

Muswellbrook Shire
Council

*State of the Environment
Report*

2003/2004

The threatened *Diuris tricolor*,
Woodlands Ridge, Muswellbrook
Photo Taken: 30th September 2004



Muswellbrook Shire Council

State of the Environment Report

2003/2004

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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Table of Contents

1. Towards Sustainability	4
1.1. Introduction	4
1.2. Key determinants	7
1.3. Implementing ESD	10
1.4. Future directions in environmental reporting	19
2. Human Settlements	20
2.1. At a glance	20
2.2. Population & settlement patterns	22
2.3. Drinking water quality and consumption	30
2.4. Energy	35
2.5. Transport	40
2.6. Waste Management	44
2.7. Tranquillity and noise	50
2.8. Community Lands	54
3. Land	59
3.1. At a glance	59
3.2. Land-use changes	60
3.3. Soil erosion	63
3.4. Induced soil salinity (including sodic soils)	65
3.5. Contaminated land	68
4. Atmosphere (air)	72
4.1. At a glance	72
4.2. The Enhanced Greenhouse Effect	73
4.3. Air quality	76
4.4. Odour	81
5. Water	84
5.1. At a glance	84
5.2. Freshwater ecosystem health	86
5.3. Surface water extraction and water consumption	91
5.4. Groundwater issues	93
6. Biodiversity	96
6.1. At a glance	96
6.2. Terrestrial and aquatic ecosystems (including native vegetation communities)	97
7. Heritage	104
7.1. At a glance	104
7.2. Aboriginal heritage	105
7.3. Non-Aboriginal heritage	108

Towards Sustainability

Management Plan Goal: To develop an environmentally sustainable community

1.1. Introduction

The issue: What is sustainability?

Sustainability is a framework for integrating economic, social and environmental decision making into natural resource management. It reflects broad agreement that people living today have an obligation to protect the health, diversity and productivity of the environment for the benefit of current and future generations.

In 1992, Australia adopted sustainability goals and objectives through the National Strategy for Ecologically Sustainable Development. The core objectives of the Strategy are:

- To ensure a path of economic wellbeing that safeguards the welfare of future generations
- To enhance the individual and community wellbeing within and between generations
- To conserve and protect biological diversity and essential ecological processes and life support systems

Local government is playing a significant role in the integration of sustainability within the community. This is mainly being done through the strategic planning and development process – by making development economically, socially and environmentally sustainable (for example water sensitive urban design, energy efficient housing etc). Further to this, future requirements of the NSW State Government will ensure the implementation of sustainable development in a consistent and comparable manner (through the Building Sustainability Index (BASIX) requirements soon to be mandatory throughout the state) (refer to Section 1.6 for more information). This integration of sustainable measures into existing planning and development networks is continuing to occur as planners, decision makers and individuals move towards sustainability.

Monitoring progress toward ESD

As important as it is to implement sustainability into our everyday decision making, it is just as important to monitor the effectiveness of these actions in achieving sustainable outcomes – ‘that there is capacity to create tangible changes of benefit to the environment and reduce the risk to the environment posed by some forms of development and human activity’ (EPA, 2000).

State of the Environment (SoE) Reporting is a monitoring and reporting tool that can assist in environmental decision making through the presentation of available data and its monitoring and assessment of progress of particular actions or outcomes to achieve 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

The structure and content of SoE reporting in NSW focuses on the condition of natural systems (ie the state of the natural system), the pressures that are acting on them through human activities, and the efforts (or response) under way to minimise the impacts of such pressures. Through this Pressure – State – Response model, (a statutory requirement under the Local Government Act), 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.

One of the inherent difficulties with State of the Environment reporting is the broad range of indicators being used, their relevance to assessing the state of a particular issue and the ability to derive trends within LGA boundaries and also regionally and statewide. "Indicators are recognised as an essential tool for monitoring and reporting changes over time and across different spatial settings" (EPA, 2000). However, many of the indicators previously used in SoE reporting were used on an individual, case by case basis and thus comparisons across geographic areas was not achievable. As the EPA has previously stated "the diverse range of data and data sources continues to reveal gaps that limit the ability of SoE reporting to influence environmental policy decision making. These limitations are often due to a lack of consistent and comparable methodologies and data sets, and to the nature of the monitoring, which is more often than not carried out for purposes other than SoE reporting" (EPA, 2000).

Efforts to reduce the difficulties described above have been made over a number of years in the Hunter Region. In 2000, the Pathways to Sustainability Project developed 16 regional indicators for sustainability for the Hunter Region. The indicators were developed to provide a picture of trends towards or away from sustainability.

Further to this, the Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS) received funding through the Natural Heritage Trust to produce a regional template for SoE reporting to ensure regional consistency in indicators used and the format of the SoE reports throughout the Hunter Region. This template was finalised in 2003 and has common indicators for use throughout the region. The template is now being used for the first time throughout the Hunter and Central Coast LGA's.

Approach taken with this SoE report

This SoE Report (2003/2004) provides an assessment of the state of the Muswellbrook Shire environment for the 2003/2004 period in accordance with the statutory requirements of the Local Government Act 1993.

This SoE Report has been developed based on the regional template and indicators developed through the LHCCREMS SoE regional reporting process.

1.2. Key determinants

There are a number of key determinants that influence environmental change. The main determinants are the physical environment (eg climate change), and human induced changes (eg population growth). These determinants can both negatively and positively influence economic, social and environmental factors.

The physical environment

“Climate influences almost every aspect of human and ecosystem health and wellbeing. It affects water availability, plant production, biodiversity, agriculture, forestry, energy requirements (space heating and cooling), human health and the economy. The variability of the NSW climate can act as a pressure on the state of the environment, can mitigate or exacerbate human impacts, and has implications for long term, sustainable environmental and resource management” (EPA, 2000).

Climate trends

Australia’s climate is highly variable due to the El Niño – Southern Oscillation. Due to this variability, it is difficult to discern clear climate changes that are occurring, however, trends globally and throughout Australia show marginal increases in temperature and rainfall extremes. A study of climate change scenarios for NSW carried out by the CSIRO Division of Atmospheric Research concluded that by 2050:

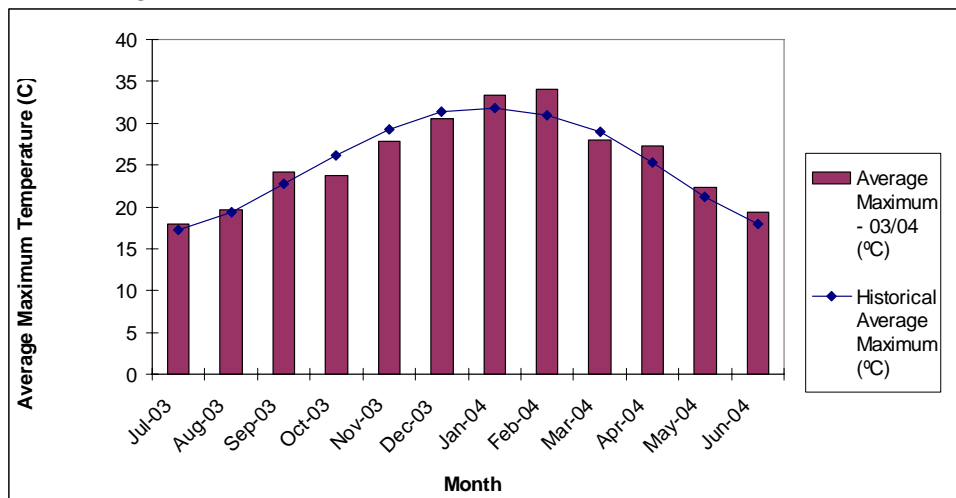
- Temperatures are likely to increase by 0.5 – 2.7°C
- NSW will experience seasonally wetter and drier conditions overall,
- The number of extreme weather events is likely to increase by about half in some areas of the state (EPA, 2000)

The climate of Muswellbrook and the Upper Hunter is characterised by warm dry summers and cool dry winters. In summer, the weather in the Muswellbrook region is dominated by synoptic high pressure systems which alternate with low pressure systems – ‘southerly busters’ ever 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.

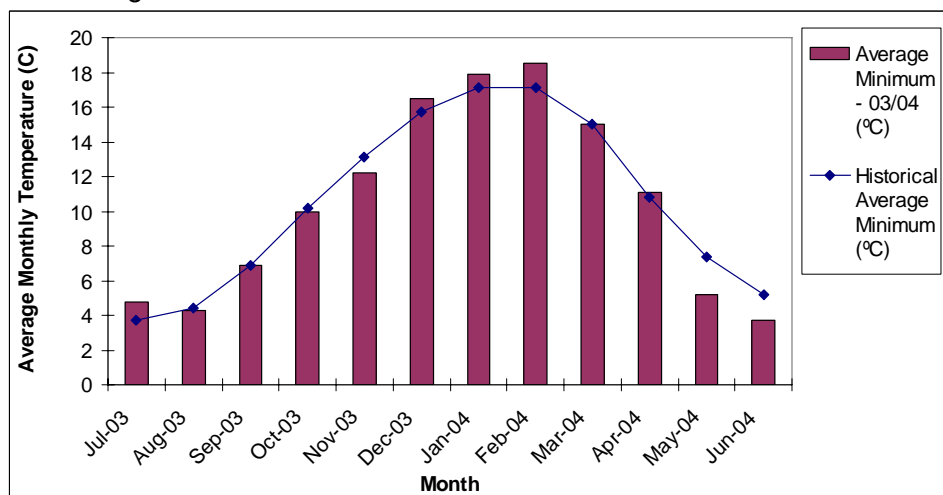
Temperature and rainfall data at Jerry’s Plains for the 2003/2004 period are detailed in Figures 1.1, 1.2 and 1.3. Trends for the period, when compared to the historical data indicate that for many months of the year both maximum and minimum temperatures were higher than the historical averages. Rainfall events were unpredictable, showing little correlation to historical data, rather resulting in large rainfall events in short periods of time, and many months of below average rainfall.

Figure 1.1: Average Maximum Monthly Temperature for 2003/2004 compared with historical averages



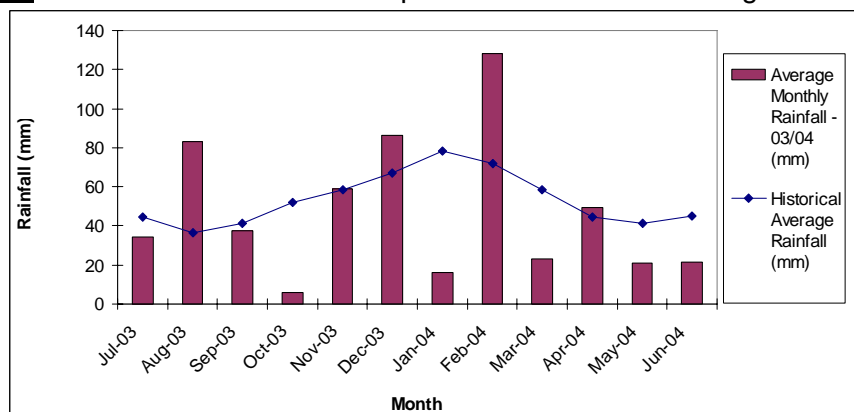
Source: Bureau of Meteorology, 2004

Figure 1.2: Average Minimum Monthly Temperature for 2003/2004 compared with historical averages



Source: Bureau of Meteorology, 2004

Figure 1.3: Rainfall for 2003/2004 compared with historical averages



Source: Bureau of Meteorology, 2004

The human environment - population & resource consumption

Population growth places additional pressure on the natural environment through the consumption of natural resources, the generation of waste products and other inputs capable of degrading the quality of the soil, water and air.

The population of the Muswellbrook Shire according to the 2001 Census was 14,796. Compared with 1996 Census data, the population in the Shire experienced a decline. 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 the population growth through emigration.

NSW residents and the Australian population as a whole are comparatively high consumers of resources and producers of waste. Estimates indicate that 20 – 25% of the world's population in industrialised or developed nations (including Australia), are responsible for consuming more than 80% of the planets resources on an annual basis (EPA, 2000).

There is increasing recognition of the limits or thresholds for renewable resources. Within NSW, water resources are allocated beyond the capacity or yield of surface waters and aquifers. Soil loss through erosion has occurred at the highest known rates, biodiversity has declined as plants and animals become threatened, endangered and extinct.

Economic profile and economic development

Muswellbrook enjoys a rich diversity of rural industries including viticulture, dairying, olive growing, horse breeding and award winning wine making industries. Over the last twenty years the region has developed into a major industrial area with the increase in coal mining activities and associated support industries.

The Muswellbrook Shire is currently experiencing strong economic growth from both commercial / industrial sectors and residential subdivisions. This has been bought about through the development of the Mt Arthur North open cut mine, extensions to the Muswellbrook No. 1 Open Cut, Drayton Coal mine extensions, Liddell Coal Mine extensions, and approval for the construction and operation of the Mt Pleasant mine. Residential subdivision growth has been strong in the townships of Muswellbrook and Denman, evidenced by the Calool Heights subdivision (all lots sold), the Calgaroo subdivision (currently being constructed), Eastbrook Links Estate (currently being constructed), the proposed North Muswellbrook residential development, Catholic Church subdivision, Denman North subdivision and the Woodlands Ridge Rural residential development.

1.3. Implementing ESD

A range of stakeholders, including all levels of government, organisations, community groups and industry have been implementing sustainability measures.

Muswellbrook Council's Role

Muswellbrook Council has been working towards achieving a sustainable community. Effective partnerships between Council, the NSW government, the community and industry have been developed to move towards a sustainable society. Such partnerships include funding from government agencies for Council to implement specific projects and programs, working relationships with industry to implement environmental restoration and rehabilitation research projects, and community education and support programs to assist and help the local community.

Not only does Council have an active role in implementing specific on the ground actions such as rehabilitation and revegetation projects, Council also has a significant role in:

- Strategic environmental planning – through planning tools such as the LEP, Development Control Plans and environmental strategies
- Enforcement of environmental legislation, including the Local Government Act, Protection of the Environment Operations Act and the Environmental Planning and Assessment Act
- Implementation of sustainability initiatives

During the 2003/2004 period, Council has continued to seek out 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 Grants Awarded, Muswellbrook Shire 2003/2004 (including regional environmental funding)

Group / Individual	Project Description	Amount Received
Council	Community Sustainability Education Program – Industry Cleaner Production	\$20,000
HCCREMS (Regional Project)	Woodsmoke Reduction Program	\$80,000
HCCREMS (Regional Project)	Biodiversity Mapping Project	\$674,000
HCCREMS (Regional Project)	Roadside Environmental Strategy	\$3,000
UHRRI	UHRRI Project Implementation	~ \$1.77 Million*
Landcare	A range of projects by Landcare groups in the Muswellbrook Shire	\$55,000

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

Council has an important regulatory role in relation to environmental matters. Council officers have authorisations to issue penalty infringement notices, clean up and prevention notices to those not complying with the requirements of the Protection of the Environment Operations Act. Such non-compliance may be in relation to water pollution, illegal waste disposal or transport, air pollution and noise pollution to name a few.

During 2003/2004, Council's authorised officers undertook a warning and educational approach to minor offences against the Act. Therefore no notices or infringement notices were issued.

Indicator: Number of Penalty Infringement Notices issued in relation to the Protection of the Environment Operations Act, 2003/2004
Number issued 2003/2004: 0

Indicator: Number of Clean Up and Prevention Notices issued in relation to the Protection of the Environment Operations Act, 2003/2004
Number issued 2003/2004: 0

The Environmental Impact of Council Activities

Muswellbrook Shire Council provides a range of services to residents of the Muswellbrook Shire. Such services include roads, drainage, water, sewer, parks and gardens and waste collection and disposal to name a few. The provision of these services has the potential to have an impact on the environment and social amenity. As an administrator and regulator, Council also uses resources in the carrying out of administrative and regulatory functions.

Resources used by Council in carrying out its functions include energy (including electricity, fuels, gas), water, paper, building products etc. Council activities have the potential in impact on the environment by the storage and use of oils, greases, fuels; pesticide and fertiliser storage and use; noise impacts; water pollution; erosion and sediment control; dust impacts; visual impacts and lighting impacts.

Measures being Implemented by Council

Council is committed to reducing the environmental impact of its activities. To this end, Council has implemented the following actions / programs to ensure all operations have a minimal impact on the environment and social amenity:

- Environmental training programs for staff:
 - Erosion and sediment control - to ensure appropriate measures are put in place at worksites, including dust minimisation measures
 - Oil spill training

- Proper storage of all oils, greases, fuels to ensure risk of spill to stormwater / natural drainage line is reduced. This has included the redesign of the works depot to ensure the protection of the stormwater system
- Energy and water efficiency programs including energy audits of Council buildings and lighting and showerhead retrofits to reduce energy and water use
- Waste recycling program to ensure recyclables are separated from the waste stream
- Wastewater recycling program to prevent water discharge in the Hunter River
- Investigations in 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)
- Downsizing of vehicle fleet to 4 cylinder vehicles using less fuel
- Purchase of energy efficient car, Toyota Prius

Hunter Central Coast Regional Environmental Management Strategy 2003/2004

Background

The Hunter and Central Coast Regional Environmental Management Strategy (HCCREMS) is an innovative and highly successful regional initiative currently being implemented by the 13 Councils of the Hunter and Central Coast, including Muswellbrook Shire Council. HCCREMS was developed to assist, support and resource local government to more efficiently develop and implement environmental management programs. It seeks to facilitate a regional approach by actively encouraging greater cooperation between member Councils, other authorities, industry and community groups.

Why a Regional Approach?

HCCREMS has become widely regarded as a model approach to integrating local government planning and environmental management at the regional level. It:

- Provides a framework for coordinated action in relation to environmental management issues impacting on the region
- Addresses those environmental and natural resource issues that are best managed at a regional scale (eg biodiversity conservation, and water and air quality management are key issues which require a broad management approach that transcends arbitrary institutional boundaries)
- Facilitates regional partnerships and resource sharing to address key environmental management issues in a coordinated, pro-active and efficient manner
- Enables Councils and Catchment Management Authority to collectively respond to a range of community needs such as education and access to quality environmental information.

