Climate Protection • Purchase of energy efficient vehicle in fleet • Downsizing Council fleet to incorporate 4 cylinder vehicles • NSW Government Policies and Strategies • Draft SEPP 66
<u>Waste management:</u>	
State	<ul style="list-style-type: none"> • Increase in consumption of resources resulting in increased waste generation
Pressure	<ul style="list-style-type: none"> • Increasing use of resources and materials, discarding of old material
Response	<ul style="list-style-type: none"> • Compost Production • Clean Up Australia Day • Industry Cleaner Production Program • Recycling Programs • Waste Education

<u>Noise:</u>	
State	<ul style="list-style-type: none"> • Noise complaints being received from the community
Pressure	<ul style="list-style-type: none"> • Increasing industrial developments in close proximity to urban centres • Neighbour hood noise an issue of great concern
Response	<ul style="list-style-type: none"> • Complaints Protocol • Noise Guide for Local Government • NSW Industrial Noise Policy • Noise Monitoring Programs
<u>Community Lands:</u>	
State	<ul style="list-style-type: none"> • Areas of open space under threat from urban encroachment
Pressure	<ul style="list-style-type: none"> • Increase in urban, industrial and commercial developments threatening open space areas • Illegal dumping polluting open space areas
Response	<ul style="list-style-type: none"> • Management Plans • Requirement for open space in new residential subdivisions

2.2. Population & settlement patterns

There is no current management plan objective, policy or goals.

Introduction

Human settlements rely on the provision of housing and urban infrastructure including drinking water, electricity, roads, sewerage and waste disposal. This section describes some of the key environmental issues relating to human settlement, including settlement patterns, energy generation and use, transport and waste.

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

Current Settlement Patterns in the Muswellbrook Shire

The most recent population census was undertaken in 2001 which indicated that actual population figures for the Muswellbrook Shire since 1986 indicate a gradual increase in population up until 1996. Between 1996 and 2001, the population declined at a rate of -1.0% (see Table 2.1). Anecdotal evidence suggests that whilst the Shire may be growing in an economic sense, the increased efficiencies of the mining and power generation industries has reduced population growth through emigration of new employees.

Table 2.1

Indicator: Actual Population, Muswellbrook Shire 1986 – 2001

1986	1991	1996	2001	1991 – 1996 Growth Persons	1996 – 2001 Growth Persons	1986 – 1991 Growth Rate	1991 – 1996 Growth Rate	1996 – 2001 Growth Rate
14,892	15,111	15,562	14,796	451	-766	0.3%	0.6%	-1.0%

Source: ABS, 2001 Census

The townships of Muswellbrook and Denman contain the majority of the population of the LGA, with significant numbers also spread over the Shire in rural dwellings. The growth of the Muswellbrook Shire since European settlement has resulted in the large scale clearing of land and substantial use of natural resources. This has placed significant pressures on the environment, particularly causing negative impacts on natural ecosystems and water resources.

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

Growth in the Muswellbrook Economy

Whilst the residential population has declined in the Muswellbrook Shire since 1996, there has been continued growth in the local economy. During the 2004/2005 financial year (1st July 2004 – 30th June 2005), a total of **525** development applications (DA) were received by Council (see Table 2.2). Though the number of total applications have decreased from last year the reduction is not considered significant. The comparison of the data indicates that development applications received within the area are consistently in high numbers. Of the 525 DA's lodged, four (4) applications were withdrawn.

Table 2.2 provides a breakdown in development application types for the 2004/2005 period.

The majority of DA's lodged during the reporting period were related to residential home improvement structures such as pergolas, garages, extensions, swimming pools etc. A decrease was observed regarding the number of individual new dwellings which may be related to the completion of existing subdivisions and the preliminary development of new subdivisions.

Table 2.2

Indicator: Development Applications Received by Muswellbrook Council, 2004/2005 & Comparisons with 2003/2004 period

Application Type	DA's Received		DA's Cancelled / Refused	
	2004/2005	2003/2004	2004/2005	2003/2004
Home Improvement	231	264	1	3
New Dwellings	87	119	1	1
Rural	60	28	-	-
Commercial	51	26	1	4
Industrial	15	14	-	2
Subdivisions	29	19	-	1
Coal Mining	-	3	-	1
Section 96 Amendments	35	30	-	1
Demolitions	2	3	-	-
Public Works	3	4	1	-
Signage	-	11	-	-
Boundary Adjustments	3	6	-	-
Tourism	5	4	-	-
Rezoning	3	7	-	1
Extractive Industries (excluding coal mining)	1	4	-	-

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

Council undertakes planning management programs to address land use planning issues in order to ensure appropriate and sustainable development is undertaken in a manner which minimises the impact on the environment. The measures currently being undertaken by Council include:

Review of the Shire Development Strategy / Muswellbrook Local Environmental Plan

The review of the current Muswellbrook Local Environmental Plan (LEP) 1985 is nearing completion. It is expected that the draft document will be placed on public exhibition late in 2005.

The proposal for DIPNR to prepare a template regarding the preparation of an LEP has not yet been finalised. Even though this template has not been completed to date, Council's Draft LEP generally follows the objectives of the DIPNR template in that it provides for and supports the development of the Shire in accordance with the objectives of the adopted Shire Development Strategy and the requirements of the Department of Planning.

Strategies for North-West Denman and South Muswellbrook

Muswellbrook Council has completed the draft *South Muswellbrook Strategic Study - Development of Residential Land*, the strategy has not yet been adopted by Council. A similar strategy has also been completed for North West Denman but this has not yet been adopted.

Development Control Plans

Council has 16 adopted development control plans (DCPs) to provide policy advice to future and current developments throughout the Shire. As per information received from DIPNR all DCPs are to be reviewed and updated in the near future.

Development control plans have proven to be very effective in that they provide specific information for the planning and development of land on a consistent basis within the Shire. The documents provide reference material for individuals, consultants, developers, planners and Council Officers to manage the impact of developments and actions on the environment.

Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation

The purpose of the Synoptic Plan is to provide a basis for development of a long term integrated strategy regarding 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.

There are requirements in development consent conditions imposed by Muswellbrook Shire Council for new / amended mining operations to comply with the objectives of the Synoptic Plan.

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.

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

Council Action

Further actions and policies to realise sustainable development principles, which will be investigated by Council in the future, include- Integrated Water Cycle Management; Water sensitive urban design principles; tree preservation policies and incentive programs to increase water and energy efficiency in developments.

BASIX

The implementation of BASIX (Building and Sustainability index) throughout regional NSW on the 1st July 2005 will ensure all new dwellings (and in the future additions and alterations) achieve reductions in energy and water use. Residential development must be designed and built to use 40% less drinking-quality water and produce 25% less greenhouse gas emissions than average NSW homes of the same type.

The requirement for applicants of new dwellings to undertake a BASIX certificate at the approval stage and to implement water and energy saving devices will improve the

sustainability of urban developments. The affect of the BASIX program on water and energy usage will be identified during the next reporting period fro 1st July 2005 to 30th June 2006.

Tree Preservation Plan

The development of a Tree Preservation Plan would assist in the conservation of remnant vegetation and the removal of native vegetation within the Shire.

Currently, Council does not have a tree preservation policy.

2.3 Drinking water quality and 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.

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

The consumption of water is managed through the implementation of Drinking Water Quality Guidelines (NHMRC & ARMCANZ) to ensure strict standards are met before water can be consumed by the community. These guidelines ensure that the drinking water provided by authorities is supplied to the community in a safe and healthy manner.

As Muswellbrook Council is the water authority within the Muswellbrook Shire, it undertakes the ownership, operation and management of three (3) water supply systems which operate within the towns of Muswellbrook, Denman and Sandy Hollow.

Monitoring the Quality of Drinking Water

In accordance with statutory guidelines, Council undertakes bacterial, pesticide, physical and chemical analysis of potable water samples in waters sourced for drinking water purposes. Table 2.3 details the compliance of the water samples taken with the NHMRC 2000 drinking water guidelines.

Table 2.3

Indicator: Compliance with NHMRC Drinking Water Guidelines

Parameter / Type	Muswellbrook Percent Compliance	Denman Percent Compliance	Sandy Hollow Percent Compliance
Physical and Chemical:			
Physical	99.6%	65%	47%
Chemical	98%	94%	89%
Key Characteristics:			
Turbidity	98%	0%	73%
pH	100%	70%	69%
Colour	100%	100%	100%
Microbiological:			
E. coli	100%	96%	99%
Total coliforms	100%	96%	93%

Non compliances of the samples compared to the drinking water guidelines are generally as a result of high turbidity of the water in the Hunter River and contaminated samples.

Current Water Consumption

As indicated in Table 2.4, water consumption within the Muswellbrook Shire has steadily increased in past years, with extreme dry climatic conditions having a significant impact.

Table 2.4

Indicator: Water Consumption, Muswellbrook Shire

1992	1993	1994/95	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/2005
1,610 ML	1,847 ML	1,855 ML	2,196 ML	2,277 ML	1,845 ML	2,076 ML	2,150 ML	2,624 ML	2,644 ML

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

Climatic Variations

Fluctuations in the consumption of water resources are typically influenced by variations in climatic conditions. During periods of high rainfall water consumption generally drops, whilst during periods of drought water consumption usually increases.

