

State of the

E n v i r o n m e n t



Report

2002/2003

MUSWELLBROOK SHIRE COUNCIL



Muswellbrook Shire Council

State of the Environment Report

2002/2003

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

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1. INTRODUCTION

Under the Local Government Act 1993, every Local Council in New South Wales is required to prepare a State of the Environment (SoE) Report for its Local Government Area as part of its annual reporting requirements. Under the Act, the report for the year following Local Government elections must be a comprehensive document. The reports in the intervening years between elections may be either a comprehensive or supplementary document, updating all important indicators. **The 2002/2003 SoE Report is a supplementary report.** The most recent comprehensive report was the 1999/2000 report.

The 2002/2003 SoE Report addresses the eight environmental sectors of land, air, water, biodiversity, waste, noise, Aboriginal heritage and non-Aboriginal heritage as required by the Local Government Act 1993 and explicitly sets out sections on stormwater and sewage as required by the regulation.

The Local Government Act requires Council to:

1. Address the eight environmental sectors:
2. Provide for each environmental sector, as a basis of comparison in subsequent reports, a statement outlining the condition of the sector at the date of the report and make relevant comparison with the equivalent statement in the last (comprehensive) SoE report.
3. Report on all major environmental impacts and related activities, including management plans relating to the environment, special council projects relating to the environment, and the environmental impact of Council activities.

This State of the Environment report covers the period July 2002 - June 2003 and provides information pertaining to the state of the environment of the Muswellbrook LGA. This report should be read in conjunction with the last comprehensive State of the Environment Report (1999/2000).

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2. THE SHIRE OF MUSWELLBROOK

2.0 OVERVIEW

The Shire of Muswellbrook is centrally located in the Upper Hunter Valley, and covers an area of 3401.55 km² being located approximately 130 km 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.

The township of Muswellbrook is the main residential and commercial settlement in the Shire, with Denman and Sandy Hollow the two other small areas of settlement. The Muswellbrook Shire is bisected by the Hunter River, which flows from the upper reaches of the Barrington Tops past Muswellbrook and Denman where it is joined by the Goulburn River and continues in an easterly direction toward the coast at Newcastle. To the west of Muswellbrook, the countryside is undulating with Wybong and Sandy Creeks being the major drainage lines in the area. Similarly undulating hills dominate the landscape between Muswellbrook and Singleton, broken only by Lake Liddell. The rugged mountains of the Wollemi National Park are located in the south-west portion of the Shire. The National Park is a popular tourist attraction.

2.1 URBAN DESIGN

Muswellbrook Shire is made up of two main settlement areas: Muswellbrook and Denman.

2.1.1 Muswellbrook

Muswellbrook is the main residential and commercial urban settlement with a population of 10,377 (ABS 2001). Muswellbrook is made up of approximately 830 hectares of urban area and approximately 57 hectares of urban green space, which represents:

- Muswellbrook urban green space per capita is equal to 0.005 ha per person.
- Residential density in Muswellbrook Urban Area is 12.5 persons per hectare of urban land.
- Within the Muswellbrook Urban Area of approximately 830 ha, an estimated 57 ha is Urban Green Space (6.9%).

2.1.2 Denman

Denman is located in the centre of the Muswellbrook Local Government Area and is located at a height of 110 metres above sea level. Within the Denman urban area, which is approximately 100 ha, the urban green space is approximately 49 ha. The Denman population of 1,437 (ABS 2001), the approximate urban area of 100 ha along with approximately 49 ha of urban green space indicates the following:

- Denman urban green space per capita is equal to 0.034 ha per person.
- Residential density in the Denman urban area is equal to 14.37 persons per hectare of land.



2.2 DEMOGRAPHICS

According to the 2001 Census, the total population of the Muswellbrook local government area at that time was 15,281 persons. This a reduction in the population when compared to the previous census in 1996 whereby the population of the Shire was 15,562. Anecdotal evidence suggests that whilst the Shire may be growing in an economic sense, the increased efficiencies for the mining and power industries has reduced the population growth through emigration of new employees.

2.3 CLIMATE

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", every three to five days. Rainfall is highest in the summer months usually as the result of thunderstorms.

In winter the mid-latitude westerlies and high-pressure systems alternating with cold fronts modify the climate. 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.

Table 1: Climatic data for Muswellbrook Area for the 2002/2003 Financial Year.

Month	Average Maximum - 2002/2003 (°C)	Historical Average Maximum (°C)	Average Minimum - 2002/2003 (°C)	Historical Average Minimum (°C)	Actual Rainfall 2002/2003 year (mm)	Historical Average Rainfall (mm)
Jul 2002	19.2	17.3	2.1	3.7	1.7	44.3
Aug 2002	21.8	19.4	4.0	4.4	9.5	36.5
Sep 2002	25.1	22.8	6.3	6.9	37.6	41.3
Oct 2002	30.1	26.2	9.5	10.2	5.8	51.6
Nov 2002	33.1	29.3	15.2	13.1	59.2	57.8
Dec 2002	31.2	31.4	15.7	15.7	86.3	67.1
Jan 2003	33.4	31.8	17.6	17.1	16.0	78.1
Feb 2003	31.9	30.9	19.0	17.0	128.1	71.3
Mar 2003	27.7	29.0	14.2	15.0	23.2	58.4
Apr 2003	23.9	25.3	12.1	10.8	49.3	45.0
May 2003	21.7	21.2	9.7	7.4	21.0	41.3
Jun 2003	20.0	17.9	6.5	5.2	21.4	45.6
Total					459.1	640.5

Source: Bureau of Meteorology – Jerry's Plains data.

2.3.1 Temperature

The climate of the Upper Hunter Valley, which includes Muswellbrook, is characterised by hot summers with periods of humid, stormy conditions, and cool to mild, dry winters.

Temperature records for the 2002/2003 period at Jerry's Plains are represented in Figures 1 and 2 below, compared to historical averages for the Jerrys Plains area:

Figure 1: Average Maximum Monthly Temperature for 2002/2003 compared with Historical Averages

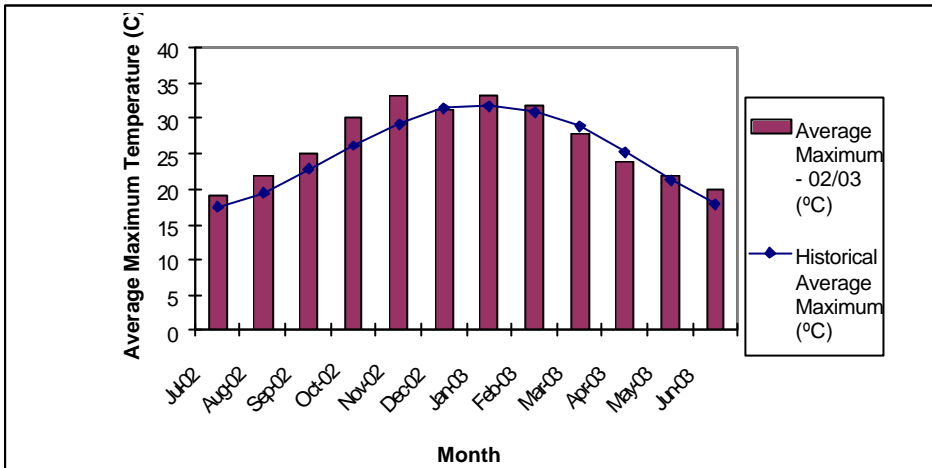
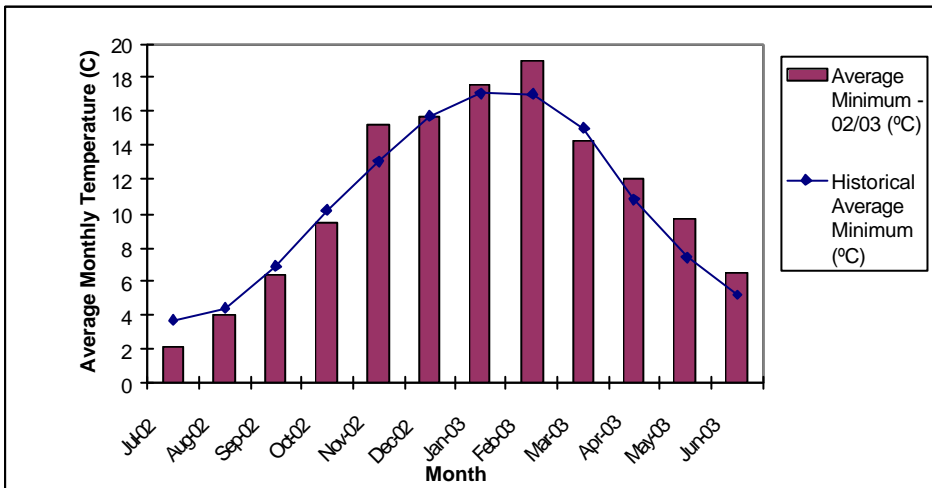


Figure 2: Average Monthly Minimum Temperatures for 2002/2003 compared to Historical Averages