Current Projects:

STATE OF ENVIRONMENT REPORTING PROJECT

Following on from the State of the Environment Capacity Building project, which involved the design and development of a framework for improved State of Environment reporting from 2003, HCCREMS has facilitated the:

- Establishment of the SoE Writers Network ensuring that networking and information exchange between Councils took place. It also provided an

opportunity for a review of the indicators that were developed as part of the original project. An amended template was provided to all Councils which incorporated these changes including the refinement of sustainability indicators. Further work will be undertaken over the next twelve months.

- Identification and collection of regional data on behalf of Councils. This included the request for 61 indicators from 11 different state and regional data sources. When received by HCCREMS, this information was then stored in a regional database and disseminated to all relevant Councils.
- Formation of a relationship with the Hunter/Central Rivers Catchment Management Authority regarding the collection of data and alignment of indicators so that reporting against catchment targets and Councils activities can be streamlined and coordinated. This will provide cost efficiencies for all parties involved.

URBAN WATER CYCLE MANAGEMENT PROGRAM:

HCCREMS is currently involved in a suite of projects designed to encourage innovation, and enhanced understanding and management of the urban water cycle. These include:

1. Urban Water Cycle Management toolkit for all NSW Councils.

This project seeks to develop, in collaboration with the NSW Environment Protection Authority, a comprehensive, pragmatic, toolkit (in CD and web-based access format) to promote more sustainable stormwater management and urban water cycle solutions that:

- minimise life cycle costs to the community,
- meet public health and safety standards,
- reduce the demand for water from river systems,
- effectively minimise deleterious impacts of stormwater on the environment.

The toolkit will be disseminated to all NSW Councils in November 2004

2. 3-year Research Project into applied Urban Water Cycle Management

The project is a continuance of groundbreaking work on Water Sensitive Urban Design by the University of Newcastle's Department of Civil, Surveying and Environmental Engineering, in partnership with Hunter Councils, Brisbane City Council, Hunter Water, the Gosford-Wyong Water Authority and the Australian Research Council.

The research project seeks to identify the most cost-effective means of minimizing the consumption of mains water and wastewater, through source control.

Source Control can be implemented through techniques as simple as using tanks to retain roof rainwater, storm water detention, and the use of water efficient appliances and practices. The research will pinpoint the best way of improving the way urban water is managed.

"A considerable amount of Australia's \$50 billion urban water cycle structure is overloaded and outdated, and the community can make huge savings from a financial and water conservation point of view, by optimising the use of source controls."

"While considerable work has already been done on source control, little of it focuses on the economic and environmental benefits."

“We want to show that there is no reason that helping preserve Australia’s most valuable natural resource necessarily means a significant financial or environmental compromise.”

(Dr. Peter Coombes, 2002)

3. Water Sensitive Urban Design above Wetlands Research Initiative.

The research and production of guidelines which allow the tuning of urban design and planning practices to the ecological needs of receiving water bodies.

In this Project, guidelines are being developed to address the management of the location-specific and finer resolution hydrological dynamics that are important to protecting wetlands, expressed in daily flows across ecologically relevant time scales (the determination of which scales are relevant to wetland condition is a question which the project aims to resolve). Similar scale dynamics in water quality, seed dispersal and consequent weed invasion will also be considered.

REGIONAL BIODIVERSITY CONSERVATION PROGRAM

The HCCREMS group continues its focus on biodiversity conservation and management at a regional scale. To date, extensive vegetation mapping and fauna habitat modelling for regionally significant species has been completed in the Lower Hunter and Central; Coast. This work is now being expanded to provide comprehensive data and mapping for the entire Hunter Central Rivers CMA region. In addition, finer scale data collection and mapping will be undertaken in the Central Coast to guide planning and development in that sub-region.

Three projects are concurrently being implemented, and aim to provide current (up-to-date) spatial information on vegetation cover and condition, and to initiate vegetation community modelling for priority areas.

Table: Summary of Proposed Project Outcomes across all three Hunter Mapping Projects

	Hunter	Central Coast	Gloucester
Gap Analysis / Data Audit	✓	✓	✓
Land use	✓	✓	✓
Extant Vegetation as a seamless coverage	✓	✓	✓
5% ccp and 1ha patch size for extant	✓	✓	✓
Vegetation Condition	✓	✓	✓
Vegetation Structure	✓	✓	✓
Wetlands, Riparian, Littoral vegetation types	✓	✓	✓
Modelling Layers	✓	✓	✓
Vegetation Community Mapping/ Modelling	✓ ¹	✓	✓
Pre-1750 Vegetation Community	✓ ¹	✓	✓
Vegetation Survey		✓	✓
Vegetation Community Diagnosis/ Descriptions	✓	✓	✓

Use existing mapping	✓	✓	✓
Output resolution at 2.5m	✓	✓	✓
Map / Field Validation	✓	✓	✓
Technical Report	✓	✓	✓
Training	✓	✓	✓

Note 1. Vegetation community modelling within the Hunter for Priority Area 1 only

In addition the HCCREMS program is:

- Working closely with the Department of Natural Resources, Infrastructure and Planning to ensure biodiversity conservation and management issues are considered in the Central Coast and Lower Hunter Settlement Strategies currently being developed
- Working collaboratively with the newly established Hunter Central Rivers Catchment Management Authority to assess and identify those areas of High Conservation Value that need to be protected and managed into the future, and that suitable tools and incentives are available to assist in the facilitation of this. Private land incentives are a key component of this work
- Continuing its partnership with member Councils to assist and support their endeavours to manage biodiversity issues within a regional context. All Lower Hunter and Central Coast Councils will be signatories to a Memorandum of Understanding which ensures continued collaboration and cooperation in this area.

WOODSMOKE REDUCTION CAMPAIGN

Woodsmoke is a major cause of air pollution in the region and studies have shown it can produce up to three times as much particle pollution as cars. While the cold winter climate make wood heating a popular and economical form of heating, the topography of the region means that the smoke from wood heaters does not disperse readily and fills the air with a smoky haze. In addition, woodsmoke contains a number of noxious gases and particles that can cause a number of health problems, such as dizziness, headaches, breathing difficulties, respiratory irritation and cancers.

The aim of the Program was to raise community awareness of the environmental and health concerns with woodsmoke in a bid to improve the region's winter air quality by minimising the amount of pollution caused by woodsmoke.

STORMWATER EXTENSION OFFICER PROGRAM

The primary function of the Stormwater Extension Officer position throughout 2003 - 2004 was to guide, assist and coordinate local councils in their management of urban stormwater. The position also developed and reinforced networks and partnerships in local government and other organisations which strengthened the management of stormwater as well as building the capacity of local government, both at the staff and organisational level, to ensure that the activities were based on Councils needs and priorities. The following is a list of outputs from the Stormwater Extension Officer Program in the last 12 months.

- Depot audits undertaken for Dungog and Singleton Councils
- Assisted with building sustainable water management principles into the following planning instruments.
 - Dungog Council's Water Efficient Building DCP
 - Great Lakes Council Waterwise Policy & DCP

- Gosford's Water Cycle Management
- Lake Macquarie's DCP 1
- Newcastle Councils DCP 50 Stormwater and Environmental Management Plan
- Erosion and Sediment Control Plans at Port Stephens, Upper Hunter and Maitland.
- Port Stephens Urban Rainwater Tanks policy
- Subdivision Code at Maitland and Port Stephens
- Wyong's Water Sensitive Urban Design
- UNHREMS Subdivision and Infrastructure DCP
- All Stormwater Management Plans in the Hunter and Central Coast have been approved by the Department of Environment and Conservation (EPA Section)
- Audits of Stormwater Management Plans were undertaken in Greater Taree, Singleton, Muswellbrook and Great Lakes LGAs
- Distributed information via monthly newsletter (17 editions) to over 140 people within Councils and other organisations
- Assisted Councils in various working groups/committees and grant funded projects
- Active stakeholder communication program was delivered over 2.5 years
- A series of capacity building workshops were developed and presented or facilitated by the Stormwater Extension Officer and these were (participants listed in brackets)
 - 4 Urban Water Cycle/Water Sensitive Urban Design - 1 costing and 3 policy related (150 participants)
 - 4 Urban Water Management in the Upper Hunter series (70)
 - 1 Council Water Management (50)
 - 3 Bus Tours (80) plus two specific for Great Lakes
 - 1 Modelling Workshop (11)
 - Landscaping – EPA (12)
 - Environmental Assessment of Small to Medium Enterprise Businesses – EPA (27)
 - Environmental Assessment of Golf Courses – EPA (23)
 - Maximising Environment Performance of Council – EPA (21)
 - Soils and Construction – EPA (26)
 - Constructed Wetlands Maintenance – Lake Macquarie (36)
 - Incident Response Workshop – Hornsby (26)
 - H2O Environmental Education – Hunter Councils Inc (20)
 - Community Engagement (20)
 - EPA Education and Grant Workshops
- Updated the regional Erosion and Sediment Control Policy
- Constructed an "innovative sites" register
- Facilitated an information stormwater network across the region

REGIONAL WEED MANAGEMENT PLANS

The Environment division of Hunter Councils also manages the regional weeds program – which is a collaborative initiative between all Councils, the Department of Agriculture and range of other state agencies and stakeholder organisations. It seeks to facilitate a coordinated approach to weeds management across the region.

ROADSIDE ENVIRONMENTAL MANAGEMENT

A draft Roadside Environmental Management Strategy has been developed which provides background information on environmental management and roadsides. The

sound management of roadside environments offers a range of potential natural resource management benefits (buffer zones for high conservation value vegetation, biodiversity conservation, water quality management etc). The strategy seeks to provide a basis for directing and prioritising roadside environment management initiatives into the future. Key steps in the program include:

1. Key roads and associated natural resource management issues mapped & accessible to all stakeholders on a central regional GIS system
2. Enhanced protection for regionally significant vegetation & habitat along roadsides
3. Identified & enhanced protection of roadside environments acting as buffer zones for other significant environmental features or Natural Resource Management issues
4. Reduced erosion and improved water quality
5. Tools & resources to enhance Council's management of roadside environments
6. Strategy and training for ongoing and improved management by Councils of gravel roads delivered
7. Signage along roadsides and an education campaign to both highlight and guide road workers/managers and the community re: significant roadside environment issues

REGIONAL SUBDIVISION AND INFRASTRUCTURE DCP

A draft regional Subdivision and Infrastructure DCP has been developed which incorporates the Auspec Guidelines (design & construction specifications) and additional information on the sustainable management of water resources, risk management issues, wetland construction and solar access for lots for Upper Hunter Councils.

RURAL RESIDENTIAL INFORMATION KIT

A two-page flyer has been developed which provides basic information to landowners on property management issues and sustainable natural resource management practices of relevance to their local areas. This was distributed to all Councils in the Upper and Northern Hunter for inclusion in their mail outs to new property owners.

SALINITY MANAGEMENT

Consistent with the NSW Salinity Strategy, sample planning provisions for urban salinity are being prepared by DIPNR. These will be included in an Urban Salinity Planning Guide which will provide a resource for regional and local plan preparation. As part of the development of the planning guide, workshops were held which provided an opportunity for council planners and others to review and trial the draft materials. Information obtained at the workshop has been included in the Draft Subdivision and Infrastructure DCP.

Community Involvement

Who Cares about the Environment in 2003?

The NSW Government has over a number of years undertaken surveys of the NSW population to gauge an understanding of people's environmental knowledge, attitudes and behaviours. These surveys have been undertaken in 1994, 1997, 2000

and the latest in 2003. The “Who Cares about the Environment in 2003?” survey shows that the community has increased its understanding of environmental issues.

The 2003 report indicates that the environment is regarded as the 6th most important issue for the NSW State Government at present. Water supply / water conservation and population increase / urban development were also regarded as being issues for state government action. The environment is regarded as being the fourth most important issue for the NSW State Government in 10 years time.

Water and air continue to be the main environmental issues of concern, as detailed in Table 1.2. Regarding water, people used to be more concerned about water pollution, but in 2003 the focus is on water conservation measures and environmental education.

Table 1.2

Indicator: Two of the most important environmental issues in NSW today

Issue	2003	2000	1997
Water	57%	46%	55%
Air	37%	40%	40%

Participation in environmental programs

Community groups, organisations and individuals in the Muswellbrook Shire regularly participate in environmental programs being held throughout the year. Such programs include tree planting days, clean up days, and environmental education days. Table 1.3 details the level of community participation in a range of environmental programs undertaken throughout 2003/2004, with a comparison to the number in 2002/2003 for the same event. The table indicates a general increase in the number of participants overall.

Table 1.3

Indicator: Participation in Environmental Programs, Muswellbrook Shire

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

1.4. Future directions in environmental reporting

The SoE report should continue to reflect the current state of the Muswellbrook Shire environment, and trends (either positive or negative) towards sustainability. The report should continue to be undertaken consistent with regional SoE reporting in the Hunter Region (through REMS), to enable comparisons to be drawn, where available, across the region.

1. Human Settlements

1.1. 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 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) • Water restrictions in Denman
Response	<ul style="list-style-type: none"> • Drought / Demand Management plans • Effluent reuse schemes • Water efficiency measures (including the Water Campaign)
<u>Energy:</u> State	<ul style="list-style-type: none"> • Energy production inefficient • Consumption of energy high
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 fleet to 4 cylinder vehicles
<u>Transport:</u> State	<ul style="list-style-type: none"> • Increase in registered 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 fleet to incorporate 4 cylinder vehicles • Green Vehicle Guide • 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 increase in 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"> • Chem Collect • Compost Production • Clean Up Australia Day

	<ul style="list-style-type: none"> • 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 • Managing Neighbourhood Noise video • Managing Rural Noise video • NSW Industrial Noise Policy • Environmental Criteria for Road Traffic Noise • 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

1.2. Population & settlement patterns

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

Introduction

All types of human settlement affect the surrounding environment as they consume resources such as land, water, energy, and produce solid and liquid waste, noise, air pollution and greenhouse gases. These environmental impacts can in turn affect urban settlements.

Human settlements rely on the provision of housing and urban infrastructure including drinking water, electricity, roads and sewerage. 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)

Historical Development of the Muswellbrook Shire

The Shire of Muswellbrook is centrally located in the Upper Hunter Valley, and covers an area of 3401.55km², being approximately 130km north-west of Newcastle. Lake Liddell delineates the Muswellbrook Shire boundaries to the east, Wollemi National Park to the West, Aberdeen to the North and Coricudgy State Forest to the South. Muswellbrook is located at Latitude 32°15' South, Longitude 150°53' East, with an elevation of 144.2 metres above sea level.

Prior to European settlement, two important tribes of Aborigines were in possession of lands in the Muswellbrook Area. In the Goulburn Valley were clans of the Kamilaroi, a large and powerful tribe whose territory was mainly on the western side of the Great Dividing Range. Around the Hunter River lived the Wanaruah, a smaller tribe whose more compact domain was located between the Kamilaroi and the Gringal to the east. These tribes had been in possession of this land for thousands of years. They were hunter-gatherers living in a fertile, normally well watered area.

European settlement within the area dates back to the discovery of the Upper Hunter by Chief Constable John Howe of Windsor in 1819. A route was established which followed the present Putty Road from Windsor during 1820, in order to open up the known parts of the Hunter Valley to settlers. Major parcels of land were surveyed by Henry Dangar in 1824 along the banks of the Hunter River for allocation to early settlers. By 1825, most of the land fronting the known parts of the Upper Hunter Valley was either granted or reserved and the establishment of great pastoral estates commenced. The development of these estates alienated the Kamilaroi and Wanaruah tribes from the rich alluvial lands and led to conflict between the settlers and the Aboriginal people between 1825 and 1830. By the end of this period, Aboriginal resistance was overcome by force of arms and diseases imposed on the Aboriginal people by European settlers and convicts.

From the early 1820's to 1840, the British Government, concerned with the cost of feeding, clothing and supervising convicts, implemented a plan to grant land to

respectable settlers. They were entitled to one convict for every one hundred acres and were required to house and feed them. Convicts were put to work to clear the land, cultivate it and tend sheep and cattle.

The shire's early development has a marked settlement pattern of historic properties along the Hunter River corridor, on the alluvial flats and adjoining open forest country. Construction of the first overland road through Muswellbrook in 1829 established the region as a river crossing settlement and service centre for the main homesteads in the region. Convicts were also used by the Government in the construction and maintenance of further roads, bridges and government buildings.

'Musclebrook' as it was known then was strategically located in relation to the Hunter River and the road to the Liverpool Plains. It was gazetted as the town of 'Musclebrook' in 1833 and grew steadily as a cattle, horse and sheep centre. The name was officially changed in 1949 to "Muswellbrook". The area steadily grew and the town of Muswellbrook developed as an established commercial centre with reticulated water (1915), and electricity (1923). The smaller settlements of Sandy Hollow and Denman were established around 1853.

Towards the end of the century, large scale dairying continued the development of the area. The mining of coal was first recorded in this area in the late nineteenth century at Kayuga. Since the first open cut coal mine was established in 1944 by Muswellbrook Coal Company, the growth of Muswellbrook has been influenced by the development of open cut coal mining in the area and the establishment of power generation at Liddell and Bayswater. The agricultural, equine and viticulture industries continue to provide diversity in the economy of the Shire.

The Shire of Muswellbrook now has two distinct urban centres at Muswellbrook and Denman.

Current Settlement Patterns in the Muswellbrook Shire

The most recent population census was undertaken in 2001. Population growth projections for the period between 1996 and 2021 indicate that the population of the Muswellbrook Shire is expected to increase by 0.1%. However, for the period 1996 – 2001, the annual average compound growth rate was -1.0%. While the population has declined, forecasts to 2026 issued by the Hunter Valley Research Foundation indicate that the population for the Shire is expected to grow at a growth rate of 0.6%, as detailed in Table 2.1.