Water Quality Issues

Water quality significantly impacts on the ability of Council to supply suitable drinking water within existing infrastructure restrictions. There have been ongoing problems with the supply of suitable drinking water for the residents of Denman. This in part is due to the water sourced from bores being high in manganese and iron. This causes substantial deposits of iron and manganese bacteria in the pipe network. These deposits slough off at regular intervals causing dirty water to be distributed to residents.

The turbidity of the Hunter River has also caused significant water supply issues to the systems in Muswellbrook and Denman, restricting the ability to pump water directly from the river.

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

Hunter River Salinity Trading Scheme

The Hunter River Salinity Trading Scheme (HRSTS) was established by the Dept of Environment and Conservation (DEC) 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 has reduced the need for the golf courses and the mine to pump water from the river to meet their water needs and reduces the treated effluent being discharged into the Hunter River.

Indicator: Volume of Treated Effluent Reused 2004/2005

Mt Arthur Coal:	896 ML
Muswellbrook Golf Club:	124 ML
Denman Golf Club:	1011 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 completed Milestone 1 of the campaign in November 2004, which required an inventory of two (2) years worth of corporate and community data to be undertaken to establish usage. The progression of Milestone 2 is currently being completed in conjunction with 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 is currently overseeing Council's progress through the Milestones of the Water Campaign.

Hunter & Central Coast Regional Environmental Management Strategy (HCCREMS)

There are four "water" projects that have been delivered in the region this year as part of HCCREMS long term commitment to promoting sustainable urban water cycle management.

1. Urban Water Cycle Management Toolkit

This project designed and developed a comprehensive and innovative toolkit of resources (in CD and web-based access format) to build the capacity of NSW Councils to embrace and pursue innovation in sustainable stormwater management and urban water cycle practises. The toolkit is available at www.urbanwater.info. The web-site provides an excellent resource for a wide range of disciplines in Councils, including engineers, planners, environmental managers, catchment managers, asset managers and educators. A capacity building DVD and video can be ordered via the website and is designed to assist staff in introducing innovation and sustainable solutions to water management issues in their LGAs. The toolkit was launched in mid 2005.

2. Australian Research Council Project - applied Urban Water Cycle Management

This is a four year research program and is now in its final stage. The purpose of the initiative is to support further development of local and regional knowledge, policies and standards that will allow development of optimal water cycle management solutions, and the associated economic benefits of reduced water demand and infrastructure investment and maintenance costs. HCCREMS became formal partners in the program in 2003 with the following organisations

- University of Newcastle
- Hunter Water Corporation
- Gosford-Wyong Water Authority
- Hunter Area Health Unit
- Brisbane City Council

3. Water Sensitive Urban Design In Catchments Above Wetlands.

Development control plans & water sensitive retrofit strategies for areas upstream of natural wetlands need to be tuned to the wetlands' needs. This is important both for the conservation of the wetlands themselves and for the conservation of aquatic ecosystems downstream, as natural wetlands provide diverse ecological services (e.g. polishing water quality & providing a hatchery for fish) for downstream ecosystems. Simply from the perspective of cost-effective drainage asset management alone, the functioning of natural wetlands needs to be protected (eg constructing water treatment wetlands whilst allowing the treatment function of natural wetlands to decline does not make financial sense). Existing WSUD planning instruments (eg HCCREMS Model Planning Provisions) focus on larger scale water cycle management and conservation issues.

Accordingly, this project sought to conduct research and produce planning guidelines for use in urban areas above wetlands and small lagoons that take into account a larger set of catchment dynamics than the currently available generic WSUD Development Control Plans. Supporting this, a documented methodology for tailoring or applying these guidelines needed to be developed to suit particular sites (both green fields & retrofit).

The Project was completed in early 2005 and provided Councils with important tools for designing the urban development in ways that protect downstream wetland ecosystems. However, the project also highlighted the complexity of the issue, and raised many questions which will be addressed in the next phase of research.

4. Regional Extension Program

There was a 12 month hiatus in the regional extension program due to funding constraints and delays. However, employment of a full time Regional Water Program Coordinator is about to commence to provide much needed specialist extension services and capacity building to Councils of the region to further implementation of urban water cycle management initiatives such as Water Sensitive Urban Design planning provisions and approaches, BASIX legislation, re-use strategies and other water conservation and water quality management initiatives.

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

BASIX

The implementation of BASIX (Building and Sustainability Index) will require that all new dwellings achieve reductions in energy and water use. BASIX comes into effect following the 1st July 2005, which will be reported during the next reporting period 2005/2006. The BASIX program will decrease the demand for water in urban areas and increase the level of sustainability of the urban environments within the Shire.

Water Campaign

Council needs to continue to be committed to the Water Campaign and the ongoing progress through Milestones 1 – 5. Reduction goals for both Council and the community need to be set and a Reduction Strategy needs to be prepared and adopted by Council.

Educational Programs

Educational programs for specific sectors of the community should be developed and implemented to raise community awareness about water efficiency issues and actions which can be taken to reduce water use. Such educational programs could be linked to Council's progression through the Water Campaign Milestones.

Incentive Schemes

Incentive schemes may be developed by Council to assist in the implementation of water saving devices and systems by individuals and possibly businesses.

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.

2.4 Energy

Management Plan Goal: To conserve energy and reduce greenhouse gases; and to reduce reliance on energy consumption

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

Energy production in NSW is predominantly through the combustion of fossil fuels (such as coal), however the use of natural gas, petroleum products, solar and wind energy are becoming more widely utilised. The majority of NSW' electricity is still produced by coal fired power stations which are the main source of greenhouse gas emissions (carbon dioxide, methane and nitrous oxide), oxides of nitrogen, sulphur dioxide and particle emissions. This production of energy is highly inefficient due to the amount of energy lost in the conversion, and is therefore unsustainable.

The amount of energy used by Council during 2004/2005 in conducting its administration and operational functions are detailed in Table 2.6. The amount of carbon dioxide (the main greenhouse gas) emissions as a result of Council's energy usage is also detailed in Table 2.6.

Table 2.6

Indicator: Energy Use by Council by Type and Equivalent Tonnes of Carbon Dioxide Emitted, 2004/2005

Emissions Inventory						
Fuel/process	Quantity Used 2004/2005		Emissions 2004/2005 - Tonnes CO₂-e	Quantity Used 2003/2004		Emissions 2003/2004 - Tonnes CO₂-e
Electricity	4,799,808	kWh	4857.5	4,931,298	kWh	4990.5
Natural Gas (non-transport)	0	GJ	0.0	0	GJ	0.0
LPG - (non-transport)	801	L	1.1	0.26	t	0.7
Petroleum Products						
Petrol/Gasoline	99.1	kL	248.0	118	kL	296.0
Automotive Diesel Oil	96.1	kL	259.0	173	kL	466.9
LPG - transport	13.9	kL	22.0	23	kL	36.8
Net Emissions			5387.6			5790.9

From the data represented in Table 2.6 a reduction in the total quantity of energy resources and emissions has decreased from the last reporting period (2003/2004) to the current period

(2004/2005). This may have been as a result of a reduction of the amount of energy used through educational programs to reduce the amount of energy used by Council.

Table 2.7 details the amount of energy consumed by the community (both residential and non residential) in Muswellbrook Shire. The corresponding emissions of carbon dioxide are also included.

Table 2.7

Indicator: Electricity Usage, Muswellbrook Local Government Area

Emissions Inventory						
Fuel/process	Quantity Energy Used 2004/2005		Emissions 2004/2005 - Tonnes CO₂-e	Quantity Energy Used 2003/2004		Emissions 2003/2004 - Tonnes CO₂-e
<i>Electricity:</i>						
Residential	83,542,301	kWh	88053.6	72,369,000	kWh	76276.9
Non Residential	308,992,464	kWh	325677.9	259,917,000	kWh	273952.5
Net Emissions	413731.5			350229.4		

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

The use of energy resources is an integral part of everyday life, from the use of electricity to run the various 'essentials' of the home to plastics and fuels, human society relies heavily on the use of fossil fuels and petroleum products. The use of these resources and the waste materials produced however creates a detrimental impact on the environment.

From the information detailed in Tables 2.6 and 2.7, Council's consumption of energy has decreased, however the quantity of energy used by the community has increased. This may indicate that further educational and efficiency efforts are required in the public sector to reduce the amount of energy consumed.

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

In recent years Muswellbrook Council has made a concerted effort in reducing its energy use through the implementation of various programs such as:

- Involvement of Council in the Cities for Climate Protection Program and progression to the CCP Plus Program
- The undertaking of an energy audit of the Council Administration Centre
- Alteration of some Council vehicles from six (6) cylinder to four (4) cylinder vehicles
- Purchase of a petrol/electric hybrid vehicle within Council's Fleet
- 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
- The adoption of the Muswellbrook Shire Greenhouse Reduction Strategy
- The implementation of the Industry Cleaner Production Program
- Revision of the Subdivision DCP to increase energy efficiency of developments

These programs listed above have reduced the consumption of energy by Muswellbrook Council which can be observed in Tables 2.9 and 2.10, however further efforts and program

implementation are required within the community to continue the progress towards sustainable use of energy resources.

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

BASIX

The implementation of BASIX (Building and Sustainability Index) will ensure all new dwellings achieve reductions in energy and water usage.