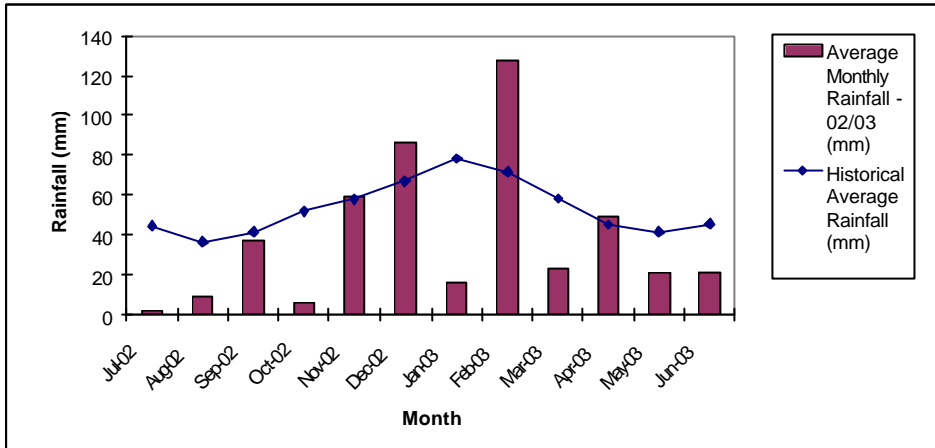




2.3.2 Rainfall

The annual rainfall for the 2002/2003 financial year was a total of 459.1 mm as detailed below in Figure 3. This rainfall is significantly less than the historical average, demonstrating the prevailing drought conditions during the first couple of months of the reporting period. Rainfall in the Muswellbrook district has a low reliability and is highly variable for any one month. Short periods of sustained heavy rainfall occur periodically in the Hunter Valley, either from the tail end of a cyclone passing down the east coast of Australia or from a stationary low pressure trough in this region. The intense convective storms usually occur in late summer, often producing short term runoff.

Figure 3: Actual Rainfall 2002/2003 versus Historical Averages for Jerrys Plains



2.3.3 Evaporation

Mean pan evaporation in the Upper Hunter, based on available records, is in excess of mean rainfall in all months, the deficit being least during winter months.

2.4 PLANNING AND MANAGEMENT PLANS

Planning provisions in the Muswellbrook Local Government Area are used to protect the sensitive areas of the environment of the Shire from the potential effects of development.

Muswellbrook Council uses a number of planning documents to enforce this protection and ensure all proposals are thoroughly assessed and are in accordance with the planning instruments adopted. These planning documents include:

2.4.1 Local Environment Plan

The Muswellbrook Local Environment Plan 1985 (LEP) is presently used by Muswellbrook Council in the assessment of development applications. The LEP delineates zones for which particular planning provisions apply. Clauses 11, 16 and 17 of the Muswellbrook LEP 1985 relate to development in Zones 7(d) – Scenic Protection, 7(L1) – Alluvial Lands and 7(L2) – Urban Buffer Zone, which are all recognised as environmentally sensitive zones. In summary, the clauses ensure that



adequate consideration is given to the following matters when assessing development applications:

- Retention of natural vegetation;
- Scenic protection of the landscape;
- Soil erosion potential;
- Aboriginal heritage;
- Drainage;
- Waste;
- Flooding;
- Bushfires;
- Impact on Water Quality;
- Visual Impacts;
- Reduction of agricultural lands
- Affect on future mining proposals

Muswellbrook Shire Council is currently undertaking a major review of the Muswellbrook LEP 1985 and the Rural Lands Strategy 1993. This will ensure that the LEP and Rural Lands Strategy reflect the growing needs of the Muswellbrook community, and additionally protect the environment and sensitive areas within the Shire. It is anticipated that the Draft Shire Development Strategy will be adopted by Muswellbrook Shire Council and the Department of Infrastructure Planning and Natural Resources by November 2003 and that the LEP Review/Amendment will be substantially completed by January/February 2004.

The advertising and referral/consultation processes of the LEP Review/Amendment should be underway by early 2004. It is likely that the Major Review/Amendment to the Muswellbrook LEP 1985 would be completed by mid/late 2004.

In conjunction with assessing development pursuant to the Muswellbrook LEP 1985 and the Environmental Planning and Assessment Act, 1979, Council additionally must refer to other planning documents in the assessment and determination of development applications. These planning instruments include Development Control Plans (DCP's), Codes, the Muswellbrook Shire Wide Heritage Study 1996, the Rural Lands Strategy 1993, Management Plans, the Synoptic Plan, and the Upper Hunter Cumulative Impact Study as discussed below. Any draft instruments must also be taken into consideration.

2.4.2 Development Control Plans

Muswellbrook Shire Council has adopted a number of Development Control Plans (DCP's) specific to the protection of the environment and with which all development within the Shire must comply. Council uses the DCP's in the assessment of development applications and conditions of consent issued by Council. Specific DCP's relating to the protection of the environment within the Muswellbrook Shire are:

- *Development Control Plan No. 9 – Erosion and Sediment Control – adopted 12th July 1999*

Council has adopted the uniform Policy and Code of Practice for Erosion and Sediment Control for the Central Coast, Hunter, Karuah-Great Lakes and Manning local government areas developed as a joint program of the Department Land and Water Conservation (DLWC), Hunter Catchment Management Trust (HCMT) and the



Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS).

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;
 - To promote and protect biodiversity.
- *Development Control Plan No. 10 – Contaminated Lands – adopted 12th July 1999*

Pursuant to the provisions of the Environmental Planning and Assessment (EP&A) Act 1979, Local Government Act 1993, Contaminated Land Management Act 1997, and the Contaminated Land Management Regulation 1998, Council has a duty of care when considering development applications, to consider fully the possibility of land contamination and the implications it has for any proposed future use of the land.

In recognition of its duty of care, Muswellbrook Council has adopted a precautionary approach to its consideration of applications involving contamination or potentially contaminated land. The object of this approach is to enable any land contamination issues to be identified and dealt with at an early stage in the planning process. In order for this to occur, Council has developed a set of procedures to be followed for rezoning proposals and development applications. These procedures allow for a merit based consideration of land contamination issues, ie. in considering the implications of contamination, Council will have regard for the sensitivity of a proposed land use in addition to any technical standards or requirements published by the NSW Environment Protection Authority (EPA), the Australian and New Zealand Environment Conservation Council (ANZECC), the National Health and Medical Research Council (NHMRC) or any other relevant authority.

New DCP's

DCP's adopted or reviewed during the 2002/2003 financial year which are relevant to the environment are:

- *Development Control Plan No. 14 – Trade Waste Approvals Policy for the Discharge of Liquid trade Waste, adopted 14th October 2002*

Sewerage systems are generally designed to cater for waste from domestic sources which are essentially of predictable composition and quality. Trade wastes (waste generated by industry, small businesses and commercial enterprises) may exert greater demands on sewerage systems and if uncontrolled can cause serious problems to the sewerage treatment processes or the environment.

The DCP ensures the proper control of trade waste discharges to the sewer, with the aim of protecting public health, the safety of Council employees, protection of the environment and prevention of nuisance and damage to the sewerage system.

Council has also commenced a review of five (5) DCP's which are discussed below:



- *DCP 1 – Off Street Parking Guidelines*

Council has identified that *Appendix 1- Schedule of Parking Requirements* requires further development and is currently undertaking a review. It is expected that this review will be complete prior to the conclusion of 2003.

- *DCP 2 – Industrial Development Landuse*

Council has identified that this complete document requires review to reflect a more contemporary approach to industrial development in Muswellbrook, particularly amongst the atmosphere of increased mining development within the Shire. It is anticipated that this review will be complete in early 2004.

- *DCP 5 – Signage Code*

Council has been reviewing the Signage DCP due to ambiguities over the requirements of the policy.

- *DCP 6 – Flood Prone Land*

Council has commenced a review of the Flood Prone Land DCP to update the requirements to more accurately reflect modern trends and the existence of more accurate details concerning flood events.

- *DCP 7 – Section 94 Development Contributions Plan*

Council has identified that the document requires a review in the areas of the schedule of charges/rates and the deferred payment of contributions to more accurately state Council's requirements. This has arisen through a recent Land & Environment Court case that revealed ambiguities in the document and public queries of the intent of the document.

2.4.3 Heritage - Plans

Currently there are a number of heritage items listed under the Hunter Regional Environmental Plan (REP) 1989 that are within the boundaries of Muswellbrook Shire. The items are broken into four categories of significance, they being State, Regional, Local and Requiring Further Investigation.

Under the REP, there are no items listed as State Significance, whilst there are 26 items of Regional Significance, 23 items of Local Significance and 32 items as requiring further investigation. Whilst the REP is used in the assessment of development applications, the Muswellbrook Shire Wide Heritage Study 1996 is also used to assess proposals as the Study provides more specific information as to what it is that makes the item to be of heritage significance, provides a more detailed analysis and was initiated as a review of the REP.

As a consequence of the Study, Council has been formalising the document into the Muswellbrook LEP 1985 and to develop a supporting DCP. For further comments, refer to the section headed 'Non – Aboriginal Heritage'.



2.4.4 Environment and Heritage Plan – Linkage with Management Plan

Muswellbrook Council has developed an Environment and Heritage Plan, which is incorporated into the Management Plan of Council. The aim of the Environment and Heritage Plan is to protect and improve the environment, through the challenges of reducing pollution levels, increasing community participation in environmental issues, establishing links between remnant native vegetation and establishing riparian zone planting on the Hunter River.