Table 2.1

Indicator: Projected Population, Muswellbrook Shire 2001 - 2026

	2001	2006	2011	2016	2021	Growth Rate %
Muswellbrook LGA	15,143	15,200	16,100	16,600	16,800	0.6%

Source: ABS, 2001 Census

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 2.2). 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 2.2

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 majority of the population within the Shire of Muswellbrook reside in the town of Muswellbrook. Slightly more people reside in the North Muswellbrook planning district than the South Muswellbrook planning district as detailed in Table 2.3. The remaining population resides in Denman and the rural areas of the Shire.

Between 1991 and 2001, Muswellbrook LGA has experienced:

- a significant decrease in the 0 – 11 years age group
- a significant decrease in the 12 – 24 years age group
- an increase in the 25 – 54 years age group
- a significant increase in the 55 years + age group

Table 2.3

Indicator: Population and Age Spread, Muswellbrook Shire 2001

Age Profile	North Muswellbrook	South Muswellbrook	Denman	Rural
0 – 4	493	373	112	210
5 – 11	648	600	177	366
12 – 17	485	493	116	310
18 – 24	466	360	119	293
25 – 39	1142	1113	277	850
40 – 54	1033	1074	314	728
55 – 64	403	381	116	355
65 – 74	268	303	87	167
74+	174	235	74	73
TOTAL	5112	4932	1392	3352

The growth of the Muswellbrook Shire mainly since European settlement has resulted in the large scale use of available resources and land. This has placed significant pressures on the environment, particularly impacts on biodiversity and water quality.

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

Growth in the Muswellbrook Economy

Whilst the residential population has declined in the Muswellbrook Shire in numbers since 1996, there has been continued growth in the local economy.

In the 2003/2004 financial year (1st July 2003 – 30th June 2004), a total of **542** development applications were received by Council. This is a significant increase in comparison to 2002/2003 where **406** development applications were lodged for the corresponding period. Of the 542 DA's lodged, 9 were withdrawn or cancelled and 4 refused. Table 2.4 provides a breakdown in development application types for the 2003/2004 period.

The majority of DA's lodged related to residential home improvement structures such as pergolas, garages, extensions, swimming pools etc. What was of most interest was the increase in applications submitted for new dwellings. A total of 112 DA's were lodged for houses, 1 for flats and apartments and 3 for dual occupancies. The increase in new dwelling DA's reflect the residential subdivision applications occurring in Muswellbrook and Denman over the last few years.

Table 2.4

Indicator: Development Applications Received by Muswellbrook Council, 2003/2004 & Comparisons with 2002/2003 period

Application Type	DA's Received		DA's Cancelled / Refused	
	2003/2004	2002/2003	2003/2004	2002/2003
Home Improvement	264	171	3	1
New Dwellings	119	96	1	1
Rural	28	21	-	1
Commercial	26	31	4	2
Industrial	14	14	2	1
Subdivisions	19	23	1	2
Coal Mining	3	5	1	4
Section 96 Amendments	30	12	1	-
Demolitions	3	7	-	1
Public Works	4	8	-	1
Signage	11	5	-	-
Boundary Adjustments	6	6	-	1
Tourism	4	3	-	-
Rezoning	7	2	1	-
Extractive Industries (excluding coal mining)	4	2	-	-

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

There has been a concerted effort by Council to address land use planning issues over the last few years in order to ensure appropriate and sustainable development is undertaken in a manner which minimises impact on the environment. The measures currently being undertaken by Council include:

Review of the Shire Development Strategy / Muswellbrook Local Environmental Plan 1985

Since the adoption of the Shire Development Strategy by DIPNR, and continued review of the Muswellbrook LEP, Council has worked with consultants Andrews Neil resulting in the finalization of the Draft Muswellbrook LEP and supporting digital mapping.

A recent meeting with DIPNR identified that the preparation of a "Template" for LEP's is underway. Generally this "Template" will provide standardization for parts of a LEP to achieve consistency in LEP's, ease of passage through Parliamentary Counsel and less litigation. The time frame for the implementation for such a Template has been scheduled for the end of 2005. DIPNR have advised Muswellbrook Council that the current review process can continue and that referrals to DIPNR and PC can continue to occur however, it would be required that Rural Council's review their LEP's, to align with the Template, within 5 years of the Template being adopted.

Council's Draft LEP generally follows the objectives of the Template in that it provides for and supports the development of the Shire in accordance with the objectives of the adopted Shire Development Strategy. The standardisation of zones is considered an achievable task once the zones have been identified by DIPNR.

Progress of the Review Process:

The Draft LEP for Muswellbrook has been finalised together with the supporting zoning maps. In accordance with DIPNR's advice Council is now able to seek a Section 65 Certificate enabling public exhibition of the Draft plan.

Strategies for North-West Denman and South Muswellbrook:

In Accordance with previous resolutions by Council the preparation of development strategies for both North-West Denman and South Muswellbrook are being undertaken by consultants Andrews Neil in consultation with Muswellbrook Council. To date supporting information pertaining to Council's future road network, water/sewer servicing of land and buffers from existing industrial and mining land have been forwarded to Andrews Neil to assist in the finalisation of the DCP for South Muswellbrook.

Similarly, constraints regarding the sewer/water servicing of land and mineral resource related constraints are being investigated to allow finalisation of the DCP for Denman.

The objectives of the Draft LEP are consistent with the direction of the Rural Lands Strategy and Shire Development Strategy in that the issue of the creation of small rural allotments, protection of alluvial land, maintaining poor agricultural land in large

parcels and the future growth of Denman and Muswellbrook, have been satisfactorily addressed.

Development Control Plans

Council has 16 adopted development control plans to provide policy advice to future and current developments throughout the Shire. Of particular note to environment protection and public health are the following DCP's:

DCP 8: Guidelines for Subdivision

This DCP is currently being reviewed by HCCREMS. A draft regional DCP has been prepared to address not only the construction of subdivision, but also environmental issues with subdivision design, including solar access, water sensitive urban design, biodiversity etc. The draft is to be placed on public exhibition before being submitted to council for consideration as an adopted policy.

DCP 9: Erosion and Sediment Control Regional Policy and Code of Practice

Council has adopted and implements the regional Erosion and Sediment Control Policy and Code of Practice. It provides for uniform control and regulation for sediment and erosion control across the region. The objectives of the policy are:

- to prevent land from being degraded by soil erosion or unsatisfactory land and water management practices
- to protect streams and waterways from being degraded by erosion and sedimentation caused by unsatisfactory land and stormwater management practices
- to promote and protect biodiversity

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

This policy provides a legislative basis for identifying lands potentially contaminated, and details the procedural processes for identifying, evaluating and remediating contaminated land. All development applications / rezoning applications for lands contaminated / potentially contaminated must abide by the Contaminated Lands Policy.

DCP 14: Trade Waste Approvals Policy

This policy ensures the proper control of trade waste discharges to the sewer to protect public health, the environment and the sewerage system.

Voluntary Conservation Agreements

Two voluntary conservation agreements are currently being prepared as green offsets to the approval of developments in the Muswellbrook Shire. This includes voluntary conservation areas at the Woodlands Ridge rural - residential subdivision and a conservation area as part of the approval of a gravel extraction and plant hire operation at Grasree Ridge. These voluntary conservation agreements will ensure the protection and appropriate management of threatened flora and fauna occurring at the sites.

Upper Hunter Cumulative Impact Study and Action Strategy

The Upper Hunter Cumulative Impact Study and Action Strategy was produced in 1997 by the then Dept of Urban Affairs and Planning. The aims of the strategy are:

- to establish the effects of cumulative impacts of various existing and major proposed land uses and activities
- to establish a regional framework for the assessment of the environmental impacts of individual development proposals and activities
- to provide a basis for coordinated environmental monitoring and enhanced environmental management practices
- to assist future strategic land use and development planning and regional issues.

Muswellbrook Council continues to be involved specifically in 18 of the 39 actions contained in the study. The major actions for Council includes:

- Action 2: Examination of specific cumulative environmental reports of four new coal mines
- Action 4: Consideration of Upper Hunter Cumulative Impact Study and state of the Rivers in assessing development applications
- Action 5: Preparation of urban and rural settlement strategies
- Action 6: Development of the Synoptic Plan
- Action 8: Consideration of groundwater vulnerability when preparing LEP's
- Actions 11 & 12: review development consent conditions for coal mines
- Action 17: Develop blasting guidelines
- Action 19: Load based licensing
- Action 24: Stormwater management
- Action 29: Community Consultation
- Action 33: State of the Environment reporting

Synoptic Plan – Integrated Landscapes for Minesite Rehabilitation

The purpose of the Synoptic Plan is to provide a basis for development of a long term integrated strategy for the rehabilitation of mines. The Synoptic Plan provides:

- 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 for new / amended mining operations to comply with the objectives of the Synoptic Plan to ensure mine rehabilitation occurs in an integrated manner to achieve maximum environmental benefit.

Planning for Bushfire Protection

Council has been provided with a Bushfire Prone Land map that has been certified by the Commissioner of the Rural Fire Service. This map is used in 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. The IDA requirements under section 100B of the Rural Fires Act has required further consideration in developments, particularly subdivisions, rural dwellings, tourist facilities and other designated developments.

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

Council Action

In order to move towards even further sustainable land use practices and planning, Council should investigate and implement where appropriate policies and strategies targeting:

- Water sensitive urban design principles
- Energy efficiency and solar access design principles
- Tree preservation policies
- Incentive programs for water and energy efficiency programs in the community

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 target for reduced greenhouse gas emissions will increase to 40% from 1 July 2006. These targets represent significant yet readily achievable savings in water use and greenhouse gas emissions by homes. This will ensure new dwellings are designed in a sustainable manner.

New homes must also meet requirements in BASIX relating to the thermal performance of the building envelope. This requirement is aimed at ensuring that homes are not overly reliant on artificial heating and cooling, such as air-conditioning, in order to be comfortable.

1.3. Drinking water quality and consumption

Management Plan Goal:

Customer orientated, environmentally sustainable water and sewerage service which meets present and future needs, and is provided in a commercial manner using best industry practice.

(Refer to sections 4.2 and 4.3 for further information)

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

Clean and safe drinking water is a basic need of all humans. Unsafe drinking water can result in widespread chronic and acute human health problems. Drinking water quality guidelines (NHMRC & ARMCANZ) exist to ensure strict standards are met before water can be consumed.

Drinking water supply – Muswellbrook Shire

Muswellbrook Council owns, operates and manages three separate water supply schemes, supplying drinking water to the towns of Muswellbrook, Denman and Sandy Hollow.

Muswellbrook Scheme

Water is drawn from the Hunter River and treated in a water softening and filtration plant that has been progressively modernised. The present capacity of the water treatment plant is 14.5ML/day. The treated water is fluoridated, chlorinated and then distributed throughout Muswellbrook via a network of trunk mains, pumping stations and service reservoirs.

Denman Scheme

The source of water for Denman town water supply is either the Hunter River, or, when this water is too turbid, a bore field adjacent to the river. Water is chlorinated before being pumped to a large reservoir.

Council is currently in the process of constructing a new river intake scheme, converting the reticulation system into a simple gravity flow system and constructing a lime-based water softening treatment plant. This will ensure Denman residents receive a higher level of water supply service.

Sandy Hollow Scheme

The source of water is a horizontal bore field close to the unregulated Goulburn River. Water is treated to remove most of the manganese and iron, but not hardness, then chlorinated and pumped to two reservoirs that supply consumers.

Council is continuing to investigate extending the water treatment processes at Sandy Hollow in order to improve the management, performance and operation of the existing plant and to ensure consistent water quality.

Monitoring of Quality of Drinking Water

Council has for a considerable time period been undertaking bacterial, pesticide and chemical analysis of potable water samples in waters abstracted for drinking water purposes from selected sites throughout the Shire. Table 2.5 details the results of the water sampling program and the compliance with the NHMRC 2000 drinking water guidelines. Non compliances with the drinking water guidelines are generally a result of highly turbid water in the Hunter River and contaminated samples.

Table 2.5

Indicator: Compliance with NHMRC Drinking Water Guidelines

Parameter / Type	Percent Compliance
Physical and Chemical:	
Physical	84%
Chemical	100%
Key Characteristics:	
Turbidity	95%
pH	99%
Colour	100%
Microbiological:	
E. coli	100%
Total coliforms	99%

Current Water Consumption

Water consumption in the Muswellbrook Shire is indicative of the weather conditions prevailing at that time. Whilst in general water consumptions appears to be increasing over the last few years, dry conditions have been prevalent. Water consumption dropped by approx 20% in 2000/2001 after considerable rainfall and flood conditions in late 2000. Table 2.6 details total water consumption in the Muswellbrook Shire from 1992 – 2003/2004.

Table 2.6

Indicator: Water Consumption, Muswellbrook Shire

1992	1993	1994/95	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04
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

Table 2.7

Indicator: Water Consumption by Sector, Muswellbrook Shire, 2003/2004

Usage Type	Consumption 2003/2004 (kL)		
	Denman	Muswellbrook	Sandy Hollow
Business	18,396	290,898	6,138
Farmland	2,345	13,770	2,233
Residential	145,249	1,311,003	13,570
Rural Residential	3,065	39,606	744
Strata Plan	0	19,603	0
Council Use	35,467	194,670	0

Other	16,302	113,036	721
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(Note: Other includes churches / schools, public reserves / buildings, charity venues and non rateable use)

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

Climatic Variations

Climatic variations greatly influence water supply and consumption in the Shire. During periods of high rainfall, water consumption generally drops, during times of drought, water consumption generally 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, restricting the ability to pump water directly from the river.

Water Restrictions

Due to the ongoing nature of the above issues, water restrictions have been in place in Denman throughout 2003/2004 as water demand exceeded water supply capabilities. Table 2.8 details water restrictions for the town of Denman over the last 3 years.

Table 2.8

Indicator: Number of Days of Water Restrictions

Year	Days of Restrictions	% of days restrictions applied
2003/2004	143	39
2002/2003	129	35
2001/2002	14	4

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

Drought Management Plan / Demand Management Plan

Council has developed the Drought Management Plan and the Demand Management Plan in order to address water supply issues throughout the Shire and ensure there will be adequate water supply for the population in times of drought. The Demand Management Plan outlines reduction strategies that can be implemented throughout the community to reduce water consumption should demand be greater than supply capabilities.

Hunter River Salinity Trading Scheme

The Hunter River Salinity Trading Scheme (HRSTS) has been established by the Dept of Environment and Conservation to regulate the discharge of saline mine water into the Hunter River and thus reduce impact on the environment. The scheme has been effective in reducing pollutants from being discharge in low flow times, and has resulted in greater water efficiencies on mine sites and a general reduction in the need to use town water.

Effluent Reuse Scheme

Council, together with the then Bayswater Colliery Company, established the Muswellbrook to Bayswater Effluent Reuse Scheme. The scheme results in approximately 85% of treated effluent from the Muswellbrook Sewage Treatment Works being piped to Bayswater and Mt Arthur North mines for further treatment and reuse in dust suppression and coal washing activities. This has reduced the need for the mine to pump water from the river to meet there water needs and has also prevented treated effluent from being discharged in the Hunter River. The remaining 15% of the treated effluent from the Muswellbrook STP is piped to the Muswellbrook Golf Course for irrigation purposes.

All treated effluent from the Denman STP is reused at Denman Golf Course.

Indicator: Volume of Treated Effluent Reused

Mt Arthur Coal:	867 ML
Muswellbrook Golf Club:	154 ML
Denman Golf Club:	914 ML

Water Campaign

Muswellbrook Shire Council has made a commitment to reducing water consumption and improving the quality of receiving waters by resolving to adopt the resolution to become a participating Council in the Water Campaign in late 2003.

The Water Campaign developed by the International Council for Local Environmental Initiatives (ICLEI) assists local government to identify and evaluate current water resource management at the corporate, community and catchment levels.

The Water Campaign consists of a framework of Milestones:

Milestone 1: Establish and inventory of water consumption and water quality issues for both the community and the corporate sector.

Milestone 2: Establish targets for water quantity and improvement in water quality for both the community and the corporate sector.

Milestone 3: Develop and obtain approval for a local water action plan which defines the measures to be implemented.

Milestone 4: Implement policies and measures to meet the established targets for water quantity and improvement in quality for both the community and corporate areas.

Milestone 5: Monitor and report on the implementation of the measures.

Council has recently completed Milestone 1 of the program.

Sustainability Committee

Council has established a Sustainability Committee to oversee and investigate the implementation of sustainable outcomes for the Shire, including water efficiency measures. This Committee is currently overseeing Council's progress through the Water Campaign.

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

BASIX

The implementation of BASIX (Building and Sustainability Index) (refer to section 1.6) will ensure all new dwellings achieve reductions in energy and water use. This will result in a decrease in water demand in urban areas throughout the Shire, and result in a measurable move for the community in living more sustainability. BASIX is likely to result in new houses having rainwater tanks for the supply of water for non-drinking water purposes (eg toilet flushing, outdoor water use etc).

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. This Reduction Strategy will outline the measures Council will implement to result in measurable reductions in water use throughout the Shire.

Educational Programs

Educational programs targeting specific users in 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

Council, together with available assistance from state government agencies, should investigate the introduction of incentive schemes to financially assist community members to implement water efficiency measures such as rebates for water efficient appliances including for example showerheads, toilets, rainwater tanks etc.

1.4. Energy

Management Plan Objectives:

- 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)

Energy is essential to the functioning of an advanced industrial society. The supply of energy however, and its use have one of the largest environmental impacts of all human activities. Most of the energy used in NSW is made from fossil fuels, such as coal, but also natural gas and petroleum products with adverse impacts on the environment throughout the production and supply chain.

Energy production and conversion, such as coal-to-electricity in power stations, is the main source of greenhouse gas emissions (carbon dioxide, methane and nitrous oxide), oxides of nitrogen, sulphur and particle emissions. The process of energy conversion and transmission is also highly inefficient, in terms of energy lost. Energy systems affect the atmosphere, land use and water quality.

The amount of energy used by Council during 2003/2004 in performing its functions is detailed in Table 2.9. The amount of carbon dioxide (the main greenhouse gas) emitted as a result of this energy usage is also detailed in Table 2.9.