Retrofitting council building

Some works have been undertaken to improve the energy efficiency of Council's Administration building, however further improvements would continue the achievements of Council in the reducing it's energy consumption. These improvements could include:

- The replacement of fluorescent light tubes with tri-phosphorous fluorescents;
- Installation of compact fluorescents in lieu of standard light globes;
- Installation of sensor lighting;

Revision of the Subdivision DCP

The review of the subdivision DCP is currently being undertaken by Council which would introduce energy efficient design and planning in urban development. This is likely to have a significant impact on the consumption of energy by the community.

2.5 Transport

There is no current management plan objective, policy or goals.

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

Transport is an essential part of modern society due to the expanse of urban development and human settlement. The method of transportation however creates a significant impact on the environment through the manufacture of vehicles and the production and consumption of fuels. The majority of motor vehicles are powered by the combustion of petroleum fuels which produce considerable air pollution such as particulate matter, green house gases and noxious fumes.

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

Public transport is limited within the Muswellbrook Shire due to the extent and size of the area, and the spread of the population. This limits the ability for public transport to service the area efficiently, therefore making private transport the only viable option for transportation.

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

Bicycle Plan - Cycleway / Walkway development

Council has undertaken the provision of cycleways to facilitate the ability for the community to use sustainable transport options as opposed to private vehicle use. A Bicycle Plan has been

developed for the expansion of the existing cycleways within the urban environment. The work regarding the cycleway infrastructure is continuing.

Cities for Climate Protection – Transport Matters

Through Council's commitment to the Cities for Climate Protection Program, Council has been undertaking investigations into its fleet of vehicles and potential measures available to reduce fuel consumption and thus air emissions.

Action for Transport 2010

Action for Transport 2010 is an integrated transport plan for NSW. It provides the framework and implementation program to guide the development and management of all land transport in NSW. It includes a range of new initiatives to expand transport infrastructure and improve the quality of transport in NSW.

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

Council Vehicle Fleet

Council should 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

Further cycleway / walkways should be constructed in the urban areas of the Shire to provide an alternative transportation option to members of the community.

Draft SEPP 66 – Integration of Land Use and Transport

The NSW State Government has drafted a State Environmental Planning Policy (SEPP) 66, - Integration of Land Use and Transport. The policy aims to improve the access to public transport, walking and cycling, thus reducing the dependency of the community on private vehicles. To achieve this, the Government has completed the draft document which proposes to plan a built environment in such a way so as to reduce the distance that individuals have to travel.

2.6. Waste Management

Management Plan Goal: To achieve a self funding, environmentally sound waste management service; Ensure sewerage system is able to cater for future requirements.

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

The consumption of goods and resources by humans creates a significant issue regarding the production of waste and its disposal. Modern society typically over consumes goods and is very wasteful in the manufacture and use of materials. The disposal of waste materials poses significant impacts on the environment including the possibility of polluting waters, the air and land.

Council provides a waste disposal service to the population of the Shire through waste and recyclable collection systems within urban areas. The Council administers the Muswellbrook Waste Depot and the Denman Transfer Station. Muswellbrook Council currently holds an Environmental Protection Licence for the operation of the Muswellbrook waste facility, which accepts various waste streams including municipal, commercial, green waste, recyclables and building materials.

Table 2.8 details the amount of recyclables collected and diverted from landfill in the 2004/2005 period.

Table 2.8

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

Product	Amount Recycled 2004/2005 (tonnes)	Amount Recycled 2003/2004 (tonnes)
Paper	426	689.72
Glass	176	377.36
Plastic	30	77.3
Aluminium Cans	5	85.02
Steel	9	127.22
Total Recycled	646	1356.62

A significant decrease in the quantity of material recycled for the 2004/2005 reporting period is of concern, and indicates that the community requires a refresher on the benefits and suitable items for recycling. The recontract of the waste collection and disposal service for Muswellbrook Council proposed for the introduction in 2006, is likely to improve the rate of recycling due to the introduction of a three bin system for recyclables, green waste and domestic waste.

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

Waste disposal is an issue which requires urgent attention, as society develops the amount of waste material produced increases, making the areas available and the ongoing maintenance of waste facilities unsustainable. Whilst technologies have been directed towards the recovery, treatment and reuse of waste streams, the over consumption of goods and resources places considerable pressures on the environment and its capacity to receive waste materials.

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

Data requested from W&W – not supplied

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

A range of programs have been developed and implemented to minimise and educate the public on the impact of waste on the environment. These schemes include:

- **Drum Muster**

The Drum Muster Program is currently run throughout the Shire where empty agricultural chemical drums are deposited at the Denman Transfer Station and the Muswellbrook Waste Depot for collection and disposal.

- **Compost Production**

Green waste is mulched at the Muswellbrook Waste Depot and transported to the Muswellbrook Sewage Treatment Plant where it is combined with solid effluent waste to create compost.

Indicator: Total Compost Produced, 2004/2005

Data requested from Muswellbrook Water & Waste – Not Supplied

Indicator: Total Compost Used, 2004/2005

Data requested from Muswellbrook Water & Waste – Not Supplied

- **Clean Up Australia Day** (see Section 1.3)
- **Industry Cleaner Production Program** - attempts to make small to medium business enterprises more sustainable.
- **Recycling Programs**

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

Waste Management Contract – Muswellbrook Shire

The current contract for the collection and management of wastes in the Muswellbrook Shire expires at the end of 2005. Council is currently in the process of developing the details of the new contract and waste management system, which will involve the introduction of a triple bin system for the disposal of green waste, domestic waste and recyclables.

Educational Programs

Further educational programs should be developed and implemented in relation to the recycling program throughout the Shire. From the reduction in the quantity of material recycled during the reporting period, it may be timely for Council to reinforce and educate the community regarding recycling.

2.7. Tranquillity and noise

There is no current management plan objective, policy or goals.

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

The management of noise within Muswellbrook Shire is an issue which is the predominant topic of complaints received by Council from members of the community.

Table 2.9

Indicator: Number of noise complaints received by Muswellbrook Council, 2004/2005, with comparisons of total noise complaints from 2001 to 2005

Source of noise	Number of complaints in 2004/2005
Industrial	3
Transport (including roads, rail, aircraft)	1
Residential (including pets, air con, power tools etc)	6
Recreational	Nil
Other	5
Total 2004/2005	15
Total 2003/2004	19
Total 2002/2003	30
Total 2001/2002	87

The number of noise complaints received by Council has decreased consistently over past years 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 mine hotlines directly.

Another possible source of noise emissions are through public entertainment premises impacting the surrounding community. Table 2.10 lists the number of public entertainment licences approved during the reporting period from 1st July 2004 to 30th June 2005. Though entertainment premises may create noise issues for the community, no complaints received by Council were regarding public entertainment.

Table 2.10

Indicator: Number of Premises with Public Entertainment Licences 2004/2005

Number of Public Entertainment Licences 2004/2005	20
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2. Why is it happening? (driving forces, pressure)

Typical causes of noise complaints in the Muswellbrook Shire are:

- Industrial noise, including noise associated with blasting – particularly if the noise source is located relatively close to urban areas
- Road traffic noise
- Rail noise
- Domestic pets
- Air conditioners
- Lawn mowers, tools etc
- Noisy neighbours
- Odours
- Erosion

As can be seen in Table 2.9, 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.

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

Noise issues are managed by Council through the 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 noise complaints and their management as per the recommendations of the Noise Guide for Local Government
- **NSW Industrial Noise Policy** - used in the management of noise emissions and the determination of noise limits for operations.
- **Noise Monitoring** - as per specific approvals all mining operations are required to monitor and manage the level of noise emissions. Also as per the approvals this data and interpretations are to be reported to Council on a regular basis.

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

Council must remain vigilant in the management of noise and the impact emissions have on the community. Noise impacts need to be assessed at the various stages of development including planning, industry design, construction and management of the facility.

2.8. Community Lands

Management Plan Goal: Provide amenities, which meet community demands and are affordable to Council and ratepayers; Provide and maintain a network of strategically placed parks at optimum affordable level.

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

Community lands, often referred to as open space, are typically areas of the urban landscape devoted to recreational parks, reserves, gardens, and other open spaces, such as nature strips. Open space areas provide numerous 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 retention functions.

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

Open space areas are constantly under threat due to the expansion of human settlement and the constant need for more land to accommodate this 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.

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

Subdivision DCP

Council is currently reviewing the Subdivision DCP which will include the provision of adequate open spaces for the population of the area.