2.4.5 Muswellbrook Urban Stormwater Management Plan

The NSW Environment Protection Authority (NSW EPA) issued a direction to all local government authorities in NSW under Section 12 of the Protection of the Environment Administration Act 1991 to prepare catchment based urban stormwater management plans. The directive required the development of a stormwater management plan for the urban areas within the shire with a population of over 1000. Within the Muswellbrook LGA, this meant that the stormwater management plan would specifically relate to the main urban areas of Muswellbrook and Denman.

Council has completed the Urban Stormwater Management Plan, with the Plan being formally adopted by Council on the 9th July 2001. The Plan details a stormwater management program for implementation throughout Muswellbrook and Denman to improve the quality of stormwater runoff from the urban areas.

The recommendations in the Stormwater Management Plan are currently being implemented.

2.4.6 Rivercare Plans

Muswellbrook Council completed the second Rivercare Plan for the Hunter River between Muswellbrook and Denman during 2000/2001. Council has now prepared Rivercare Plans for the entire length of the Hunter River between Aberdeen and Denman.

These plans have been formally adopted by Council, Landcare, the Hunter Catchment management Trust and Dept Land and water Conservation and are currently being implemented by Landcare groups and landholders in the Shire.

2.4.7 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 to be used in the assessment of development applications under the Integrated Development Approvals (IDA) process pursuant to Section 90 of the Environmental Planning and Assessment Act, 1979 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/establishment and other designated development.



3. LAND

3.0 MUSWELLBROOK LANDUSE HISTORY

Prior to European settlement, two tribes of Aborigines were in possession of lands in the Muswellbrook Area.

European settlement within the area dates back to the discovery of the Upper Hunter by Chief Constable John Howe of Windsor in 1819 (Turner, 1995). 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.

'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 1839 to "Muswellbrook". 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.

Local Government commenced in 1906 as the Wybong Shire Council but the name was changed the following year to 'Muswellbrook Shire Council'. It was during this time that the Shire's current boundaries were defined. A series of amalgamations with adjacent regions continued until 1979, when the Shire of Denman and the Municipality of Muswellbrook amalgamated to form the present-day Muswellbrook Shire (Lambley, 1989)

The area steadily grew and the town of Muswellbrook developed as an established commercial centre with reticulated water (1915), and electricity (1923).

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, which now supports a population of 15,562 (according to the ABS Census 1996).

3.1 GEOLOGY OF THE MUSWELLBROOK SHIRE

For information about the geology and topography of Muswellbrook Shire, please consult the 1999/2000 State of the Environment Report (most recent comprehensive SoE report).



3.2 STATE

3.2.1 LANDUSE

Current landuse within Muswellbrook varies from large industrial operations such as power stations and coal mining, to agricultural activities such as cattle grazing and viticulture, and the conservation zones of Wollemi and Goulburn River National Parks and nature reserves.

Table 2 details the land area each of the main landuse categories occupy within the Shire, and the percentage it represents of the 3401.55km² land area.

Table 2: Landuse within the Muswellbrook Shire

Use	Area (Hectares)	% of Total Shire
National Parks	145,550	43
Nature Reserves	3,500	1
Power Stations	13,000	3.7
Coal Mine Leases (including open cut, underground and project mine leases)	16,517	4.8
Prime Agricultural Land	20,690	6.1
Vacant and Grazing	140,333	41.1
Urban Areas (approx)	950	0.3
Total Shire	340,540	100

3.2.2 DEVELOPMENT DURING 2002/2003

3.2.2.1 Development Applications

In the 2002/2003 financial year, a total of **406** Development Applications were received by Council between 1 July 2002 and 30 June 2003. This was a significant increase in comparison to 2001/2002 where **349** Development Applications were lodged between 1 July 2001 and 30 June 2002.

Of the 406 DA's lodged in the 2002/2003 financial year, 14 were withdrawn or cancelled and only 1 was refused. Many in the latter part of the financial year are still awaiting final approval.

The majority of DA's lodged related to residential home improvement structures such as pergola's, garages, extensions, swimming pools etc. What was of most interest was the increase in applications submitted for new dwellings. A total of 85 DA's were lodged for houses, 7 for flats and apartments and 4 for dual occupancies. In total, DA's lodged for new dwellings represented 22.6% of the total DA's lodged in the 2002/2003 financial year.

Council received a steady flow of applications over a broad range of areas. These included commercial, industrial, rural, mining and subdivision applications. The majority of these applications were of a minor nature whereby premises and installations were upgraded although amongst them were some major DA's which will be discussed further on.

Below is a breakdown of the variety of DA's received in the 2002/2003 financial year:

**Table 3: Breakdown of DA's received in 2002/2003**

Application Type	DA's Received	DA's Cancelled/Refused
Home Improvement	171	1
New Dwellings	96	1
Rural	21	1
Commercial	31	2
Industrial	14	1
Subdivisions	23	2
Mining	5	4
Section 96 amendments	12	-
Demolitions	7	1
Public works	8	1
Signage	5	-
Boundary Adjustment	6	1
Tourism	3	-
Rezoning	2	-
Extractive	2	-

3.2.2.2 Subdivision Development

A total of 20 subdivision applications were approved or are in the process of approval throughout the 2002/2003 financial year. A total of 14 subdivision applications have been approved whilst 6 remain to be determined.

The majority of subdivision applications received were for rural subdivisions consisting of 25 lots, however of note is the 69 lot rural/residential subdivision at 'Woodlands Ridge Estate', Woodlands Ridge Road, Muscle Creek which is currently awaiting final approval.

Of interest in residential subdivisions was the approval of a 36 lot residential subdivision at Edinglassie Drive in South-Eastern Muswellbrook. There were also numerous residential subdivisions consisting of 25 lots in the established townships of Muswellbrook and Denman. Of major interest is the current 132 lot subdivision proposal at Adams Street in South Muswellbrook for which a rezoning and subdivision application are currently being assessed, a 200 lot residential rezoning proposal at North Muswellbrook and possible rezoning and subdivision applications for the Eastbrook Estate at South Muswellbrook.

Overall, 81 new lots were created in rural areas whilst 47 new residential lots were created in the townships of Muswellbrook and Denman.

3.2.2.3 LEP Amendments

Numerous amendments to the Muswellbrook LEP 1985 were lodged or processed during the 2002/2003 they are summarised below:

**Table 4: Summary of current amendments to the Muswellbrook LEP 1985**

Amendment #	Description
Amendment No.85	Rezoning of land in Scott Street Muswellbrook from 2(d) Residential to 6(b) Open Space (Proposed Recreation)
Amendment No. 86	Rezoning of Land in North Muswellbrook from 1(c) Rural Smallholdings to 2(a) Residential
Amendment No. 87	Creation of LEP and DCP for Heritage Sites throughout the Shire
Amendment No. 90	Rezoning of small parcel of land in Queen Street Muswellbrook from 3(b) Special Business to 2(a) Residential
Amendment No. 91	Amendment under Schedule 3 to permit on 2(c) Residential land at South Muswellbrook a Tourist Facility / Establishment
Amendment No. 92	Rezoning of large portion of unimproved land on the southern outskirts of Muswellbrook from 2(c) Residential to 2(a) Residential
Amendment No. 93	Rezoning of land for commercial business in Maitland Street Muswellbrook from 2(a) Residential to 3(b) Special Business
Amendment No. 94	Rezoning of land for commercial business in Maitland Street Muswellbrook from 2(a) Residential to 3(b) Special Business
Amendment No.95	Rezoning of significant portion of land on the South-Eastern outskirts of Muswellbrook from 2(c) Residential to 2(a) Residential
Amendment No. 96	Reclassification of land on two sites in South Muswellbrook from 'Community' to 'Operational'
Amendment No. 97	Rezoning of Land in Victoria Street Muswellbrook from 5(b) Special Uses (Railway) to 3(b) Special Business

3.2.2.4 Construction Certificates

During the 2002/2003 financial year, 278 applications for construction certificates were lodged with Council. During the year 275 applications were approved, with 1 being refused and 2 being withdrawn.

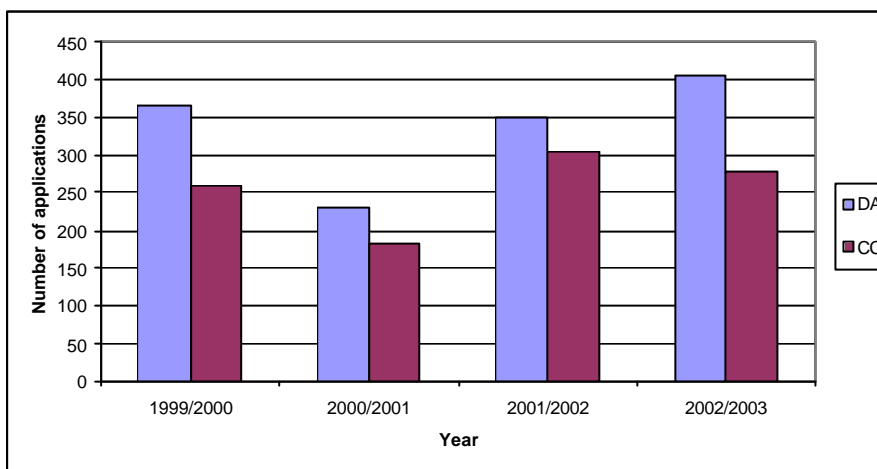
The construction certificates issued were for the following types of development:



- Residential – 234, which are broken down into:
 - New Dwellings – 66
 - House additions / alterations – 25
 - Garages / carports – 77
 - Pools – 27
 - Pergolas, awnings, screened enclosures – 40
- Commercial – 10
- Industrial – 11
- Rural – 14
- Other - 6

Figure 4 compares the number of development applications and construction certificates applied for in the 2002/2003 financial year with previous years since the last comprehensive SoE Report

Figure 4: Comparison of Construction Certificate and Development Applications for the Muswellbrook Shire



3.2.2.5 Environmentally Significant Developments Assessed during 2002/2003

Several environmentally significant developments were considered by Council and other regulatory bodies during the 2002/2003 financial year, the most important of these being:

1. Liddell Colliery Continued Operations

Liddell Colliery submitted a development application to Planning NSW for continued open cut mining operations and associated surface facilities and infrastructure at the existing Liddell Open Cut mine which is located within both the Muswellbrook and Singleton Shires. Council, through the Environment Committee, assessed the development application and recommended conditions of development consent to Planning NSW. The Minister for Planning approved the development application on the 20th November 2002.