Table 2.9

Indicator: Energy Use by Council by Type and Equivalent Tonnes of Carbon Dioxide Emitted, 2003/2004

Emissions Inventory		
Fuel/process	Basic units	Tonnes CO₂-e
Electricity	4,931,298 kWh	4990.5
Natural Gas (non-transport)	0 GJ	0.0
LPG - (non-transport)	0.26 t	0.7
Petroleum Products		
Petrol/Gasoline	118 kL	296.0
Automotive Diesel Oil	173 kL	466.9
LPG - transport	23 kL	36.8
Net Emissions		5790.9

The amount of electricity used by the Muswellbrook community (both residential and on residential) is detailed in Table 2.10. It also shows the amount of carbon dioxide emitted to produce the electricity.

Table 2.10

Indicator: Electricity Usage, Muswellbrook Local Government Area

Emissions Inventory		
Fuel/process	Basic units	Tonnes CO₂-e
<i>Electricity:</i>		
Residential	72,369,000 kWh	76276.9
Non Residential	259,917,000 kWh	273952.5
Net Emissions		350229.4

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

Society today relies heavily on the use of energy in carrying out day to day functions and activities, from the use of electricity to run computers, lights, televisions, hot water systems, to fuels used to power cars, trucks, buses and trains. Energy is thus essential to modern urban environments, however energy production and consumption produces wastes that can be harmful to the environment.

Within the Muswellbrook Shire, large scale industries such as coal mining and power generation, together with other industries and residential areas, uses significant amounts of energy. Climatic variations in the Muswellbrook Shire also results in increased use of energy for cooling and heating in the residential sector. The increase in new housing developments throughout the Shire also increases energy consumption.

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

Muswellbrook Council is committed to reducing energy consumption in both its own operations and also throughout the Muswellbrook Shire community. Council has implemented a number of targeted programs to move towards achieving reduce energy consumption levels. These programs include:

Inclusion of Energy Efficient Car in Council Fleet

Council has purchased a Toyota Prius to join the fleet of motor vehicles. The Toyota Prius uses a combination of petrol and electricity from an onboard electric motor to reduce fuel consumption and greenhouse gas emissions.

The Toyota Prius purchased uses almost two and half times less fuel than the current standard Council fleet vehicle. Investigations are being undertaken to incorporate more energy efficient vehicles within Council's fleet.

Cities for Climate Protection Program

Muswellbrook Shire Council joined the Cities for Climate Protection (CCP) Program in late 2000. The program has been developed in conjunction with the Australian Greenhouse Office and the International Council for Local Environmental Initiatives.

The program assists local government to identify the extent of greenhouse gas emissions as a result of council and community activities. The program requires Council to undertake the following Milestones:

- Milestone 1: Establish an inventory and forecast for key sources of greenhouse emissions in the council and community.
- Milestone 2: Set an emissions reduction goal for both corporate activities and the community
- Milestone 3: Develop and adopt a local greenhouse action plan which defines the measures to be implemented to meet the reduction goals
- Milestone 4: Implement actions identified in the local greenhouse action plan..
- Milestone 5: Monitor and report greenhouse gas emissions and the implementation of the actions and measures

Muswellbrook Shire Council has progressed in the program through Milestone 4 with the following measures being implemented:

- Purchase of 4 cylinder vehicles within Council's Fleet
- 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

Muswellbrook Shire Greenhouse Reduction Strategy

The Greenhouse Reduction Strategy was adopted by Council in February 2003 and was developed to complete Milestone 3 of the Cities for Climate Protection Program.

The aim of the Greenhouse Reduction Strategy is to provide "a strategic framework of actions to reduce greenhouse gas emissions from Council's operations.....and a strategic framework for the Muswellbrook Shire Community to reduce its greenhouse gas emissions in the residential, commercial, industrial and waste sectors"

A number of measures and actions identified within the strategy, including energy audits, fleet downsizing, fuel conversion in vehicle fleet and lighting retrofits of Council buildings have been undertaken to reduce Council's greenhouse gas emissions and achieve Milestone 4 of the Cities for Climate Protection Program.

Industry Cleaner Production Program

This program has been developed to assist small to medium business within Muswellbrook Shire to incorporate Cleaner Production measures into everyday business operation, including energy and water efficiency and waste reduction.

The program has resulted in three businesses within the Shire being involved in Cleaner Production audits to identify areas where achievements can be made in consumption and production of resources.

Energy Audit – Administration Centre, Muswellbrook

An energy audit of Muswellbrook Shire Council Administration Building was undertaken to determine what energy efficient measures could be implemented into the building to reduce greenhouse gas emissions as a result of the operation of the building.

The air conditioning system was identified as the largest consumer of electricity. Actions are now being undertaken to determine the feasibility of a geothermal air conditioning option which will reduce greenhouse gas emissions and provide a lower operating cost.

Subdivision DCP

Council, as part of its involvement with the Hunter Central Coast Regional Environmental Management Strategy (HCCREMS) has been developing a regional Subdivision DCP which details design and construction requirements for new subdivisions, including water sensitive urban design, solar access and other environmental requirements.

AGO funding available and programs

Funding from the Australian Greenhouse Office has been obtained which will be used to complete Milestone 5 of the Cities for Climate Protection Program. The completion of this milestone requires a re-inventory of corporate and community greenhouse emissions, and to determine the effectiveness of actions implemented as part of the program.

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

BASIX

The implementation of BASIX (Building and Sustainability Index) (refer to section 1.6) will ensure all new dwellings achieve reductions in energy and water use. This will result in a energy consumption in urban areas throughout the Shire, and result in a measurable move for the community in living more sustainability. BASIX is likely to result in new houses having insulation in both the roof and walls, solar / heat pump hot water systems, energy efficient light fittings in order to meet the initial 25% reduction (to be increased to 40% after one year).

Retrofitting council building

Within Council's Greenhouse Reduction Strategy, retrofitting of Council buildings has been identified as a high priority. Council should continue to investigate:

- The replacement of fluorescent light tubes with tri-phosphorous fluorescents;
- Installation of compact fluorescents in lieu of standard light globes;
- Installation of sensor lighting;
- Replacement of the current air conditioning system at the Administration Centre which consumes approximately 62% of electricity annually with a geothermal air conditioning option.

Cash incentive programs in the shire

Investigations should be undertaken into incentive programs to assist the community in implementing energy and water efficiency measures at home .

Adoption of subdivision DCP

Council should review and consider adopting the regional subdivision DCP being developed by REMS. This will ensure that all new subdivisions in the Muswellbrook shire are designed in accordance with energy and water efficiency standards.

Consideration of purchasing green power

In keeping with Muswellbrook Shire Council's commitment to reducing greenhouse gas emissions through involvement in the Cities for Climate Protection Program, the purchase of green power from energy suppliers should be considered. The green power sourced from renewable energy suppliers and including solar, wind and hydro power will be used to supply electricity to some of the main Council buildings and facilities. This action has been identified as a priority action within Council's Greenhouse Reduction Strategy.

Solar installation opportunities

Council should investigate opportunities for solar installations on new and existing buildings.

1.5. 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 essential for connecting communities. However, travel has major environmental costs: it consumes significant amounts of non-renewable resources, especially fossil fuels, and produces air pollution and greenhouse gas emissions. Transport also has noise, visual and other impacts on urban amenity and leads to traffic congestion and accidents. Runoff from roads can affect water quality and roads can have an impact on fragmenting natural ecosystems.

Vehicle Registrations

Table 2.11 details vehicle registrations by vehicle type and fuel type for the Muswellbrook Shire as at end of June 2004. The total number of registered vehicles in the Shire has increased from 13475 in 2002/2003 to 13946 in 2003/2004.

Table 2.11

Indicator: Vehicle Registrations by Vehicle Type and Fuel Type, Muswellbrook Shire 2003/2004

Vehicle Type	Fuel Type 2003/2004											Total
	N/A	Hydrogen	Diesel	Petrol / CNG	LPG	Electricity / Petrol	Petrol / LPG	Petrol	Diesel/ LPG	Diesel/ LPT	Unknown	
Off Road Passenger Vehicles	0	0	441	1	1	0	6	790	0	1	0	1240
Buses	0	0	53	0	0	0	0	2	0	0	0	55
Motorcycles	0	0	0	0	0	0	0	443	0	0	2	445
Heavy Plant	0	0	71	0	0	0	0	4	0	0	1	76
Heavy Trucks	0	0	332	0	0	0	1	18	0	0	6	357
Light Plant	0	0	20	0	0	0	1	0	0	0	0	21
Light Trucks	0	0	1219	0	18	0	24	1331	0	2	39	2633
Mobile Homes	0	0	9	0	0	0	3	3	0	0	1	16
Prime Movers	0	0	53	0	0	0	0	0	0	0	1	54
Small Buses	0	0	26	0	1	0	1	56	0	0	0	84
Passenger Vehicles	0	0	16	0	13	1	24	5784	0	0	95	5933
Small Trailers	2078	0	0	0	0	0	0	0	0	0	0	2078
Other Trailers	953	0	0	0	0	0	0	0	0	0	0	953
Other Vehicles	0	0	0	0	0	0	0	1	0	0	0	1
Total	3031	0	2240	1	33	1	60	8432	0	3	145	13946

Vehicle Kilometres Travelled

Vehicle kilometres travelled is a measure of the total distance travelled by cars and other vehicles. It is one of the main factors influencing vehicle based air pollution and energy consumption. Council is unable at this time to accurately report on the vehicle kilometres travelled for its fleet, however appropriate reporting mechanisms have been put in place to ensure this information is available for reporting in the 2004/2005 SoE Report.

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

Within the Muswellbrook LGA, public transport is quite limited due to the extent and size of the area, as well as population. Therefore, the main form of transport within the Shire is by private vehicles.

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

Bicycle Plan - Cycleway / Walkway development

Council is committed to providing cycleway / walkway facilities for the benefit of the community. Not only does this provide recreation and health based benefits to the population, it also provides facilities to use which may reduce use of private vehicles (and thus result in less pollutants being emitted into the atmosphere). Council has concentrated on further developing cycleways / walkways throughout the urban area of Muswellbrook during 2003/2004 in accordance with Councils Bicycle Plan.

Indicator: Cycleway / Walkway Development, Muswellbrook Shire

Km's of cycleway developed, 2003/2004: 2kms

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. Council has commenced purchasing smaller vehicles in its fleet to include 4 cylinder vehicles.

Purchase of Toyota Prius

Council has purchased a Toyota Prius to join the fleet of motor vehicles. The Toyota Prius uses a combination of petrol and electricity from an onboard electric motor to reduce fuel consumption and greenhouse gas emissions.

The Toyota Prius purchased uses almost two and half times less fuel than the current standard Council fleet vehicle. Investigations are being undertaken to incorporate more energy efficient vehicles within Council's fleet.

Green Vehicle Guide

The Green Vehicle Guide, a Federal Government initiative, provides ratings on the environmental performance of new vehicles sold in Australia. The guide rates new vehicles based on their greenhouse and air pollution performance against standards.

The ratings are based upon government recognised test standards for measuring and regulating motor vehicle exhaust emissions. Greenhouse ratings are based on the carbon dioxide (CO₂) emissions. Air pollution ratings are based primarily on the emission standard to which the vehicle has been tested and certified for supply to the Australian market.

The guide enables consumers to compare the level of emissions of different vehicles and consequently their impact on the environment. The information includes:

- Greenhouse Rating (based on CO₂ emissions) – to help consumers compare a vehicle's contribution to the greenhouse effect and climate change.
- Air Pollution Rating (based primarily on emission standards) – to help consumers compare a vehicle's contribution to urban air pollution (and associated effects on the environment, human health and amenity).
- An Overall 'Star' Rating – to help consumers identify vehicles that emit a lower level of overall emissions. The Greenhouse Rating and Air Pollution Rating are combined to determine this Overall Rating.
- Fuel Consumption (in L/100km) – to help consumers identify the most fuel-efficient vehicle for your needs. (Note: The Green Vehicle Guide replaces the Fuel Consumption Guide that previously provided this information.)

Cleaner Vehicles Action Plan

The NSW Government has adopted the five point Cleaner Vehicles Action Plan for new vehicles and is committed to improving the quality of petrol and lowering sulfur dioxide levels. New Australian vehicle design rules, combined with the introduction of cleaner fuel standards for petrol and diesel, are leading to the use of more advanced emission control technologies.

Action for Air

The NSW Government has developed a range of strategies and programs to address transport matters in metropolitan areas and thus assist in reducing transport related air emissions. This includes the Action for Air strategy which covers all activities which are major sources of air pollutants in the urban environment.

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.

Draft State Environmental Planning Policy 66 – Integration of Land Use and Transport

The NSW Government has drafted a State Environmental Planning Policy (SEPP) 66, Integration of Land Use and Transport. The policy aims to reduce dependence of cars by improving access to public transport, walking and cycling, providing facilities nearby so people travel shorter distances and encouraging multi purpose trips, which reduces the total number of trips.

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

Council Vehicle Fleet

Council should continue to review its fleet of vehicles and, where appropriate, incorporate energy efficient vehicles and / or smaller size vehicles which use less fuel and produce fewer emissions. Investigations should continue on an on-going basis in this matter.

Cycleway / Walkway Development

Further cycleway / walkways should be constructed in the urban areas of the Shire to provide an avenue for people wishing to walk / cycle and thus reduce use of vehicles and emit less air pollutants.

1.6. Waste Management

Management Plan Goal:

To achieve a self funding, environmentally sound waste management service

Challenges:

Reduction in waste stream
Community participation in recycling
More efficient use of depot facility
Compliance with EPA licence

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

The generation and management of waste has a number of potential environmental impacts, including pollution of air and water and contamination of land. High levels of waste generation may be unsustainable.

There are a number of waste streams in the Shire: domestic, municipal, commercial, industrial and building waste. Within the Muswellbrook LGA, there is currently one authorised waste disposal facility – the Muswellbrook Waste Depot. In addition to this, there is a transfer station at Denman.

The Muswellbrook Waste Depot accepts certain wastes from the above waste streams in accordance with an Environment Protection Licence. Recyclables are collected from residential areas by a kerbside collection service and sorted at the Muswellbrook Recycling Centre before being sent off to be reprocessed. Green waste is separated, mulched and combined with solid waste at the Sewage Treatment Plant to create a compost material for re-use.

Illegal dumping continues to be a problem throughout the Shire, with waste material continuing to be dumped throughout the Muswellbrook and Denman Common areas and in other locations. Council officers continue to monitor known dumping sites in an attempt to prevent further dumping.

Hunter Region Waste Audit

The Department of Environment and Conservation (previously Resource NSW), commissioned an audit into the composition of municipal wastes throughout the Hunter Region. In the audit, waste from 75 sample households in Muswellbrook was analysed to determine the total amount of different waste categories being disposed of. Results of the audit for the Muswellbrook Shire are detailed in Table 2.12.

The audit has provided an indication of the waste stream composition which will enable Council to effectively design and / or monitor resource recovery systems in the Shire.

Table 2.12

Indicator: Components of Domestic Waste

Waste category	Kg	%
Recyclables	302.05	26.56
Food Waste	325.6	28.63
Green Waste	202.91	17.84
Fines (<10mm)	26.66	2.34
Other General	275.97	24.27
Hazardous	3.95	0.35
Total	1137.14	100.00%

(Source: Waste Audit and Consultancy Services, Feb 2004)

Table 2.13 details the amount of recyclables collected and diverted from landfill in the 2003/2004 period. For the majority of recyclable products, recycling rates are higher than in previous years (with the exception of steel).

Table 2.13

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

Product	Amount Recycled 2003/2004 (tonnes)
Paper	689.72
Glass	377.36
Plastic	77.3
Aluminium Cans	85.02
Steel	127.22
Total Recycled	1356.62

Indicator: Capacity of Landfill as at 2004

Projected life of landfill: ~ 10 years

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

The increasing use of resources by society has resulted in an increasing waste problem. Whilst there have been advances in technologies to recover, treat and reuse wastes, the increasing consumption of materials and the generation of wastes places pressure on the environment, particularly existing landfills and their capacities.

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 the impact of waste on the environment. These schemes include:

Chem Collect

Council has participated in the Chem Collect program over the last two years. The program provides an avenue for members of the community to dispose of unwanted household chemicals in a safe and environmentally sound manner, rather than place the chemicals in domestic waste collection bins where disposal at landfill could create serious environmental issues.

Table 2.14 details the amounts and types of chemicals collected over the last two years of the Chem Collect program in Muswellbrook. Whilst the amount of material collected has decreased since 2003, there was still a relatively large amount of chemicals collected, indicating that people are continuing to dispose of unwanted household chemicals.

Table 2.14

Indicator: Chemicals Collected - Chem Collect Program, Muswellbrook Shire

Waste Type	Total Net Weight (Kg)	
	2003	2004
Acids	9.0	72.0
Aerosols	18.5	6.5
Alkali	0.0	56.5
Arsenic based products	0.5	0.0
Asbestos	0.0	0.0
Batteries – lead acid	808.3	494.8
Batteries – nickel cad.	3.0	7.0
Batteries – nickel hydride	0.0	0.0
Batteries – other	0.0	11.0
Cyanide	0.0	0.5
Fire Extinguishers – halon	13.0	0.0
Fire Extinguishers - other	0.0	0.0
Flares/ammunition	0.0	0.0
Fluorescent tubes	0.0	0.0
Gas cylinders – propane	168.0	105.0
Gas cylinders - other	0.0	0.0
General household chemical (eg cleaners)	60.0	106.0
Heavy metal compounds (incl. mercury)	78.0	27.5
Hydrocarbons and fuels	169.5	34.0
Inert liquids requiring treatment	0.0	0.0
Inert liquids that may be sewerred direct	0.0	0.0
Inert solids – ordinary landfill disposal	0.0	0.0
Inert solids – special landfill disposal	0.0	0.0
Low level radioactive substances (eg smoke	0.0	0.0

detectors)		
Oil (flashpoint <61°C)	0.0	0.0
Oil (flashpoint >61°C)	872.5	345.0
Organo peroxides	0.0	0.0
Oxidising agents	4.0	6.5
Paint and Varnishes – recyclable	0.0	0.0
Paint and Varnishes – non recyclable – water based	267.0	272.5
Paint and Varnishes – non recyclable – solvent based	251.0	272.0
Paint and Varnishes – metal based	0.0	0.0
Paint and Varnishes – other, including isocyanates and amines	2.0	0.0
PCB materials	0.0	0.0
Pesticides – general liquid	34.0	151.0
Pesticides – general solid	5.0	21.0
Pesticides – organochlorine liquid	1.5	0.5
Pesticides – organochlorine solid	0.0	0.0
Reactives	1.5	1.5
Solvents – halogenated	0.0	0.0
Solvents – non-halogenated	0.0	0.0
Toxics	0.0	8.0
Pharmaceuticals	1.0	0.5
Photographic chemicals	0.0	47.5
Unknowns – liquid	146.5	21.0
Unknowns - solid	20.5	0.0
Other	0.0	0.0
Total kg's of Household Chemicals Collected	2934.3	2067.8

Compost Production

Council is committed to reducing the amount of green waste disposed of to landfill. 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. This in turn is reused by Council Parks and Recreation staff. Council is currently investigating a market for the compost.