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 & Shire Development Strategy Implementation of DCP's for environmental controls of development (Erosion and Sediment control, contaminated lands, Trade Waste) Voluntary Conservation Agreements being established with developers Implementation of Upper Hunter Cumulative Impact Study and Action Strategy Consideration of Synoptic Plan – Integrated Landscapes for Minesite Rehabilitation in development assessment for mining developments Planning for Bushfire Protection provisions in development assessment 	<ul style="list-style-type: none"> Development and implementation of policies and strategies to include: <ul style="list-style-type: none"> Water sensitive urban design, Integrated Water Cycle Management and energy efficiency measures (such as the draft regional Subdivision DCP) Tree Preservation Policy Implementation of BASIX on 1 July 2005
<u>Drinking water quality:</u>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Implementation of BASIX on 1 July 2005 Water Campaign – set reduction goals and develop and implement Water Reduction Strategy Implementation of educational programs Investigate incentive schemes for water efficiency
<u>Energy:</u>	<ul style="list-style-type: none"> Purchase of fuel efficient car (Toyota Prius) Downsizing of Council fleet – purchase smaller vehicles The Cities for Climate Protection Program and progression to the CCP Plus Program Implementation of Greenhouse Reduction Strategy Development and implementation of Cleaner Production Program for industry Energy Audit of the Administration Centre Development of draft Subdivision DCP (with energy efficiency provisions) 	<ul style="list-style-type: none"> Implementation of BASIX on 1 July 2005 Adoption of regional Subdivision DCP to incorporate energy efficiency requirements into subdivision design and construction Further investigate retrofitting of Council buildings Implement energy efficiency educational programs Investigate solar power opportunities
<u>Transport:</u>	<ul style="list-style-type: none"> Implementation of the bicycle / walkway plan Council fleet – purchase smaller vehicles and fuel efficient car (Toyota Prius) CCP Program- transport matters State Govt policies and strategies including: <ul style="list-style-type: none"> Action for Transport 2010 Draft SEPP 66 	<ul style="list-style-type: none"> Continue to review vehicles in Council's fleet Continue the development of bicycle paths / walkways throughout the urban areas. Draft SEPP 66
<u>Waste management:</u>	<ul style="list-style-type: none"> Participation in Drummuster programs Production of compost using green waste and solid STP waste Clean Up Australia Day Industry Cleaner Production program 	<ul style="list-style-type: none"> Review of waste management contract for waste depot Develop and implement further waste education programs

	<ul style="list-style-type: none"> • Recycling programs at Council facilities 	
<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 	<ul style="list-style-type: none"> • Proper maintenance for weed control and biodiversity within open space

3. Land

3.1. At a glance

Issue	Summary (status)
<u>Land-use changes:</u> State	<ul style="list-style-type: none"> • Land degradation has altered the chemical, biotic and hydrological balances in the landscape • Soil erosion • Land contamination
Pressure	<ul style="list-style-type: none"> • Land clearing • Urban development • Industrial development
Response	<ul style="list-style-type: none"> • Review of the Muswellbrook LEP • Native Vegetation Clearing approvals • HCCREMS programs • Subdivision Regional DCP draft
<u>Soil erosion:</u> State	<ul style="list-style-type: none"> • Soil erosion is occurring over the natural landscape, including land, rivers and creeks, degrading the quality of the environment
Pressure	<ul style="list-style-type: none"> • Inappropriate agricultural land use practices • Urban development and expansion • Removal of vegetation • Agriculture • pests • Bushfires • Droughts • Floods
Response	<ul style="list-style-type: none"> • Erosion and Sediment Control Regional Policy and Code of Practice (DCP 9)
<u>Induced soil salinity:</u> State	<ul style="list-style-type: none"> • Increasing salinity levels in waterways • Increasing areas affected by dryland salinity
Pressure	<ul style="list-style-type: none"> • Removal of native vegetation cover • Heavy industry – potential discharge of saline waters
Response	<ul style="list-style-type: none"> • Hunter River Salinity Trading Scheme
<u>Chemical contamination:</u> State	<ul style="list-style-type: none"> • Land contamination increasingly become an issue of major concern – 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
Pressure	<ul style="list-style-type: none"> • Increase demand for land resulting in proposals to rezone / change land use activities
Response	<ul style="list-style-type: none"> • DCP 10: Determination of Rezoning and Development Applications involving contaminated land • Contaminated Sites Register • Identification of contamination issues on 149 Certificates

3.2. Land-use changes

There are no current management plan objectives, policies or goals.

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

Environmental degradation of land is essentially caused through the clearing of vegetation and the type of use that piece of land is then employed. The most significant threats to the preservation of land in Muswellbrook include:

- the clearing of native vegetation
- soil erosion and water pollution
- urban development and the encroachment of settlements into non-urban lands
- soil acidification
- soil nutrient decline
- salinity
- contamination of soil by agricultural and industrial landuses

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

Since the settlement of Australia the land has been cleared of vegetation predominantly for agricultural and development purposes, leaving the soil vulnerable to erosion, salinity, loss of nutrients and contamination. The common practice of stripping the soil of vegetation, followed by the construction of settlements has been the typical method that humans have utilised to accommodate the needs and wants of the ever increasing population. Only recently have we realised the unsustainable nature of this process.

Approval from the Dept of Infrastructure, Planning and Natural Resources (DIPNR) under the Native Vegetation Conservation Act is required for the clearing of land over a certain area. The approvals provided by DIPNR during the reporting period 2004/2005 are detailed below.

Table 3.1

Indicator: Clearing Approvals (Ha) Muswellbrook Shire 2004/2005

Purpose of Clearing	Area Cleared (Ha)
Burning to promote regeneration	8.33
Branch Lopping	0.77
Exotic Weed clearing	5.72
Selective Logging – mine site preparation	225.75
Total Cleared area 2004/2005	240.57

The land cleared during the reporting period as detailed above is mainly due to revegetation efforts and mine site clearance.

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

Review of the Muswellbrook LEP

Council is currently reviewing the Muswellbrook LEP 1985. The review includes an assessment of current land use to develop a strategic plan to ensure that future development is appropriately regulated.

Hunter & Central Coast Regional Environmental Management Strategy (HCCREMS)

HCCREMS is currently undertaking vegetation mapping surveys of the Upper Hunter Area to provide a tool for the management of remnant vegetation and surrounding land uses.

Revision of the Subdivision DCP

The DCP which is used in the management and development of subdivision within the Shire is currently being revised. Specific issues involve the sensitivity to the design of the subdivision and the protection of vegetation where possible.

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

The alteration of land management and planning is essential to sustainable use of land resources. Through the inclusion of vegetation preservation and specific landscape design techniques the use of land can be managed in such a way as to be sustainable.

Educational programs are essential to the success of any land use design changes and principle implementation.

3.3. Soil erosion

There are no current management plan objectives, policies or goals.

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

Soil erosion by water and wind is a natural process which has shaped the landscape for millions of years. This process though naturally occurring has been exacerbated since the settlement of Australia over 200 years ago when Europeans came to the country bringing farming techniques which cleared large tracts of land. Since this time land clearing has rapidly increased as it is common practice to remove all vegetation for agricultural purposes or prior to development.

Some land uses and management practices have greatly accelerated soil erosion by reducing surface cover, increasing runoff and reducing the resistance of soil to water and wind erosion. This flow of sediment and nutrients often finds its way into water courses which creates environmental issues such as increased nutrient loads, siltation of water bodies, turbidity of water and altered marine habitats.

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

There are many factors contributing to soil erosion issues in the Muswellbrook Shire. These factors or pressures include:

- inappropriate agricultural land use practices
- introduction of exotic pest species
- urban development and expansion
- removal of native vegetation
- grazing
- industry
- bushfires
- droughts
- floods

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

Erosion and Sediment Control Regional Policy and Code of Practice (DCP 9)

The Erosion and Sediment Control Regional Policy and Code of Practice which was adopted by Council in 1999, is currently undergoing a review as per requirements of DIPNR. This DCP provides a management tool for the implementation in regards to developments, land uses, open space and infrastructure construction. All development practices which disturb the soil profile are required to comply with this DCP.

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

Educational programs would improve the community's understanding regarding the issue of soil erosion and the flow on impacts sediment and nutrient loads have on the environment. Through such a program, changes to land management and planning would be more easily adopted and maintained.

3.4. Induced soil salinity (including sodic soils)

There are no current management plan objectives, policies or goals.

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

The removal of large areas of natural vegetation and the adoption of unsustainable land practices have caused water tables to rise close to the surface. This change to the water table brings salts to the surface of the soil where they concentrate through evaporation or are discharged into surface waters. Salinisation is a term which refers to the process where quantities of these salts accumulate to cause deposits on the soil surface creating major damage to the environment.

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, and surface and underground drainage from this contributes natural salinity to the river. Human activities such as industry, mining, power generation and agriculture also impact the level of salinity in the Hunter River.

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 by the NSW Department of Land and Water Conservation, the Environment Protection Authority and with the cooperation of other interested organisations. This scheme is an initiative which aims to reduce the level of salt in the river through the management of discharge events from industry to periods of high flow to reduce the impact of saline water.

The scheme aims 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

There are no current management plan objectives, policies or goals.

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

Inappropriate land uses and management techniques can have a detrimental impact on land through the contamination from chemicals of increased nutrients in the soil. The need for environmental controls, have only relatively recently become apparent as more land uses change the realisation regarding the impact of industry and agriculture are considered.

The major concern relating to contaminated land is its 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 these sites.

The management of contaminated sites in NSW is shared by the Dept of Environment and Conservation and local councils. Those sites deemed to be significantly contaminated are

managed by the DEC, whilst those considered to be of less risk are managed by local councils under State Environmental Planning Policy 55 (SEPP 55). This Planning Policy requires Council to consider past land uses and their potential for contamination with all rezoning and development application assessments.

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

Through the increasing demand for land to accommodate the growing population, the social and economic cost of contamination is becoming apparent. Muswellbrook Council manages a number of sites each year through the rehabilitation / remediation process to provide specific parcels of land for redevelopment.

Considerations of potentially contaminating activities are assessed during the DA stage for potential environmental impacts and future land uses.

Table 3.2

Indicator: Number of Development Applications for potentially contaminating activities 2004/2005

Number of DA's for potentially contaminating activities 2004/2005

2

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

DCP 10: Determination of Rezoning and Development Applications involving Contaminated Land

A review of DCP 10 is proposed to be undertaken in the near future to ensure that legislative and management requirements are adequately addressed in Council's Plan. This document provides a comprehensive framework for the consideration and management of contaminated or potentially contaminated sites.