2. Drayton Coal Mine Open Cut Extension

Drayton Coal submitted a development application in 2002 for the extension of open cut mining operations into Authorisation Area 173. An Environmental Impact Statement accompanied the development application. Muswellbrook Shire Council was the consent authority for the proposal and assessed the development through its Environment Committee. The DA was determined by way of approval on the 16th December 2002.

3. Muswellbrook Coal No. 1 Open Cut Extension

Muswellbrook Coal submitted a development application during 2002 for the extension of the existing No. 1 Open cut. An Environmental Impact Statement was submitted with the development application to assess the environmental impacts associated with the proposal, including noise, air, water, blasting, flora and fauna, aboriginal and non aboriginal heritage. Muswellbrook Shire Council was the consent authority for the development, with the DA being determined by way of approval on 11th August 2003.

4. Grasree Ridge Quarry and Plant Hire Business

A development application was lodged in 2002 for a ridge gravel quarry and plant hire business located off Grasree Ridge Road. An Environmental Impact Statement accompanied the development application for which Muswellbrook Shire Council is the consent authority. The development application has not been determined to date as there are currently outstanding issues relating to access onto the New England Highway, flora and fauna issues and aboriginal sites. The assessment of the development application is on-going, with determination of the development application anticipated during 2003/2004

3.2.3 EPA LICENSED PREMISES

Under the Protection of the Environment Operations (POEO) Act 1997 premises are required to obtain an Environment Protection Licence from the Environment Protection Authority if their activities are above the thresholds outlined in Schedule 1 of the POEO Act. The POEO Act came into force on the 1st July 1999 and replaced a number of other now repealed legislation including the Noise Control Act, Clean Water Act, Air Control Act, Environmental Offences and Penalties Act, Pollution Control Act and the regulatory provisions of the Waste Minimisation and Management Act under which pollution control licences were previously issued.

Table 5: Licenced issued by the EPA under the Protection of the Environment Operations Act 2002/2003, Muswellbrook Shire

Licence Number	Licence Holder
001323	Anglo Coal (Drayton Management) Pty Ltd
006538	Bengalla Mining Company Pty Limited
000954	Boral Resources (Country) Pty Limited
004885	Dartbrook Coal Pty Ltd
001245	Gates Pty Ltd (Jerden Street)
011345	Hunter Area Heath Service
011457	Hunter Valley Energy Coal Limited



011498	Hunter Valley Filter Sales Pty Limited
004731	Hunter Valley Gravel Supplies Pty Ltd
002094	Liddell Coal Operations Pty Limited
004731	Macquarie Generation
000113	Mt Arthur Coal Pty Limited
000656	Muswellbrook Coal Company
001593	Muswellbrook Shire Council – Muswellbrook Sewage Treatment Works
005059	Muswellbrook Shire Council – Denman Sewage Treatment Works
005980	Muswellbrook Shire Council – Muswellbrook Waste Management and Recycling Facility
001926	Pioneer Construction Materials Pty Limited
011677	Upper Hunter County Council

3.2.4 POWER STATIONS

The Muswellbrook Shire is an important electricity generation and coal mining area within New South Wales. Macquarie Generation presently operates two large coal-fired power stations in the area, Bayswater and Liddell, which supply almost one quarter of the electricity produced for the National Electricity Market (NEM), comprising New South Wales, Victoria, South Australia, Queensland and the ACT.

3.2.4.1 Liddell Power Station

Liddell Power Station (2000 megawatts capacity) was completed in 1974. Both drinking and process water supplies for the Station are abstracted from the Hunter River. This water is used to service both Liddell and Bayswater power stations. Cooling water for the units, which is used to increase the thermal efficiency, is obtained from Lake Liddell which was constructed in 1967-8 for this purpose, before the advent of the Clean Waters Act 1970.

The Station operates in accordance with EPA licence conditions which require continuous source monitoring of flue gases (sulphur and nitrogen dioxides, fluoride and particulates). Ambient air quality monitoring for the same parameters is also a requirement of the operating licence, with results from the monitoring program being formally reported to the EPA on a quarterly basis. Five ambient air monitors are maintained by Macquarie Generation and are located at Singleton Hill, Ravensworth, Lake Liddell, Mt Arthur North and Muswellbrook (Administration Centre).

3.2.4.2 Bayswater Power Station

Bayswater Power Station was completed in the mid 1980's and has an output of 2640 megawatts. Bayswater operates four 660 megawatt generating units. Each turbine generates the equivalent power of sixteen 747 jet engines in full thrust. Electricity is produced using pulverised coal-fired boilers and steam-driver turbo-generators in a similar way as outlined above. The plant is automated, and few items require manual operation.

3.2.5 EXTRACTIVE INDUSTRIES

There are two major types of extractive industry in the Muswellbrook Shire: sand/gravel extraction and coal mining.



3.2.5.1 Sand / Gravel Extraction

The number currently operating in the Shire has been reduced to five since the last SoE Report, as indicated below:

Table 6: Quarries operating in the Muswellbrook Shire 2002/2003

QUARRY	TYPE OF QUARRY
Hunter Valley Gravel Supplies	River sand and Gravel
Keepers	Ridge Gravel
N Barry	Ridge Gravel
Red Gravel	River sand and Gravel
Willowdell	River sand and Gravel

Other quarry developments:

- Cawsey Park is currently in the process of fulfilling the requirements of the Dept Land and Water Conservation and is not operational;
- Grasstree Ridge Quarry and Plant Hire Business at Grasstree Ridge ROW
- Garry Day Quarry on the Hunter River near Aberdeen

3.2.5.2 Coal Mining

Coal mining has been one of the most important industries in the Muswellbrook Shire and indeed much of the Hunter Valley almost since the beginning of European settlement in this area. There are currently six open-cut mines and one underground mine in the Muswellbrook Shire. These are:

- Mt Arthur Coal (incorporating the Bayswater No. 2 (rehabilitation), Bayswater No. 3 and Mt Arthur North mines) – open cut
- Bengalla – open cut
- Dartbrook – underground (both Muswellbrook and Scone Shires)
- Drayton – open cut
- Muswellbrook Coal – open cut
- Liddell Coal – open cut (both Muswellbrook and Singleton Shires)
- Hunter Valley Operations – open cut (part of mining lease in Muswellbrook Shire)

3.2.6 AGRICULTURE

3.2.6.1 General Overview

Agriculture is the most prominent and diverse land use in the Shire. Agricultural activities range from intensive cultivation on the floodplain, to grazing on the valley slopes.

The potential of land for agricultural use is defined by a series of Land Classes created by the NSW Department of Agriculture. The amount of prime agricultural land of agricultural suitability Classes 1 and 2 in the Shire is small, as it is restricted to the floodplains and associated low ground of the Hunter and Goulburn Rivers. The total area of prime agricultural land is 20,690 hectares but other areas of the Shire (Class 3 agricultural suitability) away from the rivers can be highly productive. The most productive land is largely used for milk production and for lucerne and pasture hay. Other agricultural activities on the alluvial flats include vegetable and



market gardening and beef fattening. Agriculture in the rest of the Shire is restricted by poor soil, lack of water and soil erosion potential. This land is used mainly for cattle and sheep grazing. Horse breeding and viticulture is carried out on smaller developments on the better soils. Fish farming is another agricultural development which is evident in the Shire.

Agriculture in Muswellbrook in 1996/97

The Australian Bureau of Statistics undertook a Agricultural Commodity Census during 1996/1997 which detailed the total area, production and value of various agricultural commodities in the Muswellbrook Shire area. The census concluded that for 1996 / 1997 the total value of agriculture for the Muswellbrook statistical area was over \$32 million.

Agriculture in Muswellbrook in 2000/ 01

Muswellbrook has a proportionally high number of holdings and low average property sizes (< 360ha), but also has a generally low average value of production per property and per hectare. This indicates the predominance of extensive agricultural enterprises on small farm holdings in Muswellbrook.

The relatively high contribution of Muswellbrook to the region's value of agricultural production, agricultural area and employment reflects the extent and quality of agricultural resources / enterprises.