Indicator: Total Compost Produced, 2003/2004

Data requested from Muswellbrook Water & Waste – Not Supplied

Indicator: Total Compost Used, 2003/2004

Data requested from Muswellbrook Water & Waste – Not Supplied

Clean Up Australia Day

Every year Council organises Clean Up Australia Day. Clean Up Australia Day 2004 resulted in 87 participants cleaning up streets, roadsides, parks and waterways in Muswellbrook, Denman and Wybong.

Waste Education – Illegal Dumping

Council has targeted illegal dumping in the Shire through the production of educational material which has been distributed to all ratepayers in the Shire. The flyers advised the community of the penalties that can be imposed for illegally disposing of waste materials, proper disposal methods for certain wastes, and numbers to call to 'dob in a dumper'. Council staff regularly undertake patrols of dumping hotspots to deter potential dumpers.

Industry Cleaner Production Program

As detailed in Section 1.8 Council received funding from the NSW Dept of Environment & Conservation for a cleaner production program in the Muswellbrook Shire. The program not only attempts to make small to medium business enterprises more energy and water efficiency, but it also attempts to reduce waste generated and disposed of.

Recycling Programs

Council's Administration Centre participates in a waste recycling scheme. The scheme ensures that all paper and other recyclables that are used in the building are reused where it is able to be, and recycled after it is used.

The program was introduced in March 1998, and with the introduction of the program, the cost of waste disposal for the centre has been reduced. The program has been working very efficiently and successfully with approximately three – quarters of the waste produced by the Centre being diverted from entering landfill and is now recycled into quality recycled products.

Council is also committed to the purchase of recycled content materials. A number of signs and play equipment being purchased by Council has been produced from recycled products. One sign is typically produced from approximately 500 milk cartons.

Don't be a Tosser Anti Litter Campaign

Council has, over a number of years, implemented the 'Don't be a Tosser' anti litter campaign. The campaign includes the distribution and display of educational material throughout the urban areas of Muswellbrook and Denman. Along with educational material, Council has increased patrol of known littering sites, and in particular has been targeting litter out of cars.

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

reviewing the current contract and making necessary changes before going out to tender. Issues which Council should consider in the review of the contract include the effectiveness of the current recycling system, the possibility of separate green waste collection (third bin) and the development of a market for compost.

Educational Programs

Further educational programs should be developed and implemented in relation to the recycling program throughout the Shire – what can and cannot be recycled etc. No effective, overall program has been run throughout the Shire since the recycling program was first introduced, so it may be timely for Council to consider reinforcing the program through education, particularly given the results of the audit complemented in early 2004. Such program may result in a decrease in the contamination rates of waste collected kerbside.

Other anti littering education programs should be developed and implemented throughout the shire in an attempt to reduce the amount of illegal waste dumping occurring throughout the Shire.

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)

Noise can be defined as 'undesirable sound' and when it intrudes on activities is considered to be noise pollution. Noise can have a number of undesirable effects depending upon its intensity, frequency, duration and the time of day when it occurs. Noise can impact adversely on health by causing tension, headaches and fatigue and permanent hearing loss over time.

As detailed in Table 2.15, the number of noise specific complaints received by Council has decreased significantly over the last few years. The decrease in noise complaints may be due to:

- Residents have become more tolerant of noise
- Residents may be tired of complaining – same noise but residents are no longer making formal complaints
- Residents are utilising the coal mining companies own complaint mechanisms and are not directing their complaints to Council or the EPA.

Table 2.15

Indicator: Number of Noise complaints received by Muswellbrook Council, 2003/2004, with Comparisons of total noise complaints for 2002/2003 and 2001/2002

Source of noise	Number of complaints in 2003/2004
Industrial	3
Transport (including roads, rail, aircraft)	4
Residential (including pets, air conditioners, power tools etc)	9
Recreational	Nil
Other	3
Total 2003/2004	19
Total 2002/2003	30
Total 2001/2002	87

Noise concerns within the community may also be a result of public entertainment premises generating noise, most commonly on Friday and Saturday nights. Table 2.16 details the current number of public entertainment licences issued by Muswellbrook Council throughout the Shire. The total includes one new licence issued during 2003/2004.

Table 2.16

Indicator: Number of Premises with Public Entertainment Licences

Number of Public Entertainment Licences 2002/2004	18
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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 etc
- Noisy neighbours

As can be seen in Table 2.15, the majority of noise related complaints received by Council relate to residential noise sources, such as pets, power tools, swimming pool pumps, air conditioners etc.

The EPA (2003) states that a number of factors contribute to problems of high noise levels including:

- Increasing population, particularly where it involves greater urbanisation and urban consolidation
- Increasing volumes of road, rail and air traffic
- Increasing industrial developments

Effective control of noise on the environment is a difficult issue for the community and for regulatory agencies due to the subjective nature of the definition of offensive noise and the difficulty of assessing noise monitoring results and the actual source of the noise.

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

Complaints Protocol

Council has a Complaints Protocol in place to ensure the concerns of the community are adequately dealt with, particularly in respect to complaints related to large industrial developments. The mechanism ensures the concerns of the community are dealt with adequately and objectively, and enables Council to monitor the resolution of complaints between the complainant and the source of the noise.

Noise Guide for Local Government

As part of its commitment to updating the Environmental Noise Control Manual, the Dept of Environment and Conservation released in June 2004 the Noise Guide for Local Government to update and replace certain sections of the ENCM. The Noise Guide for Local Government focuses on how to assess and manage noise issues dealt with by council officers, particularly neighbour to neighbour problems and those resulting from industrial and commercial premises.

Managing Neighbourhood Noise (video and booklet)

The EPA released the Managing Neighbourhood Noise video and accompanying booklet in January 2000. The video and booklet has been developed for use by authorised officers of local councils to help them select the appropriate regulatory tools when dealing with complaints about neighbourhood noise.

Managing Rural Noise (video and booklet)

The EPA released the Managing Rural Noise video and accompanying booklet in December 2001. The video and booklet has been developed for use by authorised officers of local councils to help them select the appropriate regulatory and management tools when dealing with noise complaints associated with rural activities.

NSW Industrial Noise Policy

The NSW Industrial Noise Policy replaces certain sections of the ENCM. The policy seeks to promote environmental well being throughout preventing and minimising noise by providing a framework and process for deriving noise limit conditions for consents and licences.

The Policy came into force in January 2000 and requires all assessments for potential noise from industrial facilities to be undertaken in accordance with the requirements of the policy.

Environmental Criteria for Road Traffic Noise

The Environmental Criteria for Road Traffic Noise also replaces certain sections of the ENCM and was released in June 1999. It aims to instate a more comprehensive and effective approach to managing road traffic noise.

Noise Monitoring

All mining operations within the Muswellbrook Shire carry out their own noise monitoring. Council receives results of this monitoring data, typically as part of the Annual Environmental Management Report prepared by each mine. Industry is being made more aware of its responsibilities in the noise control area and appropriate conditions are being placed on development consent to address the problems. The conditions imposed on the operations/activities attempt to reduce noise levels at the source, regulate the times of occurrence and install barriers between the noise source and the receiving environment.

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

The impact of noise on the amenity of the wider community is an important issue which, if not address appropriately, has the potential to escalate into an even greater issue of concern. Noise impacts need to be assessed at the following stages of development: planning, industry design, construction and management of the facility which has the potential to generate noise. This will ensure appropriate assessment has been undertaken and controls are in place to manage noise effectively.

2.8 Community Lands

Management Plan Goals:

- 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.

Challenges

- Meeting community expectations for parks maintenance.
- Formalising Councils relationship with community groups.

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

Community lands, or open space, are typically areas of urban land devoted to parks, reserves, gardens recreation 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.

Indicator: Area of Open Space in the Muswellbrook Shire, including National Parks and Nature Reserves

Area of Open Space:	1.45 km ² (or 1,450,000m ²)
Area of Wollemi National Park:	5264.23 km ²
Area of Manobalai Nature Reserve:	31.34 km ²
Area of Open Space per capita: (excluding National Parks and Nature Reserves)	95.75m ² per capita

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

Open space areas are increasingly under threat as a result of a number of pressures including expansion of residential areas, industrial or commercial developments or the construction of transport corridors and other infrastructure.

Additional pressures evident in the Muswellbrook Shire on open space areas has been the illegal dumping of waste material, particularly where residential areas are located adjacent to reserves and parks.

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. This ensures the uses permitted on the open space areas are determined with input from the community. Council is continuing to develop management plans for the open space areas in the Shire under the control and management of Council.

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)

In areas controlled and managed by Council proper maintenance programs need to continue to be implemented to ensure environment protection and biodiversity is maintained, such as through controlling weed infestations and protecting threatened species occurring in the areas.

Human Settlements

Responses developed in the state of the environment report for consideration in development of Council's management plan

Responses	Action to date	New action for Council's consideration
<p><u>Population & settlement patterns:</u></p>	<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 and energy efficiency measures (such as the draft regional Subdivision DCP ○ Tree Preservation Policy • Implementation of BASIX on 1 July 2005
<p><u>Drinking water quality:</u></p>	<ul style="list-style-type: none"> • Development of Drought Management Plan • Development of Demand Management Plan • Implementation of Hunter River Salinity Trading Scheme amongst industry • Effluent Reuse Scheme – recycle 100% of effluent • Water Campaign – inventory of water use (M1) • Formation of 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
<p><u>Energy:</u></p>	<ul style="list-style-type: none"> • Purchase of fuel efficient car (Toyota Prius) • Downsizing of Council fleet – purchase smaller vehicles • Progression through milestones in the Cities for Climate 	<ul style="list-style-type: none"> • Implementation of BASIX on 1 July 2005 • Continue to implement the Greenhouse Reduction Strategy • Adoption of regional

	<p>Protection Program</p> <ul style="list-style-type: none"> • Development and 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) 	<p>Subdivision DCP to incorporate energy efficiency requirements into subdivision design and construction</p> <ul style="list-style-type: none"> • Investigate participating in CCP Plus once Milestone 5 achieved in CCP Program • Further investigate retrofitting of Council buildings • Investigate incentive programs are energy efficiency • Implement energy efficiency educational programs • Investigate purpose of green power • Investigate solar power opportunities
<u>Transport:</u>	<ul style="list-style-type: none"> • Implementation of the bicycle / walkway plan • Downsizing of Council fleet – purchase smaller vehicles • Purchase of fuel efficient car (Toyota Prius) • Federal Government's Green Vehicle Guide – assist in choosing the right vehicle • State Govt policies and strategies including: <ul style="list-style-type: none"> ○ Cleaner Vehicles Action Plan ○ Action for Air ○ Action for Transport 2010 ○ Draft SEPP 66 	<ul style="list-style-type: none"> • Continue to purchase more smaller size vehicles in Council's fleet • Continue the development of bicycle paths / walkways throughout the urban areas.
<u>Waste management:</u>	<ul style="list-style-type: none"> • Participation in Chem Collect and Drummuster programs • Production of compost using green waste and solid STP waste • Clean Up Australia Day • Industry Cleaner Production program • Waste education activities, including Don't be a Tosser anti litter campaign • Recycling programs at Council facilities 	<ul style="list-style-type: none"> • Review and change were necessary waste management contract for waste depot • Develop and implement further waste education programs
<u>Noise:</u>	<ul style="list-style-type: none"> • Implementation of Council's Complaints Protocol • Development of resources to 	<ul style="list-style-type: none"> • Ensure noise complaints are addressed appropriately • Ensure noise impacts are

	<p>manage noise, including:</p> <ul style="list-style-type: none"> ○ Noise Guide for Local Government ○ Managing Neighbourhood Noise ○ Managing Rural Noise ● Implementation of NSW Industrial Noise Policy and Environmental Criteria for Road Traffic Noise 	<p>assessed in the planning stages of developments.</p>
<p><u>Community open space:</u></p>	<p>Management Plans being prepared for community lands</p>	<p>Proper maintenance for weed control and protection of known threatened species within community lands needs to occur</p>

2. Land

2.1. At a glance

Issue	Summary (status)
<u>Land-use changes:</u> State	<ul style="list-style-type: none"> Land degradation issues have 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 Hunter Catchment Blueprint
<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 native vegetation Bushfires Droughts Floods
Response	<ul style="list-style-type: none"> Erosion and Sediment Control Regional Policy and Code of Practice Construction site audits
<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 National Action Plan for Salinity and Water NSW Salinity Strategy National Dryland Salinity Program
<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"> Contaminated Land Management Act State Environmental Planning Policy 55 DCP 10: Determination of Rezoning and Development Applications involving contaminated land Contaminated Sites Register Identification of contamination issues on 149 Certificates

2.2. 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)

Most of the land degradation issues facing NSW today are the result of changes to land use during the first 100 – 150 years of European settlement, particularly those changes brought on by extensive clearing of native vegetation. These changes have altered the physical, chemical, biotic and hydrological balances in the landscape.

The major land - related environmental issues facing the Muswellbrook Shire and the Hunter Catchment as a whole include:

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

As detailed in Section 2.8, the area of open space per capita for the Muswellbrook Shire is 95.75m². Additional pressures are being placed on open space as a result in urbanisation, land degradation and illegal waste dumping.

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

Australia's soils are ancient, strongly weathered and relatively infertile. These natural limitations, together with a highly variable climate make many of the soils in the state susceptible to degradation. This degradation has been accelerated by inappropriate land use practices.

One of the major factors in changing the natural landscape and resulting in long term impacts on the environment has been the conversion of landscapes into agricultural landuse systems. Many farming methods adopted since European settlement have often been incompatible with the Australian climate and the long term sustainability of the country's soils. Other landuse changes which have placed pressure on natural landscapes and resulted in land degradation is urban expansion and industrial and commercial developments.

All of the above impact on landscape and landuse systems. They all typically result in the clearing of native vegetation, which in turn can lead to soil degradation, result in soil salinity and acidification and reduce biodiversity.

The clearing of native vegetation over a certain area now requires the approval of the Dept of Infrastructure, Planning and Natural Resources under the Native Vegetation

Conservation Act. The following indicator provides details on the amount of clearing approved in 2003/2004.

Indicator: Clearing Approvals (Ha), Muswellbrook Shire, 2003/2004

Data requested from DIPNR: Not supplied

As detailed in Section 1.6, the number of development applications submitted in 2003/2004 has increased from previous years, placing additional pressure on the environment through land use and development changes.

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 provides an assessment of land use change to develop a strategic plan to ensure development is permitted in the correct landscape zonings

Native Vegetation Clearing Approvals

Approvals for the clearing of native vegetation of over 2ha in area are currently required from the Dept of Infrastructure, Planning and Natural Resources under the Native Vegetation Conservation Act. The requirements ensure that large scale amounts of native vegetation are not cleared without proper assessment.

Hunter Catchment Blueprint

The Hunter Catchment Management Trust (now Hunter Central Rivers Catchment Management Authority) has developed the Hunter Catchment Blueprint. The Blueprint identifies and prioritises the most important natural resource management issues for action and funding. These include land use impacts on the natural landscape.

Landcare Groups

There are a number of Landcare groups in the Muswellbrook Shire working towards preventing and reversing land degradation, and encouraging the implementation of more sustainable land management practices.

Policy for Sustainable Agriculture in NSW

This state government policy recognises both the value of agriculture and its potential to affect the environment. The policy has identified a wide range of actions to achieve sustainable agriculture.

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

Land management practices must continue to change in order for improved environmental outcomes to be achieved. Land management practices should reflect the ability of the natural landscape for farming utilisation purposes.

Further educational programs should be developed targeting agricultural land uses to improve land management practices.

2.3. 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. Many of Australia's soils are old, weathered and infertile, making them particularly susceptible to erosion. The potential for soil erosion increases wherever soil is disturbed or exposed by the removal of protective vegetation cover and during high intensity rainfall or winds.

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. The clearing of native vegetation, excessive cultivation, overgrazing of introduced animals and pests, and poor matching of land use activities with land capability have been directly associated with increased rates of soil erosion in NSW. Extreme events such as drought, bushfires and floods have also increased erosion.

Degradation of riparian vegetation and changes in catchment hydrology have accelerated the erosion of creek and river banks. In urban areas, land clearing, soil disturbance and earthworks associated with development and redevelopment continue to expose soil to potential erosion.

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

As stated above, there are many factors contributing to soil erosion issues in the Muswellbrook Shire. These factors, or pressures include:

- inappropriate agricultural land use practices
- urban development and expansion
- removal of native vegetation
- bushfires
- droughts
- floods

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

Erosion and Sediment Control Regional Policy and Code of Practice

Council adopted the Erosion and Sediment Control Regional Policy and Code of Practice (DCP 9) on the 12th July 1999. It provides for uniform control of sediment and erosion control. All developments in the Muswellbrook Shire which will disturb the land surface are required to comply with the requirements of the policy and code.

Construction Site Audits

Council has commenced an auditing program of construction sites to determine compliance with Council's erosion and sediment control requirements. These audits aim to ensure erosion from construction sites is minimised, thus reducing the impact of the development on the environment, particularly downstream waterways.

At present there is no reporting mechanism in place to determine the % of compliance with erosion and sediment control requirements. Mechanisms are being introduced so that this information is able to be reported in the next SoE report.