Contaminated Sites Register

Council has established a Contaminated Sites Register which identifies all sites throughout the Shire which may be potentially contaminated as a result of past 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)

Educational programs regarding the impact of industry and various land uses on the environment, in particular on soil, would assist in the reduction of contaminated land and the extent of rehabilitation works.

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 ongoing • HCCREMS programs – remnant vegetation mapping • Regional Subdivision DCP 	<ul style="list-style-type: none"> • Improve land management practices • Education programs for the community
<u>Soil erosion:</u>	<ul style="list-style-type: none"> • Erosion and Sediment Control Policy and Code of Practice 	<ul style="list-style-type: none"> • Improve land management practices • Education programs for the community
<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>Chemical contamination:</u>	<ul style="list-style-type: none"> • DCP 10: 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)
<u>The enhanced greenhouse effect:</u> State	<ul style="list-style-type: none"> Enhanced greenhouse effect – increased emissions of greenhouse gases
Pressure	<ul style="list-style-type: none"> Land clearing Burning of fossil fuels (to generate electricity, fuel for cars, buses etc) Waste decomposition
Response	<ul style="list-style-type: none"> Review of Council fleet Cities for Climate Protection Program and CCP Plus Program Implementation Muswellbrook Greenhouse Reduction Strategy Industry Cleaner Production Program Energy Audit of Administration Centre Draft regional DCP for Subdivision (incorporating solar access etc) Construction of bicycle / walkways NSW Government strategies
<u>Air quality:</u> State	<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
Pressure	<ul style="list-style-type: none"> Natural factors such as droughts and bushfires can cause particulate emissions Human factors such as the combustion of fuels, industry and agriculture
Response	<ul style="list-style-type: none"> Woodsmoke Reduction Program ANSTO Air Monitoring Program Protection of the Environment (Control of Burning) Regulation Industrial Site Monitoring
<u>Odour:</u> State	<ul style="list-style-type: none"> Odour complaints continuing to be lodged with Council
Pressure	<ul style="list-style-type: none"> Agricultural practices generating odours Industrial and commercial developments generating odours (such as sewerage treatment works, landfills, mines, chemical storage etc)
Response	<ul style="list-style-type: none"> Complaints Protocol Protection of the Environment Operations Act Local Government Act

4.2. The Enhanced Greenhouse Effect

Management Plan Goal: to conserve energy and reduce greenhouse gases; to reduce reliance on energy consumption

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

The Greenhouse Effect

The greenhouse effect involves light energy from the sun being reradiated from the earth's surface in the form of heat which is trapped in the lower atmosphere producing a blanket effect over the earth and maintaining the earth's surface temperature at a level which is necessary to support life.

Through the emission of gases from human activities, this natural greenhouse effect is increased to a level which causes potential environmental and climatic impacts. Human activities such as power generation, motor vehicles, industrial emissions, vegetation burning, agriculture and waste decomposition all emit gases which exacerbate the greenhouse effect. These greenhouse gases include water vapour, carbon dioxide (CO₂), methane (CH₄), ozone (O₃), nitrous oxide (N₂O) and halocarbons. The greenhouse gases absorb the reradiated heat within the lower atmosphere inhibiting the ability for the earth to remove any excess heat into the upper layers of the atmosphere, which creates a phenomenon known as global warming.

Impact on the Environment

The heating of the earth's atmosphere through the accumulation of greenhouse gases is thought to have a significant impact on climate and the environment. The effects of global warming are slowly becoming more apparent 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.

As the emissions of greenhouse gases continue to occur, the rate of global warming continues to increase thus limiting the ability for human society to rectify the damage brought about by the past.

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

The heavy reliance of modern society on the burning of fossil fuels and petroleum products contributes large quantities of emissions which enhance the greenhouse effect and global warming. Other human activities such as the clearing of large areas of vegetation, agriculture and industry also significantly impact the rate of atmospheric heating.

Section 2.4 describes the information regarding the quantity of energy resources used by Council (electricity, gas, fuels etc) and that used by the community of Muswellbrook (electricity), for the period of 2003/2004 and 2004/2005.

Indicator Total amount of greenhouse gases emitted (carbon dioxide equivalent), by Council operations (electricity, gas, fuel usage), 2004/2005

Total amount CO₂ equivalent emitted: 5387.6 tonnes

(Total includes emissions generated from electricity, gas and fuel usage - refer to Section 1.8 for specific information)

Indicator Total amount of greenhouse gases emitted (carbon dioxide equivalent), for the Muswellbrook Shire Community (electricity use only), 2004/2005

Total amount CO₂ equivalent emitted: 413731.5 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)

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 greenhouse effect and global warming. In summary, the programs being implemented include:

- Involvement of Council in the Cities for Climate Protection Program and progression to the CCP Plus Program
- The undertaking of an energy audit of the Council Administration Centre
- Alteration of some Council vehicles from six (6) cylinder to four (4) cylinder vehicles
- Purchase of a petrol/electric hybrid vehicle within Council's Fleet
- 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
- The adoption of the Muswellbrook Shire Greenhouse Reduction Strategy
- The implementation of the Industry Cleaner Production Program
- Revision of the Subdivision DCP to increase energy efficiency of developments

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

Section 2.4 indicates further activities that Council could undertake in the future to continue the objective of reducing and efficiently using energy resources. In summary these actions include:

- Implementation of BASIX on 1 July 2005
- Retrofitting of Council buildings
- Develop and implement educational programs
- Investigate solar installation opportunities
- Complete the revision of the subdivision DCP to include requirements for energy efficient design
- Continue to downsize council vehicle fleet / purchase energy efficient vehicles
- Continue to implement cycleway / walkway development

4.2. Air quality

Management Plan Goal: To reduce pollution levels

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

The pollutants of the air can include contaminants which occur naturally or those which are emitted through human activities. On occasions these pollutants can be released via a combination of both natural and human processes.

The most significant pollutants of air are gaseous emissions (predominantly produced through industrial and vehicle emissions) and particulate matter (caused by agriculture, industry, dust storms, combustion and land clearing).

Air Quality Monitoring Program

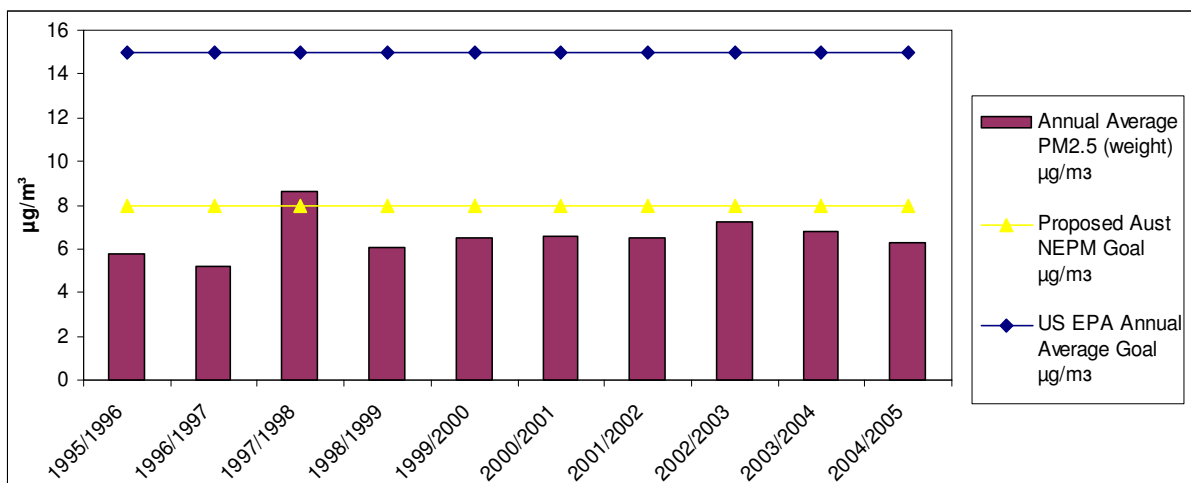
Council coordinates a PM_{2.5} air quality monitoring program in collaboration with the Australian Nuclear Science and Technology Organisation (ANSTO). The program has been in place since 1996 and tests particulate matter less than 2.5 micrograms in size for a 24 hour period twice weekly. The air sampling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

The program is designed to study the elemental composition of fine particles in the atmosphere. The total weight of particles and a breakdown of the main elements within the sample are conducted. 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 4.1 details the annual average PM_{2.5} sampled for the 2004/2005 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).