Agricultural Trends in the Hunter

Analysis of agricultural statistics between 1993/94 and 2000/01 identifies a statewide trend for fewer, larger holdings and increased value of production. Over the same period, the reported agricultural area in the Hunter remained relatively constant, but the number of farm holdings increased by 3%, resulting in a decrease in the average area per farm (-3%). Agricultural employment between 1996 and 2001 remained stable across the region as a whole, in line with state wide trends.

The reported total value of agricultural production and average value of production per farm in Hunter increased steadily between 1993/94 and 2000/01. Rural fragmentation and industry adjustment and associated declining production in some agricultural sectors / locations may, however, mask the overall effect of increased agricultural production or innovation in the region.

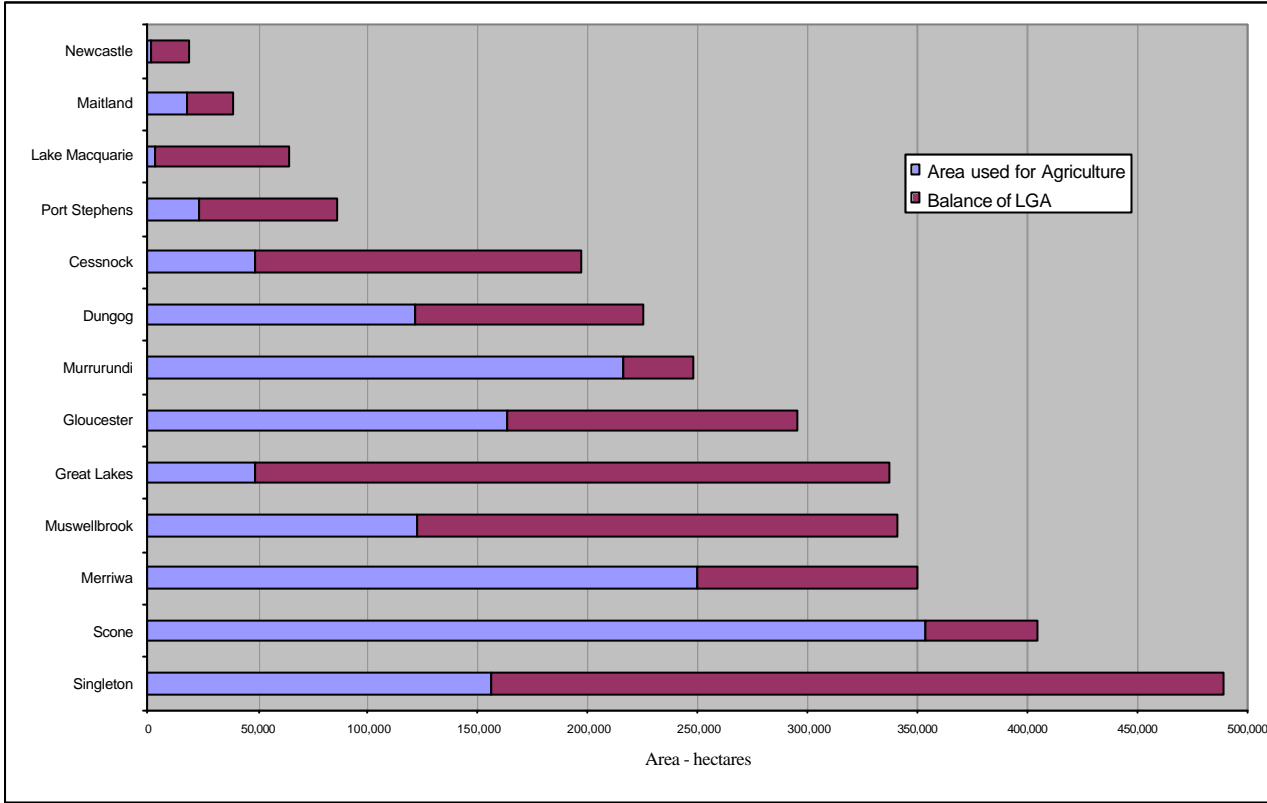
The reported increase in the regional value of agricultural production, despite declining average farm sizes indicates the growing significance of intensive agricultural enterprises in the Hunter. An average farm size of greater than 60 ha indicates that extensive / broad acre agriculture remains a defining agricultural feature in the valley.

Agricultural indicators Muswellbrook between 1993/94 and 2000/01 were positive, there is however a pattern that indicates increasing fragmentation and land use change with generally limited corresponding increases in agricultural production.

The ABS reported total area of agricultural holdings in the 13 local government areas comprising the Hunter was 1.5 mill hectares in 2000/01 (2.5% of NSW total). The size of the LGA and the reported total agricultural area varies as shown in Figure 5

The ABS reported area of agriculture in June 2001 in the Upper Hunter where the variability is pronounced reported an area of agricultural holdings in Merriwa, Murrurundi and Scone exceeding 70% of their respective LGAs, but only 32% and 36% for Singleton and Muswellbrook respectively.

Figure 5: Comparative Areas (hectares) used for Agriculture 2000/01



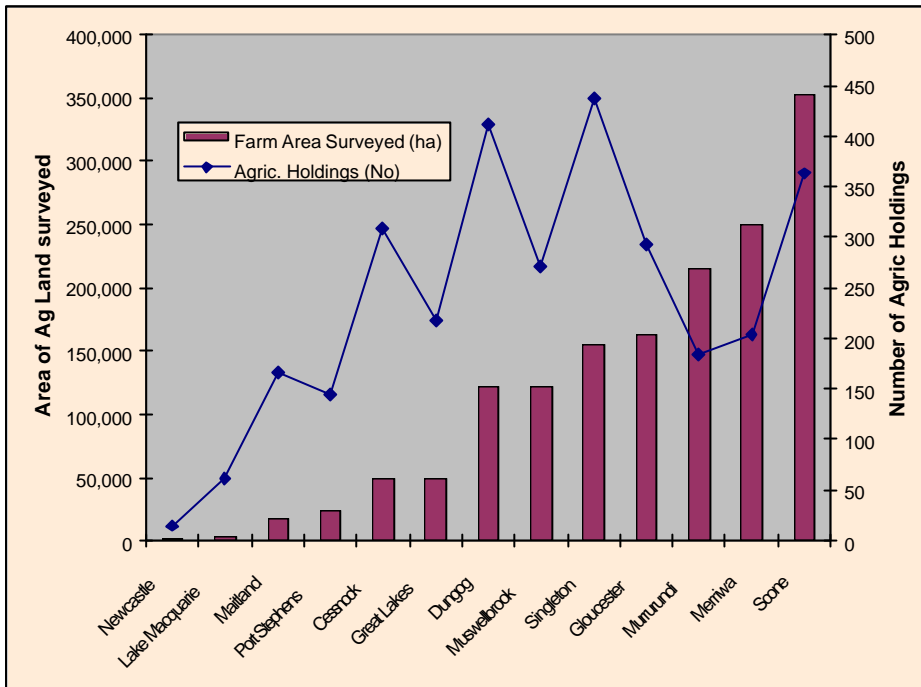
(Source: ABS Survey 2000/01 and ABS records of LGA area (1997))

Properties with less than \$5,000 of gross annual agricultural production are excluded from ABS surveys; hence highly fragmented localities with comparatively low agricultural production can result in a low reported area of agriculture. The extent of other rural land uses such as coal mining or conservation (private bushland, National Park, state forest) is also a contributory factor in the proportion of the LGA used for agriculture.

3.2.6.2 Agricultural Holdings and Value of Agricultural Production

ABS 2000/01 surveys identifies that the total number of agricultural holdings in the Hunter was 3,075 (7.3% of the NSW total). The larger, more rural LGAs generally have more holdings which meet the ABS criteria (> \$5,000 / yr), however, the number of reported holdings relates not only to the extent of agriculture but also the degree of rural fragmentation in the LGA. In particular the number of small to mid sized farm holdings.

Figure 6: Comparison of Reported Agricultural Area and Number of Agricultural Holdings



(Source: ABS agricultural data 2000/01)

Figure 6 identifies that despite the relatively similar agricultural reported area in the ABS surveys there are more holdings in Maitland than Port Stephens. Similarly there are notably more holdings in Cessnock than Great Lakes, in Dungog than Muswellbrook and in Singleton than Gloucester. Since all these LGAs have intensive (high value) agricultural enterprises (poultry, nurseries, turf etc) on relatively small holdings, the primary difference may be the influence of larger remnant grazing properties in Port Stephens, Great Lakes, Muswellbrook and Gloucester and the proportionally high number of small to mid sized properties in Maitland, Cessnock, Dungog and Singleton.

Further indication of the extent of rural fragmentation and average property sizes across the region is provided in Table 6, which shows the average size of properties across each LGA and the comparative agricultural production values. It should be noted, however, that considerable variation in lot size and returns is likely within each LGA.