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

Land management practices must continue to change in order for improved environmental outcomes to be achieved. Land management practices should reflect the ability of the natural landscape for farming utilisation purposes.

Further educational programs should be developed targeting agricultural land uses to improve land management practices.

2.4. 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)

Salinity occurs naturally in many areas of NSW, with high levels of soluble salts stored in the soil and ground water. These accumulations of salt have developed from landscape processes over thousands of years. In other areas however, increasing salinity is the result of human activities altering the natural balance of the water cycle in the landscape – this is ‘induced’ salinity.

The removal of native vegetation through land clearing and the adoption of unsuitable land practices have caused water tables to rise. This allows salts to move close to the surface of the soil where they are concentrated by evaporation or discharged into surface waters. Salinisation occurs when enough of these salts accumulate to cause degradation of land and water resources and vegetation.

Rising water tables and soil salinisation have serious and wide ranging environmental and economic implications, including decreased agricultural production, damage to infrastructure, landscape degradation and a decline in ecosystem health.

Indicator: Area affected by salinity, Muswellbrook Shire

Data requested from DIPNR: Not supplied

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

Water quality and the salinity level in the Hunter River has become an important issue for water users, industry, government agencies and the community over recent years.

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. But activities such as coal mining, power generation, industry and land clearing have increased the level of salinity in the river.

The coal mining and power industries generate large amounts of saline water during their operations. Factors affecting the rate and salinity of wastewater production include rainfall, rate of groundwater seepage into mine workings, use of water for on-site coal washing and dust suppression. Some saline minewater is stored for use on the mine site but the ability to store wastewater is controlled by the capacity of off river storage dams. Some saline wastewater may need to be disposed of. They may choose to do this through discharge to the river system.

Some more modern mines have water management systems which reduce the amount of saline water needing to be discharged, but this is not possible for all mines in the Hunter Valley.

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

Hunter River Salinity Trading Scheme

In response to the need to control saline water discharges into the Hunter River, the NSW Department of Land and Water Conservation and the Environment Protection Authority, with the cooperation of other interested organisations, developed the Hunter River Salinity Trading Scheme, an innovative method which reduces saline levels in the river while allowing mines and industry to discharge their excess water during periods of high flow thus maintaining in stream water quality.

The main objectives of the Hunter River Salinity Trading Scheme are:

- 1) To manage saline water discharges to minimise their impact on irrigation and other water uses, and on the aquatic environment of the Hunter River catchment.
- 2) To achieve this at the least overall cost to the community, in an equitable and flexible way that provides ongoing financial incentives to further reduce pollution through saline water discharges.

Generally, the scheme aims to keep salinity levels in the Hunter River below an agreed target salinity level of 600EC at Denman and 900EC at the Glennies Creek/Hunter River junction and at Singleton. This is achieved by limiting discharges of saline wastewater from coal mines and power stations to periods of flow in the river when impacts from these discharges are minimised by dilution effects. This is managed through a system of discharge “credits” which determine the discharge of each mine or power station participating in the scheme (known as “licence holders”).

National Action Plan for Salinity and Water

The National Action Plan for Salinity and Water is a seven year framework providing funding and coordinating actions in salinity or deteriorating water quality areas. The National Action Plan compliments and works consistency with the NSW Salinity Strategy.

NSW Salinity Strategy

The NSW Salinity Strategy aims to set the foundation for addressing salinity issues in salinity affected areas throughout NSW. The Strategy identifies eight key tools to address salinity issues and find regional solutions.

National Dryland Salinity Program

The National Dryland Salinity Program supports research, development and extension efforts for managing dryland salinity. The program has defined the distribution and impacts of dryland salinity across Australia and will assist in developing targeted national responses to the problem.

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

Priority areas of salinity need to continue to be managed effectively, with funding made available to assist in the implementation of appropriate measures.

Ongoing evaluation and monitoring of implemented actions needs to continue in order to determine their effectiveness and required changes needed.

2.5. 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)

In the past, many industrial and other activities have been carried out without adequate environmental safeguards or controls. Whilst air and water pollution have long been acknowledged as important environmental issues, it is only in recent years that the legacy of land contamination has been widely recognised by government, industry and the community.

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. These impacts can in turn affect public health by exposing people to polluted surface and groundwaters, inhalation and ingestion of soil, or through uptake and subsequent bioaccumulation by plants and animals.

The management of contaminated sites in NSW is shared by the Dept of Environment and Conservation and local councils. DEC manage sites deemed to present a significant risk of harm to the environment or public health. Muswellbrook Council, under State Environmental Planning Policy 55 (SEPP 55), is required, when dealing with rezoning proposals and in determining development applications, to consider whether the land is contaminated and if it is suitable for the proposed use. If the land is unsuitable, remediation is to be satisfactorily carried out before the land is used for the proposed use.

Table 3.1

Types of land uses causing soil or land contamination

Acid / alkali plant and blending
Agricultural / horticultural activities
Airports
Asbestos production and disposal
Chemicals manufacturing and blending
Defence works
Drum reconditioning works
Dry cleaning establishments
Electrical manufacturing
Electroplating and heat treatment works
Engine works
Explosive industry
Gasworks
Iron and steel works
Landfill sites

NOTE: The list in Table 3.1 is not exhaustive – other land uses can cause contamination. Furthermore, land contamination is not an inherent outcome of any of these land uses – site contamination arises from the standards of environmental management applied, rather than from the land use itself.

Metal treatment
Mining and extractive industries
Oil production and storage
Paint formulation and manufacture
Pesticide manufacture and formulation
Power stations
Railway yards
Scrap yards
Service stations
Sheep and cattle dips
Smelting and refining
Tanning and associated trades
Waste storage and treatment
Wood preservation premises

Muswellbrook Shire Council has a Contaminated Sites Register which identifies potentially contaminated sites throughout the Shire.

Indicator Number of potentially contaminated sites, Muswellbrook Shire (from the Contaminated Sites Register) 2003/2004	
Potentially contaminated sites:	102

The DEC (formerly the Environment Protection Authority) regulates sites deemed to present a significant risk of harm to the environment and / or human health. When a site is deemed to present a significant risk of harm, DEC notifies the relevant local council that the classification has been made.

Indicator: Number of Significant Risk of Harm Sites, Muswellbrook Shire, 2003/2004	
Significant Risk of Harm Sites:	0

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

Land contamination is an increasingly emerging issue. Demand for land, particularly residential land, is increasing. Council is continuing to receive inquires and development applications for redevelopment, particularly in older areas of Muswellbrook and Denman, resulting in land use changes from previously industrial / commercial developments to residential / multi unit dwellings. The redevelopment is at times occurring on land previously contaminated by past landuses, such as old service stations etc.

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

Contaminated Land Management Act

The Contaminated Land Management Act was established to provide a legislative process for the investigation and remediation of sites that pose a significant risk of harm to human health and the environment. The Department of Environment and Conservation is responsible for the regulation of these sites.

State Environmental Planning Policy 55

SEPP 55 details matters which must be considered by council and other planning agencies when making development and rezoning decisions affecting contaminated land. It ensures the planning system appropriately addresses land contamination issues at the planning stages of proposed developments / rezonings.

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

This policy provides a legislative basis for identifying lands potentially contaminated, and details the procedural processes for identifying, evaluating and remediating contaminated land. All development applications / rezoning applications for lands contaminated / potentially contaminated must abide by the Contaminated Lands Policy.

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 is undertaken.

Identification of Contamination Issues on 149 Certificates

Council identifies land which may be potentially contaminated on all 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)

Review of Contaminated Sites Register

Council should undertake a review of the Contaminated Sites Register to ensure all potentially contaminated sites are identified on the register.

Review of DCP 10

Council should undertake a review of DCP 10 to ensure it provides comprehensive advice to developers and the community regarding investigations associated with contaminated sites and the development assessment process under the planning framework.

Land

Responses developed in the state of the environment report for consideration in 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 • Native Vegetation Clearing approvals • Hunter Catchment Blueprint • Landcare groups – implementing on the ground works • Policy for Sustainable Agriculture in NSW 	<ul style="list-style-type: none"> • Continue to review the Muswellbrook LEP for consideration by Council • 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 • Construction Site Audits 	<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 • National Action Plan for Salinity and Water • NSW Salinity Strategy • National Dryland Salinity Program 	<ul style="list-style-type: none"> • Identification of priority areas with appropriate allocation of funding from the NSW government to assist in the implementation of appropriate remediation measures • Ongoing monitoring and evaluation of implemented actions
<u>Chemical contamination:</u>	<ul style="list-style-type: none"> • Contaminated Land Management Act • State Environmental Planning Policy 55 • 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"> • River of Contaminated Sites Register • Review of DCP 10

3. Atmosphere (air)

3.1. 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"> Energy efficient car in council fleet Downsizing of council fleet vehicles to 4 cylinders Cities for Climate Protection Development and 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: Action for Air, Action for Transport, Cleaner Vehicle Action Plan, Draft SEPP 66
<u>Air quality:</u> State	<ul style="list-style-type: none"> Air pollution as a result of both human induced and natural processes, including motor vehicles, coal fired electricity generation, industrial processes, solid fuel burning, dust storms, bushfires 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 burning coal for electricity, combustion of fuels, burning of solid wood for heating
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 sewage 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

3.2. The Enhanced Greenhouse Effect

Management Plan Objectives:

- To conserve energy and reduce greenhouse gases
- To reduce reliance on energy consumption

Refer to Section 1.8 for further information regarding energy and fuel use – both contributing factors to the enhanced greenhouse effect.

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

The Natural Greenhouse Effect

The greenhouse effect is a naturally occurring phenomenon. Light energy from the sun is radiated off the earth's surface in the form of heat. Some of this heat is trapped in the lower atmosphere by greenhouse gases, forming a blanket over the earth and maintaining the earth's surface temperature at a level which is necessary to support life.

The greenhouse gases include water vapour, carbon dioxide (CO₂), methane (CH₄), ozone (O₃), nitrous oxide (N₂O) and halocarbons. Without this natural greenhouse effect, the earth's surface temperature would be approximately 33°C cooler than what it is naturally.

The Enhanced Greenhouse Effect

Human activity is enhancing the concentration of greenhouse gases in the atmosphere, notably carbon dioxide, methane and nitrous oxides. The concentration of carbon dioxide in the atmosphere is now 30% higher than 200 years ago, and is caused by the burning of oil, coal and natural gas and the clearing and burning of vegetation. Carbon dioxide is the biggest contributor to the enhanced greenhouse effect (70%). Human activities such as waste decomposition, rice cultivation and venting of natural gas have resulted in methane concentrations rising by 145% over the past 200 years, which contributes approx 20% to the enhanced greenhouse effect. The burning of vegetation and industrial emissions have increased nitrous oxide emissions by about 15% over the past 200 years.

This increase in greenhouse gases has the potential to trap more heat in the earth's lower atmosphere, enhance the greenhouse effect, and lead to global warming.

Impact on the Environment

As the accumulation of greenhouse gases in the atmosphere increases, the amount of heat trapped in the atmosphere will also increase. Changes to our climate as a result of enhanced greenhouse gases will lead to potentially significant effects on natural ecosystems. The consequences to society from these effects may include flooding of low lying coastal areas, increase in intensity, duration and frequency of storms and cyclones, changes in flora and fauna habitat distribution, increases in fire risk, spread of pests and tropical diseases, and disturbance to agricultural systems.

The projected changes in climate will result in significant, often adverse impacts on many ecological systems and socio economic sectors including food supply and water resources and in human health.

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

Changes in land use and the burning of fossil fuels are the main contributors to the enhanced greenhouse effect. This includes the clearing of native vegetation and the replacement with other landuse systems which generate high levels of greenhouse gases such as rice cultivation and waste decomposition. The burning of coal to create electricity (for use in homes, offices, industry, etc) and the combustion of fuels to drive our transport systems (cars, buses, trains, planes) all generate greenhouse gases which are enhancing the natural greenhouse effect, resulting in adverse environmental impacts.

Section 1.8 details specific information regarding energy use (electricity, gas, fuels etc) in Council operations and for the community as a whole over the 2003/2004 period. It also details to calculated carbon dioxide equivalent emissions as a result of the energy usage.

Indicator Total amount of greenhouse gases emitted (carbon dioxide equivalent), Council operations (electricity, gas, fuel usage), 2003/2004

Total amount CO₂ equivalent emitted: 5790.9 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), 2003/2004

Total amount CO₂ equivalent emitted: 350229.4 tonnes

(Total includes emissions generated from electricity use only. Does not include emissions from community fuel and gas use etc - refer to Section 1.8 for specific information)

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

Sections 1.8 and 1.9 detail actions currently being implemented by Council and other stakeholders to address energy efficiency measures, including decreasing energy and fuel consumption (and thus decrease greenhouse gas emissions). Refer to these sections for detailed information.

In summary, the programs being implemented include:

- Inclusion of energy efficient car in council fleet
- Downsizing of Council fleet vehicles
- Participant in Cities for Climate Protection Program – progression to Milestone 5
- Development and implementation of Muswellbrook Greenhouse Reduction Strategy
- Implementation of Industry Cleaner Production Program
- Completion of energy audit for the Administration Centre
- Development of draft regional Subdivision DCP to incorporate solar access and energy efficiency design criteria
- Construction of bicycle / walkways (implementation of bicycle plan)
- Development and release of Green Vehicle Guide to provide advice to car buyers on environmental aspects of new vehicles
- NSW Government strategies: Action for Air, Action for Transport, Cleaner Vehicle Action Plan, Draft SEPP 66

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

Section 1.8 and 1.9 also details further actions that should be undertaken to continue to adequately address greenhouse gas issues. Refer to these sections for more detailed information, however, in summary, the actions are:

- Implementation of BASIX on 1 July 2005
- Retrofitting of Council buildings
- Investigate incentive programs
- Develop and implement educational programs
- Investigate purchase of green power
- Investigate solar installation opportunities
- Continue to downsize council vehicle fleet / purchase energy efficient vehicles
- Continue to implement cycleway / walkway development

3.3. Air quality

Management Plan Challenge: To reduce pollution levels

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

Air pollution occurs both naturally and as a result of human activities. At times, naturally occurring events such as dust storms and bushfires can cause severe air pollution. However, human activities including motor vehicle use, coal fired electricity generation, industrial processes and solid-fuel burning for domestic heating are all significant sources of pollutants, particularly in urbanised areas.

Air Quality Monitoring Program

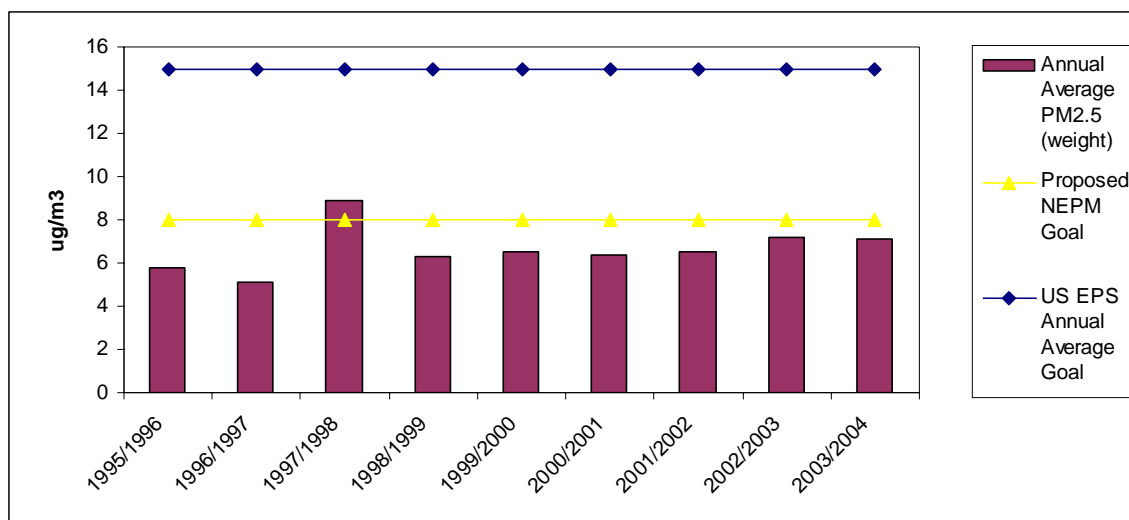
Council coordinates a PM_{2.5} air quality monitoring program in collaboration with the Australian Nuclear Science and Technology Organisation (ANSTO). The program has been in place since 1996 and tests particulate matter less than 2.5 micrograms for a 24 hour period twice weekly. The air sampling unit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

The study is designed to determine the elemental composition of fine particles in the atmosphere. Total weight, plus a breakdown of the main elements within the sample are performed. The results 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 2003/2004 period compared with previous years. It indicates that overall, there is a slight increase in PM_{2.5} in the atmosphere, however, this may be a result of the prevailing meteorological conditions over the last few years (ie drought conditions) then a significant increase in air pollution as such.

Figure 4.1:

Indicator: Particulate Matter (<2.5 µg/m³) Emissions, Muswellbrook Shire 1995 - 2004



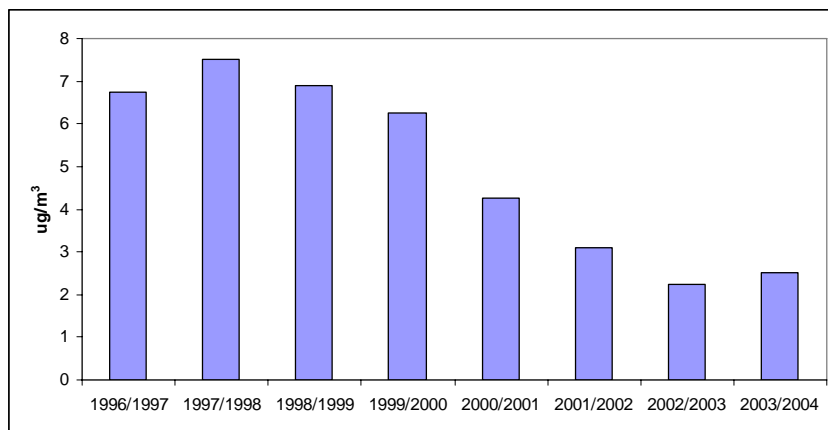
Note that the high levels of PM_{2.5} sampled in 1997/1998 are a result of severe regional bushfires in late 1997.