Figure 4.1:

Indicator: Particulate Matter (<2.5 µg/m³) Emissions, Muswellbrook Shire 1995 - 2005

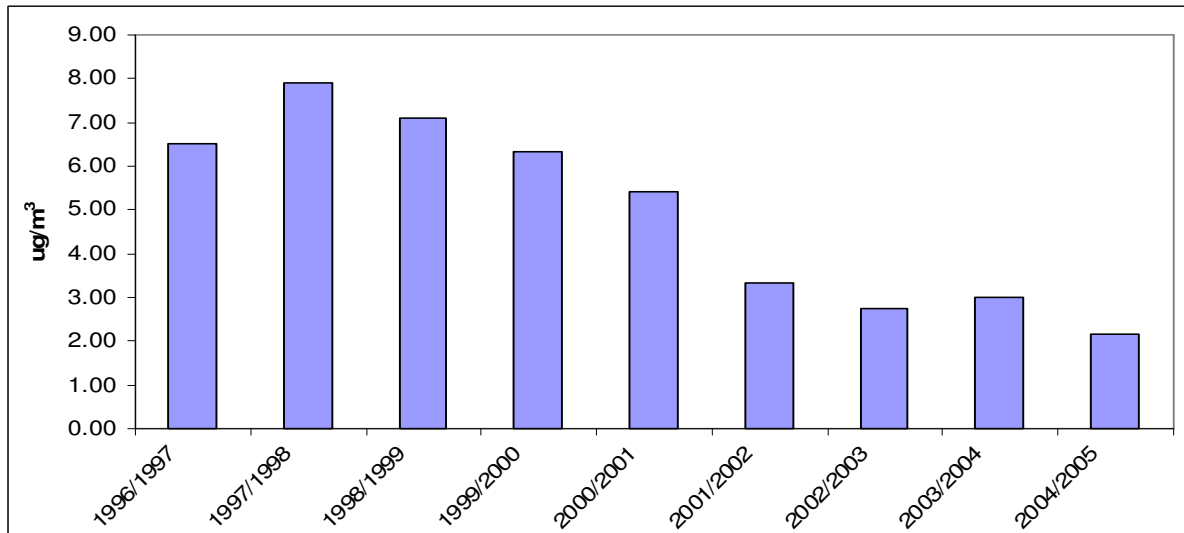


Note that the high levels of PM_{2.5} sampled in 1997/1998 are result of severe regional bushfires in late 1997.

Figure 4.2 details the results of the samples taken for the air sampling program regarding lead levels in the atmosphere. The results indicate a consistent decrease of lead levels within the atmosphere since 1996 to 2005. This is predominantly caused by the elimination of vehicle fuel containing lead.

Figure 4.2:

Indicator: Lead Emissions, Muswellbrook 1996 - 2005



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

The pollution of the Muswellbrook atmosphere is influenced by various natural and human induced factors. However the coal/ power and agriculture industries combined with motor vehicles are believed to be the largest consistent contributors to particulate matter in the air. The prolonged drought has further impacted the ability for fine particles of soil to enter the air increasing the impact of the coal industry and agriculture. As shown in Figure 4.1, bushfires can also have a significant impact on particulate matter through the emission of soot and ash particles, as indicated by the results for 1997/1998.

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

Woodsmoke Reduction Program

The woodsmoke reduction program was conducted during the 2004/2005 reporting period from June 2004 to September 2004. Though this information was reported in last SoE report for 2003/2004, the majority of the program was actually conducted during the current reporting period 1st July to 30th June 2005. Therefore the information has again been included as detailed below.

The Woodsmoke Reduction Program was a regional initiative developed by HCCREMS, which aimed to raise community awareness of the health and environmental impacts of poorly maintained and utilised home wood heaters. Educational material including brochures, magnets, posters and seedsticks were distributed to the community and regular inspections undertaken.

Regular inspections by Council officers were conducted during the program for approximately four (4) hours per week, which assessed smoke emissions from residences. 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.

A four step enforcement process was designed to reduce the number of excessively smoky chimneys in the region. Firstly, fliers were sent to households that were observed to have a smoky chimney for a period of at least 20 minutes. Then, follow-up surveys were conducted within a 2-4 week period to observe if the chimney was still smoking after a period of 20 minutes. Repeat smoky chimneys were sent a series of letters which contained more advice on how to reduce woodsmoke pollution, offered free site visits from Council staff and/or retailers to assess the problem wood heater/chimney and outlined penalties associated with continued pollution from the chimney. The final step of the enforcement process was to issue a Section 96 (POEO Act 1997) Prevention Notice.

The results of the program are detailed below in Table 4.1.

Table 4.1:

Indicator: Number of Smoky Chimneys surveys and found to be Smoking Excessively, Muswellbrook Shire

Number of smoky chimneys surveyed in total	Number of chimneys found to be excessively smoky (Education pack sent to resident)	Follow up letters sent (smoke found to be excessive on follow up surveys)
218	140	21

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 (Control of Burning) Regulation

Under the Protection of the Environment Operations (Control of Burning) Regulation, backyard burning is banned in urban areas throughout the Shire. Approvals can be obtained with conditions in place for the burning of material in rural areas. 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 to implement the Woodsmoke Reduction Program during the winter season in order to progress the education of the community regarding the impacts of woodsmoke. Funding of the program however is not provided for the next reporting period in 2005/2006.

4.4. Odour

There is no current management plan objective, policy or goals.

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

Offensive odour is a difficult factor to quantify and regulate due to the nature and variety of the receptors, which are human noses. Whilst Council has a role in the control of offensive odours, matters are normally pursued following the receipt of a complaint regarding offensive odour. The number of odour complaints received by Council for the 2004/2005 reporting period is detailed below.

Indicator: Number of Odour Complaints received by Council, 2004/2005

Number of Odour Complaints: 4

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

The emission of odours may be produced via many sources such as agricultural practices, industry, businesses, residences, vehicles and the sewerage. If activities are not adequately conducted and managed they may produce odour issues which have the potential to have a significant impact on the community.

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. The mechanism also enables Council to monitor the resolution of complaints between the complainant and the source of the noise.

Protection of the Environment Operations Act 1997

The POEO Act provides regulations for the management and prosecution of offensive odour emissions. 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)

Council (and other consent authorities) should implement strategic planning to ensure that future land use changes do not have the potential to generate odour impacts on communities (such as residential developments located adjacent to odour emanating developments).

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 • Industry Cleaner Production Program • Energy Audit of Administration Centre • Draft regional DCP for Subdivision (incorporating solar access etc) • Construction of bicycle / walkways • NSW Government strategies 	<ul style="list-style-type: none"> • Implement BASIX on 1 July 2005 • Investigate retrofitting of council buildings • Develop and implement educational programs • Investigate solar installation opportunities • Continue to review the Council vehicle fleet • 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 (Control of Burning) 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 and other agencies should ensure future land use changes do not generate odour impacts

5. Water

5.1. At a glance

Issue	Summary (status)
<p>Freshwater ecosystem health</p> <p>State</p>	<ul style="list-style-type: none"> • Freshwater ecosystems in a degraded state • Floodplain vegetation cleared • Streamflow affected due to regulation of the Hunter River • Increase demand for water • Salt, nutrients and bacteria entering river systems in runoff events • Groundwater levels rising • Algal blooms occurring
<p>Pressure</p>	<ul style="list-style-type: none"> • Land use impacts from agriculture, clearing of native vegetation, runoff of sediments, on site sewerage management systems • Urban impacts – increasing urbanisation, stormwater containing pollutants
<p>Response</p>	<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 • Upper Hunter Water Quality Working Group
<p><u>Surface water extraction / water consumption:</u></p> <p>State</p>	<ul style="list-style-type: none"> • Increase demand for water resources – rate of extraction not sustainable • Modified flow patterns – regulation of the river
<p>Pressure</p>	<ul style="list-style-type: none"> • Agricultural demand for irrigation • Potable water demand in urban areas • Industrial demand for water for industrial processes
<p>Response</p>	<ul style="list-style-type: none"> • Effluent Reuse Scheme • Water Campaign (water efficiency measures) • HCCREMS programs • Sustainability Committee
<p><u>Groundwater issues:</u></p> <p>State</p>	<ul style="list-style-type: none"> • Increasing use of groundwater resources • 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
<p>Pressure</p>	<ul style="list-style-type: none"> • Climatic variations • Limited surface waters • 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
<p>Response</p>	<ul style="list-style-type: none"> • Water Management Act

5.2. Freshwater ecosystem health

Management Plan Goal: Reduce pollution levels; reduce nutrient levels and sediment entering major rivers and streams; maintain rivercare strategies for the Hunter and Goulburn River systems; Identify impacts of Hunter River and Goulburn River systems in the Shire; reduce pollution by application of DCP 9 (Sediment and Erosion Control) and DCP 6 (Flood Prone Land).

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

Water resources are impacted by a range of natural factors such as climate, vegetation, geology, groundwater, run off and precipitation. As human civilisation relies so heavily on water resources the quality and quantity of water is of significant concern.

The affects of human activities such as agriculture, industry, production, development, settlement and recreation are major contributors to poor water quality. If managed inadequately these activities can have a significant influence on water resources creating negative impacts on the terrestrial environment, economy and society

Table 5.1

Indicator: Water Quality Guidelines and Mean Results of Water Sampling, Muswellbrook Shire 1st July 2004 to 30th June 2005

Site	Turbidity (ntu)	Salinity (Electrical conductivity) (µs/cm)	Faecal Coliforms	pH
Muswellbrook Bridge (Upstream)	12.5	355.6	849.1	8.4
Ford Street Pump Station	11.7	354.7	527.9	8.4
Hunter River between Muswellbrook & Denman	27.6	396.4	150.9	8.3
Denman Pump Station	24.9	435.6	341.0	8.4
Muscle Creek	13.3	1654.7	320.8	7.7
Hunter River – Aberdeen Golf Course	14.0	292.2	380.1	8.5
Hunter River – Broad Crossing Aberdeen	16.2	351.8	127.6	8.5

Water Quality Guidelines (ANZECC/ARMCANZ)

Parameter	Good	Moderate	Fair	Poor
Turbidity (ntu)	< 5	5 - 25	25 - 50	> 50
Salinity (µs/cm)	< 280	280 - 800	800 - 1500	> 1500
Faecal coliforms (cfu/100ml)	Less than 150	n/a	150 - 1000	> 1000

As detailed in Table 5.1, the water sampling results indicate that the samples are described as 'moderate' in regards to the compliance with the Water Quality Guidelines. Some samples however are within the 'fair' to 'poor' categories, in particular the results for faecal coliforms.