Table 6: Comparison of the average area and average value of production per farm

	Ave Area / farm surveyed (ha)	Estimated Annual Value of Production (\$ mill)	Ave value / farm surveyed (\$/ farm)	Ave value / ha (\$/ha)
Singleton	360	\$34.6	\$79,200	\$220
Muswellbrook	450	\$33.6	\$123,900	\$270
Scone	970	\$51.3	\$141,300	\$150
Murrurundi	1,170	\$38.2	\$207,700	\$180
Merriwa	1,220	\$32.0	\$156,900	\$130
Lower Hunter *	140	\$68	\$97,100	\$710
Nthn Hunter	360	\$98	\$106,100	\$290
Upper Hunter	750	\$190	\$130,000	\$170
Hunter *	500	\$470	\$152,800	\$308
NSW	1,450	\$8,836	\$210,600	\$145

Notes:

- ABS annual production for Lake Macquarie was reported as \$123 mill in 2000/01, this is regarded as erroneous as the figure for 1993/94 and 1996/97 was \$8 mill and no corresponding increase in agricultural developments is known. The figure for the Hunter region or NSW has not been adjusted.
- Figures for Ave area /farm, ave value/farm and ave value/ha have been rounded.
- *Lower Hunter* = Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock LGAs
Upper Hunter = Singleton, Muswellbrook, Scone, Merriwa and Murrurundi LGAs
Nthn Hunter = Dungog, Gloucester and Great Lakes LGAs.

(Source: ABS Agricultural Surveys 2000/01)

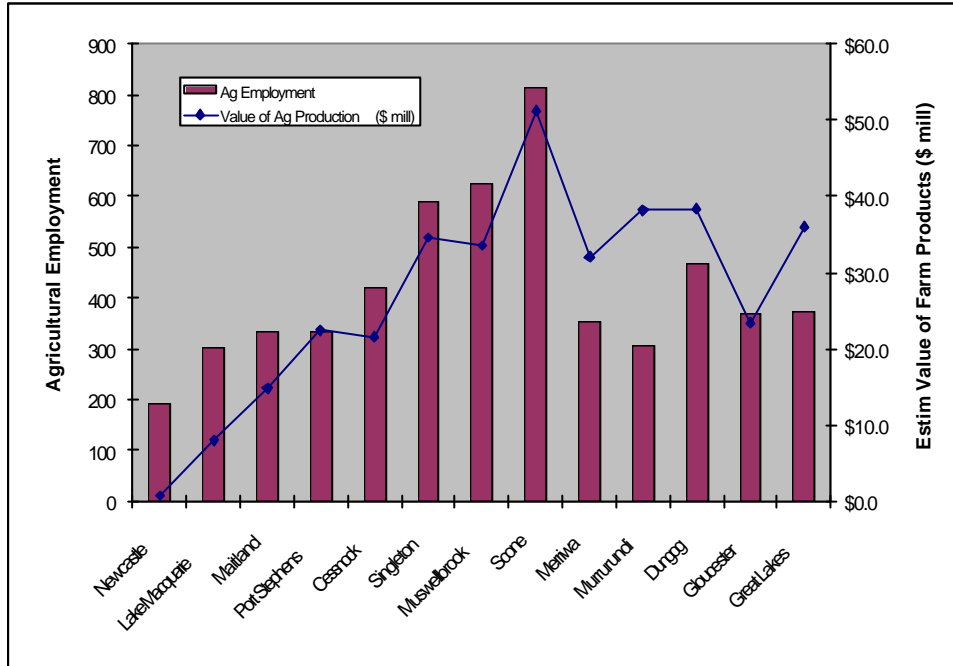
Agricultural properties in the Hunter are on average generally smaller than the state-wide average (approximately 500ha versus 1,450ha) and have a lower average value of production per property (\$152,800 vs \$210,600), but a higher value of agricultural production per hectare (\$308 vs \$145). This reflects the extent of rural fragmentation and the significance of intensive agricultural enterprises such as poultry, dairying and viticulture in the region. The area, however, remains less fragmented than the North Coast where the average area of agricultural holdings reported in ABS data for 2001 is approximately 280ha.

Muswellbrook has a low average property sizes (230 - 360ha) and has a low average value of production per hectare (<\$310), proportionally high number of holdings and a generally low average farm gate value of production per property (\$79,200 - \$123,800). This indicates a predominance of small - medium property sizes in the Shire and extensive agricultural enterprises.

3.2.6.3 Agricultural Employment

In June 2001, some 5,500 people were directly employed in agriculture in the Hunter. This comprises a significant 4.5% of total regional employment (ABS 2001-population census) and 6.8% of the state's agricultural workforce. Agricultural employment within LGAs is indicated in Figure 7.

Figure 7: Comparison of Value of Agricultural Production and Agricultural Employment.



(Source: ABS Agricultural Survey 2000/01)

More detailed assessment of 2001 ABS data (Gillespie 2003) identifies that the largest sectors for agricultural employment in the region are beef cattle (31%), dairying (14%), poultry (10%), equine (9%) and viticulture (9%) enterprises. These enterprises are generally dominant in the LGAs with the highest reported agricultural employment (Muswellbrook), but caution is required in the interpretation of employment data as the census records where people were resident on census night rather than where they actually work.

In the Hunter 77% of agricultural employment is associated with livestock industries and 53% of agricultural employment in the region is associated with intensive enterprises (eg poultry, viticulture, dairying, horticulture) indicating the significance of intensive livestock enterprises in the region.

3.2.6.4 Relative Significance

Comparison of the relative contribution of each local government area in terms of the total agricultural area, number of farms value of production and employment in Table 7 further illustrates the variation in the nature of agriculture between local government areas in the region.

**Table 7: Comparison of the relative agricultural significance of each LGA**

Local Government Area	% of Hunter Farms	% of Hunter Ag Area	% of Hunter Ag Value	% of Hunter Employ'm't
Muswellbrook	9%	8%	9%	11%
Singleton	14%	10%	10%	11%
Murrurundi	6%	14%	11%	6%
Merriwa	7%	16%	9%	6%
Scone	12%	23%	14%	15%
Lower Hunter *	23%	6%	19%	29%
Upper Hunter	47%	72%	53%	49%
Nthn Hunter	30%	22%	28%	22%
<i>Hunter as % of NSW</i>	7.3%	2.5%	6.8%	5.3%

Notes:

- *Lower Hunter* = Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock LGAs
Upper Hunter = Singleton, Muswellbrook, Scone, Merriwa and Murrurundi LGAs
Nthn Hunter = Dungog, Gloucester and Great Lakes LGAs.
- ABS annual production for Lake Macquarie was recorded as \$8 mill in 1993/97 1996/97 but \$123 mill in 2000/01. Adjusted figure of \$8mill used, as no corresponding increase in agricultural production is known.

(Source: ABS Agricultural Surveys 2000/01 and ABS population census 2001.)

Muswellbrook had a higher percentage of the total number of holdings in the region than the relative proportion of total agricultural area but varying levels of agricultural employment.

3.2.6.4 Hunter Valley

The area reported in ABS agricultural surveys of the Hunter Region between 1993/94 and 2000/01 has remained relatively constant. This pattern matches statewide trends as indicated in Table 8. During the same period, however, the reported number holdings in the Hunter increased by 3% contrary to the state trend (2% fewer holdings) resulting in a decrease in the average area of farm holdings (-3%) whereas the ave size of holdings state-wide remained constant.

The reported total value of agricultural production in the Hunter between 1993/94 and 2000/01 also increased steadily reflecting production increases and innovation in agriculture. The 42% difference across the 8-year period is slightly greater than the equivalent statewide increase of 40% but this is unlikely to be significant. The average value of production per farm also increased (up 5%) but this was slightly lower than the state trend.

Contrary to the statewide trend the decline in the average size and number of holdings in the Hunter across the 8-year period indicates ongoing rural fragmentation that is not being counter balanced by the consolidation of farms. Declining production in some agricultural sectors or LGAs as a result of rural fragmentation and industry



adjustment may, also mask the reported extent of increasing value of agricultural production.

Table 8: Relative Changes in Agriculture in the Hunter and NSW

Indicators	Hunter Trend	State Trend	Hunter as % of NSW (2001)
Area of Agriculture (1993/94 - 2000/01)	0 %	0 %	2.5 %
No of Ag. Holdings (1993/94 - 2000/01)	3 %	- 2 %	7.3 %
Value of Ag. Production (1993/94 - 2000/01)	42 %	40 %	6.8 %
Agricultural Employment (1996 - 2001)	0 %	1 %	5.3 %
Ave Area / Agric Holding (1993/94 - 2000/01)	- 3 %	0 %	
Ave \$ of production / farm (1993/94 - 2000/01)	5 %	7 %	
Ave \$ of production / ha (1993/94 - 2000/01)	42 %	40 %	
Ave \$ of production / Employee (1996 - 2001)	2 %	7 %	

From ABS Agricultural Census 2000/01 and ABS Population Census 2001.

The average agricultural employment in Muswellbrook has increased since the last population census (ABS population census) as illustrated in Table 9. As a consequence regional agricultural employment has remained stable, contrary to general perceptions. State wide agricultural employment also remained relatively constant.