The results indicate that the level of PM_{2.5} in the atmosphere of Muswellbrook is below the US EPA annual average standard of 15µg/m³ and below the proposed Australian NEPM goal of 8µg/m³.

Figure 4.2 details the results of lead levels in the atmosphere. The results indicate a decrease in lead levels since 1996 to 2004. This may be in part attributable to leaded petrol being used less on vehicles and the use of lead replacements.

Figure 4.2:

Indicator: Lead Emissions, Muswellbrook 1996 - 2004



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

As discussed above, there are a large range of factors influencing air pollution levels in Muswellbrook. These include natural impacts from droughts (increase soil and organic fine particles in the atmosphere) and bushfires, which emit high levels of smoke and soot into the atmosphere (as evident in 1997/1998 sampling results).

Human induced impacts occur as a result of our day to day activities and requirements, including from the burning of coal to produce electricity, combustion of fuels to power motor vehicles, buses, trains and planes and from the burning of wood for domestic heating purposes.

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

Woodsmoke Reduction Program

Woodsmoke is a major cause of air pollution in the region and studies have shown it can produce up to three times as much particle pollution as cars. While the cold winter climate make wood heating a popular and economical form of heating, the topography of the region means that the smoke from wood heaters does not disperse readily and fills the air with a smoky haze. In addition, woodsmoke contains a number of noxious gases and particles that can cause a number of health

problems, such as dizziness, headaches, breathing difficulties, respiratory irritation and cancers.

The aim of the Woodsmoke Reduction program, implemented as a regional program throughout the Upper and Northern Hunter, was to raise community awareness of the environmental and health concerns with woodsmoke in a bid to improve the region's winter air quality by minimising the amount of pollution caused by woodsmoke.

A variety of community education methods, along with an enforcement program, were employed to achieve the aims of the Program. Educational materials including brochures, magnets, posters and seedsticks were produced and distributed throughout the community to inform residents about the environmental and health issues of woodsmoke and ways to minimise woodsmoke pollution. A school education program was also developed, with a Woodsmoke Teaching Unit handbook produced for Stages 3 & 4.

The enforcement program comprised regular 'chimney surveys' throughout the region to identify smoky chimneys and track the impact of community education activities. These surveys were conducted in Singleton, Muswellbrook and Great Lakes LGAs by Council staff for approximately four hours each week. A four step enforcement process was designed to reduce the number of smoky chimneys in the region. Firstly, fliers were sent to households that were observed to have an excessively smoky chimney for 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 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 (POE Act 1997) Prevention Notice.

Overall, 45% of chimneys surveyed in the region, which were seen to be smoking on the first survey, were identified as smoky chimneys (i.e. chimneys that smoke excessively for 20 minutes or more). Follow-up surveys found that 86% of these smoky chimneys were no longer smoking excessively, requiring no further action. (

The results of the surveys are a visible indication that the aims of the Woodsmoke Reduction Program were met. With such a significant reduction in observed smoky chimneys, it may be inferred that the education methods and enforcement program combined to reduce woodsmoke and improve the region's winter air quality.

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 smoky (Education pack sent to resident)	Follow up letters sent (where 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 has been running since 1995 and Council is committed to continuing the program into the future.

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, with restrictions in place for the burning of material in rural areas (approvals are required). The Regulation also prohibits burning in the open of certain items such as coated wire and tyres and phases out the use of incinerators.

Industrial Site Monitoring

Air pollution levels are being monitored by a network of monitors located throughout Muswellbrook and other areas of the Shire. The samples are collected by many of the industrial developments in the Shire, including coal mines, quarries, power stations etc. These monitors enable the identification of air pollution issues in the Shire.

State and Federal Government Responses

The NSW and Federal Governments are also actively addressing air pollution issues through a number of programs, including:

- Cleaner transport programs (see Section 1.9 for further information)
- Cleaner business programs – through cleaner production funding throughout the state
- Cleaner homes programs (for example the woodsmoke reduction program detailed above – this is occurring throughout many areas of the state)

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

Air monitoring programs

Council and other organisations (such as mining companies, power stations etc), should continue to undertake air monitoring in order to monitor any air pollution impacts that may be occurring, particularly for the township of Muswellbrook. Industry should continue to implement appropriate actions, such as dust minimisation measures, in order to prevent dust impacts from occurring.

Woodsmoke Reduction Program

Council should continue to implement the Woodsmoke Reduction Program during the winter season in order to raise community awareness about environmental and health issues associated woodsmoke emissions and thus preventing emissions from occurring through proper management and use of wood heaters.

State and Federal Government Programs

The state and federal governments should continue to fund cleaner air programs throughout the state.

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)

Odours are typically an air impurity which are difficult to regulate due to individual perceptions and reactions to different things. Climatic and seasonal influences can impact on odour and the effect is may have on individuals.

The number of odour complaints received by Council for the 2003/2004 period are detailed below. Typically, the odour complaints were in relation to sewer concerns.

Indicator: Number of Odour Complaints received by Council, 2003/2004

Number of Odour Complaints:	6
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2. Why is it happening? (Driving forces, pressure)

Many agricultural, industrial and commercial developments have the potential to generate odours. Such developments include farming (such as dairy farms), sewerage treatment plants, landfills, mines, chemical storage areas etc.

The activities, if not managed appropriately, can generate significant odours and impact on human amenity.

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

Complaints Protocol

Council has a Complaints Protocol in place to ensure the concerns of the community are adequately dealt with, particularly in respect to complaints related to large industrial developments. The mechanism ensures the concerns of the community are dealt with adequately and objectively, and enables Council to monitor the resolution of complaints between the complainant and the source of the noise.

Protection of the Environment Operations Act 1997

Under the POEO Act, it is an offence for the operator of any facility to cause air pollution, including odour, through a 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 public nuisance under which Council can take action against odours.

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

Council, together with other consent authorities and government agencies, should 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 in the state of the environment report for consideration in 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"> • Energy efficient car in council fleet • Downsizing of council fleet vehicles to 4 cylinders • Cities for Climate Protection • Development and 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: Action for Air, Action for Transport, Cleaner Vehicle Action Plan, Draft SEPP 66 	<ul style="list-style-type: none"> • Implement BASIX on 1 July 2005 • Investigate retrofitting of council buildings • Investigate incentive programs • Develop and implement educational programs • Investigate the purchase of green power • Investigate solar installation opportunities • Continue to downsize council vehicle fleet where options exist • Continue to implement bicycle / walkway plan
<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

4. Water

4.1. At a glance

Issue	Summary (status)
<p><u>Freshwater ecosystem health</u> 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 • Blue green algal blooms occurring
Pressure	<ul style="list-style-type: none"> • Land use impacts from agriculture, clearing of native vegetation, runoff of sediments, in site sewage management systems • Urban impacts – increasing urbanisation, stormwater containing pollutants
Response	<ul style="list-style-type: none"> • Water Quality Monitoring program • Effluent Reuse Schemes • Rivercare Plans • Urban Stormwater Management Plan • Auditing program for On-S Sewage Management Systems • Trade Waste Audits • Upper Hunter River Rehabilitation Initiative • Hunter Catchment Blueprint • Healthy Rivers Commission
<p><u>Surface water extraction / water consumption:</u> State</p>	<ul style="list-style-type: none"> • Increase demand for water resources – rate of extraction in not sustainable • Modified flow patterns – regulation of the river
Pressure	<ul style="list-style-type: none"> • Agricultural demand for irrigation • Potable water demand in urban areas • Industrial demand for water for industrial processes
Response	<ul style="list-style-type: none"> • Drought Management Plan • Demand Management Plan • Effluent Reuse Scheme • Water Campaign (water efficiency measures) • Subdivision DCP (to incorporate water sensitive urban design principles)
<p><u>Groundwater issues:</u> State</p>	<ul style="list-style-type: none"> • Increasing use of groundwater resources • Over extraction can result in reduced base flows to rivers and decrease the amount of water available to other groundwater dependent ecosystems; altered water quality; reduced amount of groundwater available for future use
Pressure	<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 sewage management systems • Contamination as a result of diffuse and point source pollution

Response	• Water Management Act
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4.2. Freshwater ecosystem health

Management Plan Objectives:

- Reduce nutrient levels and sediment entering major rivers and streams
- Identify impacts on the Hunter River and Goulburn River systems in the Shire
- Reduce pollution by application of DCP 6 (flood prone land) and DCP 9 (erosion and sediment control)

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

Healthy freshwater ecosystems are vital for the maintenance of aquatic and terrestrial biodiversity, water quality and industries such as aquaculture and fishing.

Geology, climate, riparian vegetation, groundwater quality, stream flow and landuse all influence the quality of water in rivers and streams. The Hunter catchment is in a degraded state compared to other catchments by changes to river channel structure, loss of riparian vegetation and growth of weed species. The following changes are occurring in the Hunter catchment:

- Nearly all original floodplain vegetation has been cleared
- Streamflow has been affected due to regulation
- The demand for unregulated streams has increased the frequency of low and zero flow periods
- Most salt, nutrients and bacteria are delivered to the rivers during high runoff events
- Groundwater levels are rising in some areas
- Blue green algal blooms have occurred periodically in many of the storages of the Hunter catchment

Table 5.1:

Indicator: Water Quality Guidelines and Mean Results of Water Sampling, Muswellbrook Shire 2003/2004

Site	Turbidity (ntu)	Salinity (Electrical conductivity) ($\mu\text{s}/\text{cm}$)	Faecal Coliforms	pH
Muswellbrook Bridge (Upstream)	20.3	301	1893	8.4
Ford Street Pump Station	13.6	313	1983	8.4
Muscle Creek	7.0	1373	1606	7.8
Hunter River between Muswellbrook & Denman	20.8	345	1628	8.4
Denman Pump Station	26.16	367	1592	8.4

Water Quality Guidelines (ANZECC/ARMCANZ)

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

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

There are a range of factors influencing freshwater ecosystem health, including:

Landuse Impacts

Impacts from current land use practices including:

- Agriculture – agricultural activities can contribute high levels of nutrients and sediments to the river systems in run off through irrigation practices or rainfall runoff
- Clearing of vegetation, particularly on river banks, 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. This in turn may pollute waterways

Urban Impacts

- Increase urbanisation results in greater runoff from land which once would have infiltrated the ground.
- Stormwater – transports pollutants from each 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 native vegetation in the catchment, sealing of ground surface for driveways, housing, roads etc, application of fertilisers, pesticides and herbicides, contaminated runoff from industrial / commercial premises, hosing of leaf litter and grass clippings into drains in urban areas, washing cars on the street.

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

There are a range of programs and actions being implemented to address freshwater ecosystem health. These programs include:

Water Quality Monitoring

Monthly water quality sampling is undertaken by Council under a program established in 1998 by the Upper Hunter Water Quality Advisory Committee and has been running for 7 years. The program was reviewed throughout 2002/2003 to ensure it continues to deliver effective outcomes for the community.

A number of parameters are analysed in the program, including pH, phosphate, electrical conductivity, 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

As discussed in section 1.7, Council has established effluent reuse programs for Muswellbrook and Denman sewage treatment works. These programs have resulted in 100% of effluent from the Muswellbrook and Denman STP being reused at minesites and golf courses, preventing treated effluent from being discharged under licence into the Hunter River.

Rivercare Plans

Council, together with technical assistance from the then Dept Land and Water Conservation, commissioned the development of two Rivercare Plans for the Hunter River, one covering Muswellbrook to Aberdeen and the other from Muswellbrook to Denman. The Rivercare Plans identify the strategies required to restore, rehabilitate and maintain the environment of the Hunter River over the next 5 years. The Rivercare plans are currently being implemented through Landcare groups and landowners.

Urban Stormwater Management Plan

The Muswellbrook Urban Stormwater Management Plan was developed under the direction of the NSW Environment Protection Authority. The stormwater plan covers Muswellbrook and Denman urban areas. The plan seeks to develop and implement strategies that will improve the quality of stormwater runoff from urban areas which will lead to improved water quality of streams and rivers in the Muswellbrook LGA and the Hunter River downstream. The plan is currently being implemented by Council.

Auditing Program for On Site Sewage Management Systems

Council has continued with the auditing of established on-site sewage management systems throughout the Shire. There is a total of 1181 systems registered with Council, of which 185 were inspected throughout 2003/2004.

Table 5.2:

Indicator: Registered On Site Sewage Management System Inspections 2003/2004

System Type	Number Compliant	Number Non-Compliant
ATWS	27	7
Septic	28	122
Modified Septic	0	1
Compliance status	55	130

Trade Waste Audits

Council has continued the auditing of trade waste premises (commercial / industrial) and the issuing of Trade Waste Approvals in accordance with DCP 14. The auditing program and the issuing of agreements ensure that wastewater source control measures are installed and the amount of pollutants being discharged into the sewer is minimised as much as possible. The installation and operation of trade waste measures also ensure the wastes are not inappropriately discharged into the stormwater system.

Indicator: Number of Trade Waste Approvals 2003/2004

Number of trade waste approvals: 83

Upper Hunter River Rehabilitation Initiative

The Upper Hunter River Rehabilitation Initiative is a joint initiative between Macquarie University, Dept of Infrastructure, Planning and Natural Resources and the Hunter-Central Rivers Catchment Management Authority with support of a range of industry partners and community stakeholders. The aims of UHRRI 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.

Throughout 2003/2004, the UHRRI project focussed on the planting of native vegetation on the banks of the Hunter River, and the planning stages for the placement of woody debris into the river system.

Hunter Catchment Blueprint

The Hunter Catchment Blueprint is a 10 year plan for integrated catchment management throughout the Hunter. The Blueprint sets natural resource priorities which will set the direction for managing native vegetation, biodiversity, water sources and soils in the Hunter catchment. The Hunter Catchment Blueprint is overseen by the Hunter – Central Rivers Catchment Management Authority.

Healthy Rivers Commission – Hunter River

The Healthy Rivers Commission released its report in May 2002 from its independent inquiry into the Hunter River. The Inquiry was undertaken to examine how the Hunter River was being managed – to determine whether the management is integrated and focused on achieving improved river health, whether there is an agreed set of river health goals adopted and whether river management plans are achieving desired outcomes.

The Inquiry found that there is much useful work being undertaken by a range of stakeholders (local community, landowners, Councils, agencies, businesses and individuals) to achieve river health goals. The Commission also found that government and community goals for ecologically sustainable development are yet being fully addressed in catchment management in the Hunter. The Commission

developed 8 key recommendations and 17 ancillary recommendations to guide government and the community to achieve appropriate river health goals.

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

Water Monitoring Program – a Upper Hunter approach

In order to address water quality issues in the Upper Hunter, Council has proposed to work with the Upper Hunter Shire Council to review existing water monitoring programs and devise an adequate program for the Upper Hunter region. This has been identified and is currently in the planning stages. Council should continue its commitment to the establishment of a committee to address these issues.

Revegetation / Rehabilitation Program

Council, environmental groups, landowners and individuals should continue to seek funding for the implementation of the revegetation / rehabilitation programs in the Shire to improve riverine health.

Council should continue to support existing programs, such as the innovative Upper Hunter River Rehabilitation Initiative to improve freshwater ecosystem health.

Implementation of Catchment Blueprint

The Hunter Catchment Blueprint's priority actions should be implemented by the relevant stakeholders in an integrated manner to ensure river health goals and sustainability are achieved. This will include funding and support from a wide range of stakeholders including government agencies, locals government, environmental groups, landowners and individuals.

4.3. Surface water extraction and water consumption

Management Plan Goal:

Customer orientated, environmentally sustainable water and sewerage service which meets present and future needs, and is provided in a commercial manner using best industry practice.

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

The extraction of surface waters is placing stress on both river health and the reliability of water supply. It is now widely recognised that the rate of extraction is not sustainable.

The natural flow patterns of rivers are highly variable. These patterns are essential for maintaining riverine health. Taking water away and modifying flow patterns can cause damage to river health.

The natural flows of many river systems in NSW, including the Hunter River, has been substantially modified to meet agricultural and urban demands and prevent the flooding of rural and urban settlements. The impacts of modified flows (regulated rivers) include:

- degraded water quality
- reduced riverine habitat
- reduced flooding of riparian zones and floodplains
- increase in algal blooms
- erosion of river channels

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

There is a great demand for water. A range of land uses rely heavily on water to undertake their activities, including:

- Agriculture – for the irrigation of pastures and crops
- Potable water supply in urban areas
- Industry – a range of industries rely heavily on water, including coal mines, power stations, etc

Refer to Sections 1.7 and 4.2 for data on water consumption patterns and further information regarding water use for the Muswellbrook Shire.

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

Sections 1.7 and 4.2 detail actions currently being implemented by Council and other stakeholders to address water consumption issues. Refer to these sections for detailed information.

In summary, the programs being implemented include:

- Drought Management Plan
- Demand Management Plan
- Effluent Reuse Scheme
- Water Campaign (water efficiency measures)
- Subdivision DCP (to incorporate water sensitive urban design)

Water Management Act – Water Sharing Plans

In addition to the above programs, the NSW Government has been introducing Water Sharing Plans for a number of waterways in NSW. The plans are being made under the Water Management Act.

The Water Management Act 2000 recognises the importance of maintaining the environmental health of the State's water while encouraging innovative and efficient use of this scarce commodity. Provisions to protect the environmental health of our water sources are set in the water sharing plans as well as the rules for a range of new water dealings for licence holders.

There are currently two water sharing plans applicable to the Muswellbrook Shire: the Regulated Hunter River Water Source and the Wybong Creek Water Sharing Plan. Water sharing plans ensure adequate water to support the ecological processes and needs of the river and direct how the water available for extraction is to be shared. The Water sharing plans set rules to affect the management of water access licences, water allocation accounts, the trading of or dealings in licences and water allocations, the extraction of water, the operation of dams and the management of water flows.