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

Landuse Impacts

Poor water quality results can be caused through a range of factors regarding various land uses 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
- 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 infiltrated the ground.
- 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.
- 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.

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 address freshwater ecosystem health. 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. 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 have resulted in 100% of 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 and prevents treated effluent from being discharged under licence into the Hunter River.

Auditing Program for On Site Sewerage Management Systems

Council currently has 1181 septic systems registered throughout the Shire as a result of the 1999 registration program. The total number of systems within the Shire is estimated at 1330, however some systems have not yet been identified and registered. This estimated total includes septic systems which have been approved and installed since the registration process conducted in 1999. Of the 1181 registered systems, 1153 systems have already been inspected by Council Officers in regards to their compliance and maintenance. The following table indicates the number of systems which have been registered and inspected to date.

Table 5.2

Indicator: Registered and Inspected On Site Sewerage Management Systems

System Type	Number Compliant	Number Non-Compliant
ATWS	221	19
Septic	682	151
Modified Septic	18	2
Decommissioned	60	0
Compliance status	981	172

During the reporting period a total of 37 systems were approved and installed, which are detailed in Table 5.3 below.

Table 5.3

Indicator: Wastewater system installation and operation applications 2004/2005

System Type	Number
ATWS	27
Septic	10
Waterless Composting Toilets	0
Compliance status	37

Trade Waste Approvals

Council continues to undertake an approval process for the issuing of Trade Waste Permits in accordance with DCP 14. The issuing of permits ensures that wastewater 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.

Indicator: Number of Trade Waste Approvals 2004/2005

Number of trade waste approvals: 120

Upper Hunter River Rehabilitation Initiative

The Upper Hunter River Rehabilitation Initiative is a joint scheme 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 UHRRRI are to experimentally rehabilitate an 8 kilometre stretch of the upper Hunter

River near Muswellbrook (downstream of Keys Bridge) which involves 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 salinity from industrial sources in the Hunter River is managed via a program to avoid discharges of saline water during periods of low flow. Section 3.4 details further information regarding the scheme.

Upper Hunter Water Quality Working Group

The Upper Hunter Water Quality Working Group (UHWQWG) has recently been established in association with Upper Hunter Shire Council to conduct investigations and programs relevant to the quality of water in the Hunter River. The group is currently collating data and assessing the options available for various projects to address the issue of water quality.

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

Revegetation and Rehabilitation Programs

Continued efforts in achieving 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 extent and health of the riparian vegetation and bank stability of the Hunter River and tributaries.

5.3. Surface water extraction and water consumption

Management Plan Goal: To provide environmentally sustainable Water and Sewerage services that: are customer oriented; meet present and future needs; are efficient and cost-effective; and follow best practice management.

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

The extraction and consumption of surface waters creates a significant impact on the quality and availability of resources in natural water courses. The over consumption of water resources has become a major environmental issue in today's society with reduced levels of available water and heavy restrictions imposed on its use. With much of the state in drought conditions and dam levels drastically low the issue of water use is of considerable concern.

Through the high extraction rates of surface waters, changes have occurred to natural flow patterns such as river diversions and restriction of flows. This alteration to flow patterns can have a significant effect to aquatic environments such as creeks, rivers, wetlands and coastal regions which rely on the natural wetting and drying cycles of natural water flows.

The affects of highly modified or regulated flows include:

- degraded water quality
- reduced aquatic habitat
- reduced natural flooding of riparian zones and floodplains
- increase in algal blooms
- erosion of river channels
- degradation of wetland and marsh areas

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

Basically the main contributor to the over consumption of water is caused by a high demand by the growing population. As the population increases the demand for water is further impacted as many land uses rely on water use such as urban developments, agriculture, industry and production.

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 include:

- Effluent Reuse Scheme
- Water Campaign (water efficiency measures)
- HCCREMS Programs
- Sustainability Committee to assist in water sustainability measures

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:

- Implementation of BASIX on 1 July 2005
- Water Campaign – set reduction goals and develop and implement Water Reduction Strategy
- Implementation of educational programs
- Completion of the Integrated Water Cycle Management Plan to manage water resources
- Plans incorporating Water Sensitive Urban Design
- Investigate incentive schemes for water efficiency

5.4. Groundwater issues

There is no current management plan objective, policy or goals.

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

Groundwater supplies water to many natural systems such as rivers, lakes, wetlands and creeks. If groundwater is tapped and over utilised it may have a significant detrimental impact on the availability and quality of water to these ecosystems. Groundwater is affected by a

range of natural factors such as climate, vegetation, geology, topography and precipitation; and human activities such as extraction of soil, clearing of vegetation, extraction of water via bores, development and contamination.

Approximately 11% of the water used in NSW for drinking, irrigation, watering stock and domestic and industrial purposes comes from groundwater sources. Many towns throughout the state, including Denman and Sandy Hollow, use groundwater as their main water supply. This use of groundwater is expected to increase because most of their State's surface water resources are already fully committed.

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

As detailed above, the most significant impacts on groundwater resources are essentially caused by the availability and contamination of groundwater produced through the following factors:

- Climatic variations – during drought periods, the lack of surface water results in increased groundwater use
- Limited surface waters in some areas, resulting in the need to extract groundwater for sufficient supplies
- Increased demand on surface water and the allocation of available resources results in pressures for the use of 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 on site 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 who regulates 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

The over consumption of water needs to be addressed, as the human population continues to grow further pressures will be imposed on the existing over utilised resources. Various programs, incentives and education should be undertaken to promote sustainable resource management and the need for natural ecosystems to be included in the allocation of water.

BASIX

Through the introduction of the BASIX program, new developments are required to include water saving methods through design and devices used to achieve the requirement of the water efficiency target of 40%. This program promotes the possible implementation of drought tolerant landscaping, rainwater tanks and water efficient devices, which would make considerable savings in the demand for water resources.

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 riverine 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 • Upper Hunter Water Quality Working Group 	<ul style="list-style-type: none"> • Revegetation / Rehabilitation Program
Surface water extraction:	<ul style="list-style-type: none"> • Effluent Reuse Scheme • Water Campaign (water efficiency measures) • HCCREMS Programs 	<ul style="list-style-type: none"> • Implementation of BASIX on 1 July 2005 • Water Campaign – progress through Milestones • Implementation of educational programs • Investigate incentive schemes for water efficiency • IWCM and WSUD
Groundwater issues:	<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><u>Terrestrial and aquatic ecosystems</u> State</p>	<ul style="list-style-type: none"> • Threatened species listed in the Muswellbrook Shire under the Threatened Species Conservation Act
<p>Pressure</p>	<ul style="list-style-type: none"> • Key threatening processes • Land use changes • Clearing native vegetation • Urbanisation and encroachment • Inappropriate zoning • Fire management practices • Altered hydrology • Pollution • Salinity
<p>Response</p>	<ul style="list-style-type: none"> • Establishment of reserves and National Parks • Voluntary conservation agreements • Biodiversity Planning Guide for Local Government • Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation • HCCREMS Programs

6.2. Terrestrial and aquatic ecosystems (including native vegetation communities)

Management Plan Goal: Maintain wildlife corridors and principles identified in the Upper Hunter Synopsis Plan; Promote wildlife corridors between remnant vegetation.

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

A program of remnant vegetation mapping has been undertaken by the Hunter Central Rivers Catchment Management Authority through the Hunter Remnant Vegetation Project. This project involved a study area within the Hunter Valley of 315,000 ha being surveyed via 1:25,000 aerial photography, which assessed the vegetation structure of pre-European vegetation communities. Through the project approximately 60,700 ha of remnant vegetation was mapped. The largest community of remnant vegetation included in the study area was located near Denman of approximately 2,251 ha.

Interpretations were made regarding remnant vegetation within the Hunter area based on the study. The study found that clearing works have focussed predominantly on the river and tributaries flood plain with the majority of remnant vegetation found in National Parks, State Forests and military bases. Also a high diversity of vegetation was found within the area exhibiting very few connecting corridors, though opportunities exist for the establishment of corridors to connect vegetation fragments.

Indicator: National Parks, Nature Reserves, State Conservation Area in the Muswellbrook Shire	
Total Area of Wollemi National Park:	5264.23 km ²
Total Area of Manobalai Nature Reserve:	31.34 km ²
No State Conservation Areas in the Muswellbrook Shire	

The number of species listed on the NSW Wildlife Atlas for the Muswellbrook Shire, are detailed in Table 6.1.

Table 6.1

Indicator: Flora and Fauna species, Muswellbrook Shire under the NSW State Legislation (Wildlife Atlas Records)

Classification	Number of species
FLORA	
• Endangered (E1) (Endangered - TSC Act)	3
• Endangered (E2) (Endangered - TSC Act)	1
• Vulnerable (V) (Vulnerable - TSC Act)	12
• Protected Plants (P13) (Protected - NPW Act)	9
• Unprotected (U)	540
Total Number of Species recorded	565
FAUNA	
• Endangered (E1) (Endangered - TSC Act)	4
• Endangered (E4) (Presumed Extinct - TSC Act)	0
• Vulnerable (V) (Vulnerable - TSC Act)	31
• Protected (P) (Protected - NPW Act)	307
• Unprotected (U)	20
Total Number of Species recorded	362

Weeds

The maintenance of native species and biodiversity can be managed through the removal of introduced species which compete with the endemic vegetation. Weed management and removal is conducted in the Shire by a Regional Weeds Program which receive funding from Upper Hunter Councils and the Department of Agriculture. This program aims for a regional perspective on the management of weeds and an overall approach to weed removal.