**Table 4: Agricultural Trends across the Hunter**

Local Government Area	Change in Surveyed				Comment on Agricultural and Land use trends
	Area of Farmland (1993/94 – 2000/01)	No of Farms (1993/94 – 2000/01)	Value of Agric. Production (1993/94 – 2000/01)	Agric Employment 1996/97 - 2000/01	
Singleton	-11%	12%	1%	-14%	Agriculture in decline Land use change occurring
Muswellbrook	0%	-6%	14%	0%	Fragmentation but also increasing production in some sectors and locations
Merriwa	3%	-5%	36%	4%	Generally positive agricultural indicators
Murrurundi	10%	-4%	29%	4%	
Scone	7%	3%	48%	15%	
Lower Hunter	13%	11%	-19%	3%	Ag generally in decline Generally positive trend except for Singleton
Upper Hunter	-13%	-1%	2%	-4%	
Northern Hunter	3%	2%	25%	1%	Intensification / land use change
Hunter	0%	3%	7%	0%	Fragmentation offset by Intensification

Notes:

- *Lower Hunter* = Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock LGAs
Upper Hunter = Singleton, Muswellbrook, Scone, Merriwa and Murrurundi LGAs
Nthn Hunter = Dungog, Gloucester and Great Lakes LGAs.
- ABS annual production for Lake Macquarie was recorded as \$8 mill in 1993/97 & 1996/97 but \$123 mill in 2000/01. Adjusted figure of \$8 mill used, as no corresponding increase in agricultural production is known.

Analysis of trends in different agricultural sectors in the Hunter (Gillespie 2003) identifies growth in the beef (linked with a major decrease in stock on hand), pigs (subject to market fluctuations and grain prices), eggs, poultry meat, grape and vegetable production as well as increased olive plantings and mushroom production. Dairy, cereal grains, fodder (including lucerne hay) and apiary industries, however, all declined in the value of production and number of producers. The number of producers and employment in the meat chicken industry also declined over the period although the value and volume of production increased. These trends are expected to continue in line with industry rationalisation.

Increasing value of agricultural production despite declining average farm sizes and increased fragmentation indicates the growing significance of intensive agricultural enterprises in the Hunter. An average farm size of greater than 60 ha even in urban council areas, however, indicates that extensive / broad acre agriculture remains a key feature of agriculture in the valley. Gillespie's 2003 report on agricultural trends in



various agricultural sectors identifies that beef cattle still remain the dominant agricultural enterprise in the Hunter. Significant variation exists, however, in the changing patterns of agriculture within different parts of the region as indicated in Table 9.

Agricultural indicators for Muswellbrook were steady.

3.2.6.6 Upper Hunter: Singleton, Muswellbrook, Scone, Merriwa, Murrurundi

In the more rural LGAs of Scone, Merriwa and Murrurundi the reported agricultural area increased whilst the number of farms generally decreased. The coincidental significant increases in the value of agricultural production (29 – 36%) and increased agricultural employment (4 – 15%) indicates possible farm consolidation and / or the break up of the smaller less productive farms which then fell below the ABS criteria. Scone in particular reported positive indicators for agricultural growth.

In Muswellbrook the area of farmland remained constant but the number of farms declined. Some consolidation of farm holdings may have occurred as a result of mining company acquisitions and dairy rationalisation (though the latter only partly related to the reporting period). Continued rural fragmentation may also have focused on the mid to smaller properties thereby reducing the number of farms qualifying for the ABS survey with the associated loss of farm area offset by better reporting of actual farm area on other properties in the LGA. This appears to be supported by the reported 14% increase in the value of agricultural production.

Table 10: Trends in Agricultural Production Value 93/94 – 00/01

Value of Ag Production (\$ mill)	1993/94 (\$ mill)	1996/97 (\$ mill)	2000/01 (\$ mill)	Change 94 - 01 (\$ mill)	% Change	% of Region 2000/01	Reg Ranking 2000/01
Merriwa	\$23.6	\$28.1	\$32.0	\$8.40	36%	9%	7
Murrurundi	\$29.6	\$37.8	\$38.2	\$8.60	29%	11%	3
Muswellbrook	\$29.4	\$32.3	\$33.6	\$4.20	14%	9%	6
Scone	\$34.6	\$39.5	\$51.3	\$16.60	48%	14%	1
Singleton	\$34.1	\$35.1	\$34.6	\$0.50	1%	10%	5
Lower Hunter	\$83.7	\$76.6	\$67.6	-\$16.10	-19%	19%	
Nthn Hunter	\$95.9	\$97.1	\$97.7	\$1.80	2%	28%	
Upper Hunter	\$151.3	\$171.2	\$189.6	\$38.30	25%	53%	
Hunter	\$330.9	\$431.8	\$470.0	\$139.10	42.10%		
NSW	\$6,315.7	\$8,177.3	\$8,836.6	2520.9	39.90%		

Table 11: Trends in Number of Farms 93/94 – 00/01

Number of Farms Surveyed (no.)	1993/94	1996/97	2000/01	Change 94 - 01	% Change	% of Region 2000/01	Reg Ranking 2000/01
Merriwa	214	210	204	-10	-5%	7%	8
Murrurundi	191	182	184	-7	-4%	6%	9
Muswellbrook	288	283	271	-17	-6%	9%	6
Scone	353	344	363	10	3%	12%	3
Singleton	390	397	437	47	12%	14%	1
Upper Hunter	1,436	1,416	1,459	23	2%	47%	



Hunter	2,996	2,987	3,075	79	3%	
NSW	42,817	41,869	41,951	-866	-2%	

Table 12: Trends in Agricultural Employment 96/97 – 00/01

Agricultural Employment	1993/94	1996/97	2000/01	Change 96 -01	% Change	% of Region 2000/01	Reg Ranking 2000/01
Merriwa		341	355	14	4%	6%	8
Murrurundi		295	306	11	4%	6%	11
Muswellbrook		629	626	-3	0%	11%	2
Scone		710	816	106	15%	15%	1
Singleton		687	591	-96	-14%	11%	3
Lower Hunter		1,542	1,584	42	3%	29%	
Nthn Hunter		1,260	1,212	-48	-4%	22%	
Upper Hunter		2,662	2,694	32	1%	49%	
Hunter		5,475	5,487	12	0.2%		
NSW		79,707	80,570	863	1.1%		

Notes:

- Lower Hunter = Newcastle, Lake Macquarie, Cessnock, Maitland, Pt Stephens LGAs
- Nthn Hunter = Dungog, Gloucester, Gt Lakes LGAs
- Upper Hunter = Singleton, Muswellbrook, Murrurundi, Merriwa, Scone LGAs

3.3 PRESSURE

3.3.1 POWER STATIONS

3.3.1.1 Ash Generation and Disposal

During the coal combustion process in power stations, certain elements remain inert. Solid particles remain in the furnace (heavy bottom ash) and flues (fly ash) of the power station. The bottom ash is deposited at Pikes Gully. The fly ash is mixed with water to form slurry which is then deposited at the old Ravensworth mine void.

Macquarie Generation divert some of the ash which is a waste product of the generation of electricity by way of selling it for further use in cement manufacturing and road construction.

3.3.1.2 Other Pressures from Power Stations

The Liddell and Bayswater power stations additionally place pressure on other aspects of the environment, including air, noise and water. The specific pressures of these have been detailed in the Air, Noise and Water sections of this report.



3.3.2 EXTRACTIVE INDUSTRIES

Mining and quarrying activities place pressure on the environment mainly in that they disturb the ground surface, leaving it vulnerable to erosion by wind and water, creating dust problems and water contamination issues. There are also social issues to be overcome in relation to these activities, as they often conflict with the everyday lives of those around them. Noise is a major contributor, along with vibration (from blasting and machinery), dust and traffic problems associated with transporting product.

Table 13 details the mines currently extracting coal, their location in regards to the township of Muswellbrook, the date the mine commenced operation and the production figures for the 2002/2003 financial year.

Table 13: Coal Mine production figures 2002/2003

Mine	Location	Type	Commencement	Raw Production 2002/2003 (Mt)
Mt Arthur Coal (incl Bayswater No. 3 and Mt Arthur North)	5km SW of Mbk	Open cut	1995 (Bayswater No. 3) 2001 (Mt Arthur North)	7.1
Bengalla	3km W of Mbk	Open Cut	1997	7
Dartbrook	11km NW of Mbk	Underground	1994	2.91
Drayton	9km SE of Mbk	Open cut	1983	4.57
Muswellbrook Coal	1km NE of Mbk	Open cut	1979	1.145
Liddell Colliery	13kms S of Mbk	Open Cut	1946	3.2

Muswellbrook Shire has the last major unallocated open cut coal reserves left in NSW. As older, more costly open cut and underground operations close in the Lower Hunter Valley and Central Coast areas, the emphasis on coal production has begun to shift to the Muswellbrook area. This is evident in the number of new coal mine proposals, and the identification of unallocated coal reserves in the surrounding area. The following table identifies coal mines proposals for the Muswellbrook area which have been, or currently are for determination by the Minister.

Table 14: Proposed coal mining developments in the Muswellbrook Shire

Mine	Location	Type	Status
Mt Pleasant	2km NW of Mbk	Open Cut	Development consent granted, construction not commenced
Sandy Creek	1km NE of Mbk	Underground	Development Consent granted, construction not commenced
Saddlers Creek	SE of Mbk	Potential Open Cut	Exploration stage
Rosehill	W of Mbk	Potential open cut	Exploration stage
Anvill Hill	W of Mbk	Potential open cut	Exploration stage



3.3.3 AGRICULTURE

Agriculture places major pressures on the environment through many sources. Broad acre farming uses chemicals such as herbicides and pesticides that may have a cumulative and harmful effect upon both aquatic and terrestrial flora and fauna, the structure of the soil is disturbed and the soil hydrology is also disrupted. Removing native vegetation and replacing it with annual crops reduces the biodiversity of the region and can contribute to the problem of soil salinity.