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

Sections 1.7 and 4.2 also detail further actions that should be undertaken to continue to adequately address water consumption issues. Refer to these sections for more detailed information, however, in summary, the actions are:

- 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

4.4. 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)

Many ecosystems, such as rivers and lakes require groundwater for their ongoing health and maintenance. Groundwater is a vital resource, particularly where surface water supplies are limited. Many towns throughout the state, including Denman and Sandy Hollow, use groundwater as a water supply.

Approximately 11% of the water used in NSW for drinking, irrigation, watering stock and domestic and industrial purposes comes from groundwater sources. This is expected to increase because most of the State's surface water resources are fully committed for extractive and other uses.

Changes in climatic conditions affect the amount of groundwater used. Extraction may increase in times of drought to offset the lack of surface water available, while in periods of high rainfall, use may decrease significantly.

Over extraction of groundwater can:

- Reduce base flows to rivers and decrease the water available to other groundwater dependent ecosystems
- Alter water quality
- Reduce the amount of groundwater available for future use

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

As discussed above, the pressures placed on groundwater are a result of both extraction and contamination issues, including:

- 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 sewage management systems impacting on groundwater quality (refer to Section 4.2 for further information regarding the management of on-site sewage management systems)
- 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 sewage management systems, coal, tars and ash from gas works etc).

Contamination may occur from the infiltration of such contaminants to the groundwater.

Indicator: Number of groundwater licences, Muswellbrook Shire

Data requested from DIPNR: Not supplied

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

Water Management Act

The major response to the pressures on groundwater resources has been from the NSW Government, who regulates the extraction and use of groundwater throughout the state. The NSW Government has introduced a range of measures to ensure that allocations for extraction do not exceed sustainable yields. The primary mechanism for achieving this has been the licensing of groundwater systems and the implementation of water-sharing plans in specific areas.

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

There needs to be a concerted effort to reduce the demand for water, whether from surface water supplies or groundwater supplies. This will reduce stresses to the natural environment and ensure ecosystem health. Reduction in water demand needs to be addressed by all stakeholders: government, community and industry to ensure each sector appropriately reduces its demand.

As part of the reduction strategies, educational programs should be developed and implemented and incentive schemes should be investigated to assist water users to reduce their demand.

Water

Responses developed in the state of the environment report for consideration in development of Council's management plan

Responses	Action to date	New action for Council's consideration
<p><u>Freshwater riverine ecosystem health</u></p>	<ul style="list-style-type: none"> • Water Quality Monitoring program • Effluent Reuse Schemes • Rivercare Plans • Urban Stormwater Management Plan • Auditing program for On-S Sewage Management Systems • Trade Waste Audits • Upper Hunter River Rehabilitation Initiative • Hunter Catchment Blueprint <p>Healthy Rivers Commission</p>	<ul style="list-style-type: none"> • Water Monitoring Program – an Upper Hunter approach • Revegetation / Rehabilitation Program • Implementation of Catchment Blueprint
<p>Surface water extraction:</p>	<ul style="list-style-type: none"> • Drought Management Plan • Demand Management Plan • Effluent Reuse Scheme • Water Campaign (water efficiency measures) • Subdivision DCP (to incorporate water sensitive urban design principles) 	<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
<p>Groundwater issues:</p>	<ul style="list-style-type: none"> • Water Management Act 	<ul style="list-style-type: none"> • Water use reduction measures

5. Biodiversity

Biodiversity is defined as “the variety of life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic, species diversity and ecosystem diversity” (NSW NPWS, 1999).

5.1. 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 • Matters of National Environmental Significance listed for the Muswellbrook Shire under the Commonwealth Environment Protection and Biodiversity Conservation Act
Pressure	<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
Response	<ul style="list-style-type: none"> • Establishment of reserves • Voluntary conservation agreements • Threatened species recovery plans / threat abatement plans • NSW Biodiversity Strategy • Biodiversity Planning Guide for Local Government • National Objectives and Targets for Biodiversity Conservation 2001 – 2005 • National Local Government Biodiversity Strategy • Synoptic Plan – Integrated Landscapes for Minesite Rehabilitation • Native Vegetation Act 2003 • Commonwealth and NSW Government funding programs (NHT, Environmental Trust etc)

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

Management Plan Challenge:

- Maintain wildlife corridors and principles identified in the Synoptic Plan

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

No systematic vegetation mapping for the whole of the Muswellbrook Shire has been undertaken to date which would provide details on the native vegetation communities and terrestrial ecosystems present. As a result, the extent and knowledge of native vegetation communities and diversity is limited. Knowledge which exists is typically a result of studies undertaken for proposed developments throughout the Shire.

Indicator: Area covered by conservation agreements with NPWS

Data requested from NPWS: Not Supplied

Indicator: Area of National Park, Nature Reserve, State Conservation Area in the Muswellbrook Shire

Area of Wollemi National Park: 5264.23 km²

Area of Manobalai Nature Reserve: 31.34 km²

No State Conservation Areas in the Muswellbrook Shire

The number of threatened species listed on the NSW Wildlife Atlas for the Muswellbrook Shire are detailed in Table 6.1. Table 6.2 details the matters of national environmental significance located within the Muswellbrook Shire under the Commonwealth Environment Protection and Biodiversity Conservation Act.

Table 6.1:

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

Classification	Number of species
FLORA	
• Endangered E1 (Endangered) (TSC Act)	2
• Endangered E4 (Presumed Extinct) (TSC Act)	0
• Vulnerable (TSC Act)	13
• Protected Plants (NPW Act)	8
FAUNA	

• Endangered E1 (Endangered) (TSC Act)	3
• Endangered E4 (Presumed Extinct) (TSC Act)	0
• Vulnerable (TSC Act)	27
• Protected (NPW Act)	294

Table 6.2:

Indicator: Matters of National Environmental Significance, Muswellbrook Shire, EPBC Act (Commonwealth)

Matters of National Environmental Significance	Number	Details
World Heritage Properties	1	Wollemi National Park - part of the Greater Blue Mountains Area
Wetlands of International Significance (Ramsar sites)	2	Within same catchment of the Hunter Estuary Wetlands (but not located in the Muswellbrook LGA) Macquarie Marches is also listed, but is not located in the Muswellbrook LGA, nor the Hunter Catchment
Threatened Ecological Communities	1	Grassy White Box Woodlands
Threatened Species	36	Including both flora and fauna species
Migratory Species	9	Including migratory terrestrial and migratory wetland species

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

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

- Key threatening processes (loss of habitat through clearing, frequent fire, predation by and competition with introduced species, changes to natural flow regimes, disease, collection - as per the Threatened Species Conservation Act – see list below)
- Clearing of native vegetation
- Inappropriate zoning
- Land use changes (resulting in land disturbance)
- Urbanisation and encroachment
- Fire management practices
- Altered hydrology
- Pollution
- Salinity

Key Threatening Processes

The Threatened Species Conservation Act 1995 (Section 8) lists the following as key threatening processes to biodiversity:

- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands (as described in the final determination of the Scientific Committee to list the threatening process)
- Anthropogenic Climate Change
- Bushrock removal (as described in the final determination of the Scientific Committee to list the threatening process)
- Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)
- Competition and grazing by the feral European Rabbit, *Oryctolagus cuniculus* (L.)
- Competition from feral honey bees, *Apis mellifera* L.
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition
- Importation of Red Imported Fire Ants *Solenopsis invicta* Buren 1972
- Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations
- Infection of native plants by *Phytophthora cinnamomi*
- Invasion of native plant communities by *Chrysanthemoides monilifera*
- Loss or degradation (or both) of sites used for hill-topping by butterflies
- Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish) (as described in the final determination of the Scientific Committee to list the threatening process)
- Predation by the European Red Fox *Vulpes Vulpes* (Linnaeus, 1758)
- Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)
- Predation by the Ship Rat *Rattus rattus* on Lord Howe Island

Indicator: Native Vegetation Clearing (ha), 2003/2004

Data requested from DIPNR: Not Supplied

Indicator: Hazard Reduction Activity / Area burnt by Bushfires, Muswellbrook Shire, 2003/2004

Area of Hazard Reduction Activity:	10 ha burnt 9375 ha grazed
Area Burnt by Bushfires:	163 ha

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

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

Establishment of Reserves

The designation of areas as National Parks and Nature Reserves ensures the protection of biodiversity within these 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.

National parks and nature reserves need to be appropriately managed however to minimise the risk to biodiversity, as many of the threats above can impact on these areas.

Voluntary Conservation Agreements

As discussed in Section 1.6, Council has required two recent developments to establish voluntary conservation agreements over land to ensure the protection of biodiversity. See Section 1.6 for further information.

Threatened Species Recovery Plans / Threat Abatement Plans

Once a species, population or ecological community has been listed as threatened, the Threatened Species Conservation Act requires the NPWS to draw up a recovery plan. This plan is designed to return the species, population or ecological community to a point where their survival is viable in nature.

Recovery plans outline the actions that government departments and other organisations have agreed upon to help the recovery of the species and they must be considered during the development assessment process of new developments which may impact on a particular species.

NSW Biodiversity Strategy

The NSW Biodiversity Strategy provides a framework for coordinating and integrating government and community efforts to protect native biodiversity, ensuring that available resources are efficiently and effectively applied.

Biodiversity Planning Guide for NSW Local Government

The Guide aims to assist councils to carry out biodiversity conservation as part of their day to day functions, particularly in relation to planning and development. The guide demonstrates how councils can conserve biodiversity through their existing regulatory and operational functions.

National Objectives and Targets for Biodiversity Conservation 2001 – 2005

The document sets objectives and targets for ten priority outcomes which the Commonwealth, States and Territories should pursue between 2001 and 2005, including the protection and restoration of native vegetation and terrestrial ecosystems, freshwater ecosystems and marine and estuarine ecosystems; the control of invasive species etc.

National Local Government Biodiversity Strategy

The National Local Government Biodiversity Strategy represents an agreed Local Government position at the national levels on the management of biodiversity. It recognises that conservation and sustainable use of natural resources will only be achieved through local planning area planning and management, along with community education and participation.

Synoptic Plan – Integrated Landscapes for Minesite Rehabilitation

As discussed in section 1.6, the Synoptic Plan is a strategic planning instrument for the future rehabilitation of mine sites within the Upper Hunter. The plan, in the long term, will aid in the protection of biodiversity through the development of corridors and linkages for wildlife through previously mined areas which will connect up with natural landscapes. This will aid in the movement of species between habitats and should result in an increase in species diversity within the area.

Native Vegetation Act

The Native Vegetation Act 2003 sets a framework for:

- ending broadscale clearing unless it improves or maintains environmental outcomes;
- encouraging revegetation and rehabilitation of land with native vegetation; and
- rewarding farmers for good land management.

The NSW Parliament passed the Native Vegetation Act 2003 but a supporting Regulation must be prepared and approved by the Minister before the Act can commence. The draft Regulation prepared in consultation with farming and environmental groups provides detail on how the Act will work on the ground. It is currently on public exhibition and will be finalised in light of comments received in order for the Act to commence in early 2005.

Commonwealth and State Government Funding – NHT / Environmental Trust

The Commonwealth and NSW Governments have provided funding opportunities for the implementation of a range of projects aimed at addressing environmental concerns, including biodiversity issues. Without these funds being available, many on the ground actions, particularly by local government and community groups / environmental groups, would not be implemented.

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

Council, together with other stakeholders should continue to seek funding where available for the implementation of environmental restoration and rehabilitation programs that address biodiversity issues.

Council should also apply, where appropriate, requirements for voluntary conservation agreements on development which may have significant impacts on the environment or which pose threats to biodiversity.

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 will provide valuable information on biodiversity within the Muswellbrook Shire and enable issues on concern to be addressed appropriately.

Biodiversity

Responses developed in the state of the environment report for consideration in development of Council's management plan

Responses	Action to date	New action for Council's consideration
<p><u>Terrestrial and aquatic ecosystems (including native vegetation communities)</u></p>	<ul style="list-style-type: none"> • Establishment of reserves • Voluntary conservation agreements • Threatened species recovery plans / threat abatement plans • NSW Biodiversity Strategy • Biodiversity Planning Guide for Local Government • National Objectives and Targets for Biodiversity Conservation 2001 – 2005 • National Local Government Biodiversity Strategy • Synoptic Plan – Integrated Landscapes for Minesite Rehabilitation • Native Vegetation Act 2003 • Commonwealth and NSW Government funding programs (NHT, Environmental Trust etc) 	<ul style="list-style-type: none"> • Regional Biodiversity Mapping project – funding received by HCCREMS • Continue to seek funding to implement on the ground works • Continue to explore the possibilities of voluntary conservation agreements in the Shire

6. Heritage

6.1. At a glance

Issue	Summary
<u>Aboriginal heritage:</u> State	<ul style="list-style-type: none"> Increasing 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

6.2. Aboriginal heritage

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

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

Heritage values in NSW are often divided into the categories of cultural and natural heritage. Cultural heritage comprises both indigenous and non indigenous (historic) heritage. Natural heritage refers to the physical forms of the terrestrial and aquatic environments. Distinguishing between natural and cultural heritage is often difficult because they can be elaborately intertwined. Aboriginal people have always had culturally specific associations with the natural landscape, making their cultural heritage values inseparable from natural values.

As evident in Table 7.1, there are a large number of known Aboriginal sites and relics in the Muswellbrook Shire. Many of these have been identified through the development assessment process for major development. The number of known sites has slightly increased from the previous year,

Table 7.1:

Indicator: Recorded Aboriginal Sites and Relics, Muswellbrook Shire 2003/2004 and Comparison with 2002/2003

Site Type	Number of Features 2003/2004	Number of Features 2002/2003
Aboriginal Resource and Gathering	0	0
Aboriginal Ceremony and Dreaming	1	1
Art (pigment or engraved)	11	11
Artefact	1080	1069
Burial	3	3
Ceremonial Ring (stone or earth)	1	1
Conflict	0	0
Earth Mound	1	1
Fish Trap	0	0
Grinding Groove	6	6
Habitation Structure	0	0
Hearth	0	0
Non-Human Bone and Organic Matter	0	0
Ochre Quarry	1	1
Potential Archaeological Deposit	0	0
Shell	2	2
Stone Arrangement	3	3
Stone Quarry	3	3
Modified Tree (Carved or Scarred)	14	14
Water Hole	0	0
Total Number of Features	1126	1115

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

A number of pressures can affect heritage values. Increasing population and housing density in urban areas can lead to the loss or degradation of heritage items and places as land uses change and residential areas and their infrastructure expand and intensify. Industrial developments resulting in large scale land use modifications such as open cut coal mining can impact on aboriginal relics and places. Other impacts occur from land clearing for agricultural purposes and gravel and sand extraction operations to name a few.

Apart from surveys 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 mining developments in the Shire.

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. AHIMS includes:

- a database and recording cards for all Aboriginal objects, Aboriginal places and other Aboriginal heritage values in NSW that have been reported to the NPWS
- a database index of archaeological reports and a library of these reports.

It is essential to note that a report from AHIMS does not represent a comprehensive list of all Aboriginal objects or Aboriginal places in a specified area. A report lists recorded sites only. In any given area there may be a number of undiscovered and/or unrecorded Aboriginal objects.

National Parks and Wildlife Act

The NPW Act protects all Aboriginal objects and Aboriginal places in NSW. It is an offence to do any of the following things without the permission of the NPWS (penalties can apply):

- 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)

In order to ensure aboriginal sites and relics are appropriately protected and managed, it is imperative that further research regarding their locations is undertaken. This currently mainly happens during the development assessment process for development, and is rarely undertaken for the sole purpose of identifying sites. The state government should work with local councils and community groups / aboriginal organisations in an attempt to gain a better understanding of aboriginal sites in the local area.

6.3. Non-Aboriginal heritage

Management Plan Objective:

Provide appropriate heritage advice when considering projects and development applications.

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

Muswellbrook Shire has a long history of European settlement, during which substantial changes have been made and are continuing to be made to both townscapes and rural landscapes. The conservation of heritage items in the Muswellbrook Shire is essential in order to preserve the history of the region.

A response to ensure heritage items are identified and appropriately managed has been the listing of items on heritage registers. Table 7.2 details the items in the Muswellbrook Shire which are currently listed on various registers:

Table 7.2:

Indicator: Heritage listed items, Muswellbrook Shire

Name of Heritage Register	Number of items listed
Register of the National Estate:	
• Registered	22
• Interim	2
Register of the National Trust of NSW	42
The Royal Australian Institute of Architects Register of Twentieth Century Buildings of Significance	16
Hunter REP (Heritage) 1986	70
NSW Heritage Council under the Heritage Act:	
• Permanent Conservation Order	6
LEP:	
• Registered sites on draft LEP schedule	136
• Sites requiring further investigation on Draft LEP schedule	38
• Potential archaeological sites on draft LEP schedule	
• Register of significant trees on draft LEP schedule	24
• Heritage conservation areas on draft LEP schedule	2
	4

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

The main impact on heritage items is the inappropriate management of the item, often to the point of disrepair. This issue is common where the heritage item is abandoned, or empty due to safety requirements (such as being in the active mining lease for open cut coal mines). A lack of maintenance can often result in the buildings becoming run down.

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

Progress to date since Council resolved to undertake the draft LEP amendment and draft DCP includes refinement of the items and descriptions thereof, conservation areas, listing of items for further investigation and items of potential archaeological interest, detailing of how development is to be assessed in terms of the items and the Environmental Planning and Assessment Act, 1979, and the protection/maintenance of heritage items.

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.

Appointment 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 draft Heritage amendment to the Muswellbrook LEP 1985 and the draft Heritage Development Control Plan. At each visit Council holds its 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.

Council should continue to, through the Heritage Committee, promote the proper management of heritage items in the Muswellbrook Shire to ensure they are conserved for the future.

Heritage

Responses developed in the state of the environment report for consideration in 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 – all sites / relics are protected Section 90 consent to destroy required to destroy aboriginal sites / relics 	<ul style="list-style-type: none"> Further research be undertaken were 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 Appointment of Heritage Advisor 	<ul style="list-style-type: none"> Further research be undertaken were possible by relevant stakeholders into the heritage values of identified heritage items