During the reporting period the Upper Hunter Weeds Authority conducted weed eradication programs as detailed in Table 6.2.

Table 6.2

Indicator: Upper Hunter Weeds Authority projects within the Upper Hunter Region 2004/2005

Regional Management Plans	Weeds Treated	Herbicides used
Giant Parramatta Grass	Blackberry	Grazon
Green Cestrum	Johnsons Grass	Roundup
Water Hyacinth	Mother of Millions	Garlon
Alligator Weed	St Johns Wort	
Silver Leaf Nightshade		
Mother of Millions		
Total Area Treated for all weed eradication projects		3045 sq/m

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

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

- Key threatening processes (as detailed in Section 8 of the Threatened Species Conservation Act, including- alteration of flow regimes; anthropogenic climate change; habitat removal; native vegetation clearing; competition and predation by introduced species; frequency of fires; infection by diseases)
- Inappropriate zoning
- Land use changes (resulting in land disturbance)
- Urbanisation and encroachment
- Altered hydrology
- Pollution
- Salinity

Approvals for the clearing of land are provided by DIPNR under the Native Vegetation Act 1997. The area of native vegetation approved for clearing during the reporting period is detailed below.

Indicator: Native Vegetation Clearing (ha), 2004/2005

Area approved for clearing under the Native Vegetation Act 1997: 240.57 ha

Note that the clearing approved under the Native Vegetation Act does not include riparian vegetation

Fire and hazard reduction activities also has a considerable impact on vegetation and biodiversity.

Indicator: Hazard Reduction Activity and Fire Ban Restrictions for Muswellbrook Shire, 2004/2005

Area of Hazard Reduction Activity conducted by all agencies:	1374.2 ha
Number days Total Fire Ban for Greater Hunter Fire Weather Area:	6
Number of incidents requiring response by Rural Fire Service:	33

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

There have been a range of responses to threats to biodiversity. These include:

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. Within the Muswellbrook Shire, Wollemi 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.

Biodiversity Planning Guide for NSW Local Government

The Guide assists councils in the development and implementation of Biodiversity Conservation Management Plans to manage the processes of planning and development. The guide demonstrates how councils can conserve biodiversity through their existing regulatory and operational functions.

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. A major vegetation mapping program has been undertaken throughout 2004 – 2005 with the following objectives for regional and sub-regional scale map outputs:

Hunter-Central Rivers Catchment Wide Vegetation Mapping:

- Vegetation Cover
- Vegetation Structure
- Vegetation Condition
- Systematic Vegetation Surveys in priority areas

Sub-regional Vegetation Mapping in the Central Coast

- Pre-1750 Vegetation Communities
- Extant Vegetation Communities at 1:16,000 Scale
- Regional Significant Vegetation

Activities and Outputs

Project Administration and Coordination

- Project Coordinator and GIS Analyst employed to coordinate work program.
- A Steering Committee/Reference Group and Expert Panels were convened and have assisted in the development of the project.

Surveys and Analysis

- Data collation of environmental and biological datasets has been completed for the 14 Council areas. Datasets include vegetation plot data, climate variables, geology, administrative boundaries, infrastructure etc.
- Using this data, a gap analysis/data audit was undertaken to identify those environments not well sampled by the 6,000 existing vegetation survey sites in the region. (These sites are the combined total from 79 different surveys.)
- Poorly sampled environments were targeted for additional systematic vegetation surveys across all tenures throughout the Hunter.
- HCCREMS successfully undertook private landholder liaison to assist the survey effort with significant support from the member Councils.
- Based on the survey priorities, five botanical survey teams were engaged to complete a total of 315 systematic sites throughout the region. Almost 250 of these surveys have been completed, with the remainder due by August 2005.
- Collaboration is occurring with Councils who have also scheduled local vegetation surveys to ensure complimentary efforts and compatibility in methods and approaches. This will lead to cost efficiencies for all parties.

Satellite Image Pilot Study

- The Project team proposed to use SPOT 5 satellite imagery and this was endorsed by an independent expert panel. To validate this methodology, a Pilot Study in the Central Coast was designed. The pilot tests the ability of satellite imagery – in comparison to Air Photo interpretation - to capture floristic variability which may not be accurately represented by vegetation modelling.
- The methodology for the Pilot Study was agreed to by Reference Group and Expert Panel.
- Aerial Photo Interpretation (API) mapping is almost complete for target areas mapped at 1:16,000 scale and satellite imagery analysis is underway.
- Rapid Assessment field survey work is being carried out for validation purposes.

Catchment Wide Vegetation Mapping and Validation

- SPOT5 satellite imagery has been acquired for the study area.
- Preliminary classification of this imagery is being undertaken to stratify the landscape into formation level vegetation units. These units will be targeted by rapid surveys to assist the final classification in discerning vegetation cover and formation.
- Vegetation condition assessment is underway

The Mapping Projects will be completed by the end of December 2005.

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

The completion of a Tree Preservation Plan and a Biodiversity Plan (developed as per the Guide detailed above) should be undertaken to manage the issue of vegetation and biodiversity preservation within the Shire.

Regional Biodiversity Mapping

The Hunter – Central Coast Regional Environmental Management Strategy (HCCREMS) has gained funding in the order of \$674,000 for a Biodiversity Mapping Project for the Hunter Region. This project is currently ongoing with vegetation mapping completed.

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

Responses	Action to date	New action for Council's consideration
<u>Terrestrial and aquatic ecosystems (including native vegetation communities)</u>	<ul style="list-style-type: none"> • Establishment of reserves and National Parks • Voluntary conservation agreements • Biodiversity Planning Guide for Local Government • Synoptic Plan – Integrated Landscapes for Mine site Rehabilitation • HCCREMS Programs 	<ul style="list-style-type: none"> • Completion of the Regional Biodiversity Mapping project –by HCCREMS • Completion of a Tree Preservation Plan and Biodiversity Conservation Management Plan • Continue to explore the possibilities of voluntary conservation agreements in the Shire

7. Heritage

7.1. At a glance

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

7.2. Aboriginal heritage

Management Plan Goal: Promote and support cultural activities within the Shire; the provision of appropriate heritage advice consideration of projects and applications.

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

Aboriginal heritage refers to the sites and relics discovered which have cultural heritage significance to the Aboriginal population. The association that the Aboriginal people have with the landscape also makes many landforms and pieces of land culturally significant in terms of Aboriginal heritage. As the number of new developments approved increases in areas which have not been previously cleared and developed, more relics and sites are uncovered, that may have Aboriginal heritage significance.

The number of development applications which may have an impact on Aboriginal Heritage is listed below.

Indicator:	Number of approvals that impact on Aboriginal Heritage sites
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Approvals:	4
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2. Why is it happening? (Driving forces, pressure)

The loss of sites and relics which have heritage value can be caused by factors such as the increasing population, the spread of urban development, landuse changes, inappropriate land use, industrial development and changes to water flow regimes.

Apart from investigations undertaken in 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 impact assessment for large developments within the Shire. Those reported to the NPWS are listed in an information database as detailed below.

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 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 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 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 aboriginal object.

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

Further investigations into the location of sites and relics of Aboriginal heritage 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: Promote and support cultural activities within the Shire; the provision of appropriate heritage advice consideration of projects and applications.

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

Muswellbrook has had an extensive history of European history which has left several sites of heritage significance. The conservation of heritage items in the Muswellbrook Shire is essential in order to preserve the history of the region.

The number of development approvals which may impact on non- Aboriginal heritage sites are detailed below.

Number of approvals during 2004/2005 which may impact on non- Aboriginal Heritage sites

Number of approvals during the 2004/ 2005 reporting period	4
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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 is 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 Heritage Local Environmental Plan and a Heritage Development Control Plan with the assistance of the Heritage Office, Council's Heritage Advisor and Council's Heritage Committee (which incorporates Councillors, staff and members of the Muswellbrook Historical Society). To form the basis of the draft LEP amendment and draft DCP a detailed heritage study 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 has been completed.

Progress to date since Council resolved to undertake the draft LEP amendment has included the preparation of the document, followed by adoption by the Heritage Committee and sign off by Parliamentary Counsel.

Heritage Study Implementation

In terms of the above, Council uses the Hunter REP 1989 and Section 79(c) for assessment purposes under the Environmental Planning and Assessment Act, 1979. 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.

Any developments where heritage matters are apparent but the site is not listed in the Study, those matters 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 Urban Affairs and Planning.

Engagement of a Heritage Advisor

Council continues to engage a Heritage Advisor who visits Muswellbrook Shire once every two months to advise on matters to do with the drafting of the Heritage amendment to the Muswellbrook LEP 1985 and 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• Section 90 consent to destroy required to destroy aboriginal sites / relics	<ul style="list-style-type: none">• Further research 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• Heritage Study Implementation• Engagement of Heritage Advisor	<ul style="list-style-type: none">• Further research be undertaken where possible by relevant stakeholders into the heritage values of identified heritage items