Dryland salinity is determined by a number of factors in the local catchment such as geology, soil type, farming practices and vegetation cover. Regions identified by the Department of Infrastructure, Planning and Natural Resources as being affected by dryland salinity are:

- Muscle Creek catchment;
- Wybong area;
- Yarrawa;
- Baerami Creek south of Denman;
- Giants Creek; and
- Lake Liddell catchment.

Cattle and sheep farming is also an important environmental pressure. Hard hoofed animals can speed up erosion of river banks and hill sides, affecting water quality. Intensive operations such as cattle feed-lots and poultry farms can create problems with effluent disposal and groundwater contamination.

Grape growing for wine is an important pressure on land in the Muswellbrook area and the Hunter Valley in general. The main environmental concerns regarding vineyards are the application of herbicides and pesticides, and the disposal of waste water. A typical winery uses three to four litres of water to produce one litre of wine. The important components of winery waste water include:

- Heavy metals and salts;
- Organic acids and carbonates;
- Proteins; and
- Ethanol, yeast and bacteria slurries.

3.3.4 EROSION

Soil erosion is a natural process resulting in loss of soil from land through the effects of wind, water or gravity. Soil erosion is accelerated by human activities such as tree clearing and the introduction of hoofed animals, which disturb the land surface and the existing vegetation cover. There are several types of erosion, including:

- Sheet erosion occurs when topsoil is removed from the ground surface usually as a result of overland flow of rainwater where vegetation is not of a sufficient density to prevent the soil being washed away.
- Gully and rill erosion is usually associated with the drainage system where land clearing has led to higher surface runoff quantity and velocity.
- Mass Movement is a general term for soil erosion where large quantities of soil move suddenly, usually as a result of gravity rather than water movement. Clearing trees and other vegetation from steep slopes can exacerbate this type of erosion.



- Stream bank erosion is a natural process that occurs as a river channel shifts with the river bed. Clearing of riparian vegetation can speed up this process and it can threaten arable farmland.

3.3.5 NATIVE VEGETATION CLEARING

Clearing of native vegetation for agricultural purposes, commercial and industrial developments can have significant impacts on the land, resulting not only in soil erosion and dryland salinity, but additionally reduce the biodiversity of flora and fauna. As a large percentage of native vegetation has already been cleared, the proper management of native vegetation is critical. The Native Vegetation Conservation Act introduced a requirement for approval to be sought for the clearing of over 2ha of native vegetation. During 2002/2003, the number of approvals sought for the clearing of native vegetation, and the amount approved / refused is detailed below:

Table 15: Vegetation Clearings approved / refused under the NVC Act 2002/2003

Registered Number	Type of Clearing	Determined	Area Approved (ha)	Area Conserved (ha)
MS0211	Clear felling	14/01/2003	25.83	0
MS0209	Exotic Riparian	20/12/2002	6.224	1.18
MS0202	Logging	01/10/2002	108.99	26.9
MS0302	Regrowth	02/04/2003	66.6	2.1
Number of applications: 4			Total Area approved (ha)	207.644
			Total area conserved (ha)	30.18

3.4 RESPONSE

3.4.1 UPPER NORTHERN HUNTER REGIONAL ENVIRONMENTAL MANAGEMENT STRATEGY (UNHREMS)

BACKGROUND

The UNHREMS initiative is designed to facilitate regional cooperation, and provide environmental management training and resources to its member Councils. Supported by Hunter Councils Inc, the project was established in early 2002 with the provision of grant monies from the Department of Transport & Regional Development. Since that time, a full time Project Coordinator has been employed, a Steering Committee established, a regional strategy developed, a number of projects initiated, and external funding sought for future project work.

The key benefits of the UNHREMS Project is its potential ability to

- Provide participating Councils with considerable financial benefits by directly funding a range of major regional environmental projects on their behalf
- Attract funding and support from a range of agencies and organisations, only available to collaborative regional initiatives such as UNHREMS
- Facilitate the sharing of a wide range of information, resources and learnings across Councils of the region, avoiding wastage or unnecessary duplication



- Assist in the development of effective partnerships and regional co-operation between Councils, state and federal agencies, community networks, industry and the Catchment Management Trust
- Enable Councils to collectively respond to a range of community needs (such as coordinated regional education programs, improved access to regional and local environmental information and resources)

STEERING COMMITTEE MEMBERSHIP

Cr Robyn Tozer, Chair	<i>Muswellbrook Council</i>
Ms Amanda Payton	<i>Muswellbrook Council</i>
Cr Ean Cottle	<i>Merriwa Council</i>
Cr Peter Urpeth	<i>Singleton Council</i>
Mr Mark Roser	<i>Singleton Council</i>
Cr Julie Lyford	<i>Gloucester Council</i>
Mr Bruce Heise	<i>Gloucester Council</i>
Mr Mat Bell	<i>Great Lakes Council</i>
Mr Terry Kavanagh	<i>Dungog Council</i>
Mr David Casson	<i>Scone/Murrurundi/Merriwa Councils</i>
Ms Jane Book	<i>Coordinator</i>

OUTPUTS

Upper and Northern Hunter Regional Environmental Management Strategy

The Upper and Northern Hunter Regional Environmental Management Strategy was developed and endorsed by the Councils involved.

State of Environment Reporting Project

A capacity building program for Council officers was delivered utilising LHCCREMS SoE Reporting Project. Sessions included an introduction to the project, background to the legal requirements of SoE reporting and review of the template developed by LHCCREMS. Outcomes include a support network of SoE Writers, development of a methodology for community consultation, mechanisms for efficiencies in data collection and costs savings where applicable.

Rural Residential Information Kit

The Strategy identifies the development of a Rural Residential Flyer, which will form part of a Kit, to provide information to owners/developers/users of rural residential land to aid them in managing their land. Already a two page flyer has been distributed to all Councils for inclusion in their mailouts to new property owners. In addition, an application has been submitted to the Myer Foundation requesting funds for the development of the full Kit.

Urban Water Cycle Management

Through the Stormwater Extension Officer we have delivered a series of workshop sessions, training sessions and planning tools to all Councils and Councillors in the Upper and Northern Hunter (at no cost) which will assist with knowledge transfer for urban water cycle management.

Representative Role of the Coordinator

The Coordinator is currently acting as a conduit for Councils in both provision and dissemination of information. One example of this is the Upper Hunter Reference Group of the Hunter Region Vegetation Committee where the Coordinator is the



Local Government representative on this reference group. The Coordinator is also involved in the Local Government Reference Group which is primarily involved with the Region Vegetation Committee and the Catchment Blueprint.

3.3 Catchment Blueprint 3 Year Investment Strategy

The Coordinator and members of the Steering Committee were involved in the development of projects that were submitted for funding under the Three Year Investment Strategy. These projects include:

1. Vegetation survey and mapping / Biodiversity Planning & Training: - Hunter region	\$468,000
2. Private landholder Conservation Incentive Scheme – Hunter region	\$424,000
3. Corridor Mapping and Planning – Hunter region	\$168,500
4. Mainstreaming Water Sensitive Design – Hunter & Central Coast regions	\$320,000
5. Roadside Vegetation Mapping and Training – Hunter region	\$433,000
6. Wetland research – Hunter & Central Coast regions	\$170,500
7. Regional NRM incentive pilot: Hunter & Central Coast regions	\$198,000
8. Planning Instrument Review: Hunter Region	\$65,000
9. UNHREMS Coordinator project – 3 years	\$310,000
TOTAL	\$2,557,000

3.3 UNHREMS Website

The LHCCREMS website is hosting a page on the UNHREMS and provides links to the seven member Councils' websites and also provides access to the UNHREM Strategy, and two page flyers on UNHREMS, SoE Reporting and Rural Residential Block management.

3.4.2 UPPER HUNTER CUMULATIVE IMPACT STUDY AND ACTION STRATEGY

The Upper Hunter Cumulative Impact Study and Action Strategy (UHCIS) was produced in 1997 by the Department of Urban Affairs and Planning (DUAP). The aims of the Strategy included:

- 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; and
- To assist future strategic land use and development planning and regional levels.

Muswellbrook Shire is involved specifically in 18 of the 39 actions contained in the study. The major actions include:

- **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 Settlements Strategy
- **Action 6:** Development of Synoptic Plan
- **Action 8:** Consideration of groundwater vulnerability when preparing LEPs
- **Actions 11 and 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

3.4.3 SYNOPTIC PLAN – INTEGRATED LANDSCAPES FOR MINESITE REHABILITATION

As a recommendation of the Upper Hunter Cumulative Impact Study, the Department of Mineral Resources prepared the “Synoptic Plan – Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of NSW”. This document was launched at the Singleton Coal Discussion Day in October 1999. Information regarding the history of the Synoptic Plan is contained in the 1997/98 SoE Report.

The purpose of the study is to provide a basis for development of a long term integrated strategy for the rehabilitation of mines. This initiative will hopefully encourage adjacent landowners, government and the broader community to contribute in planning and land management terms to a region-wide landscape strategy.

The Synoptic Plan provides an overview of:

- Current practices and trends in mine rehabilitation.
- Regional initiatives in vegetation management.
- Emerging environmental issues and their implications on mine rehabilitation.
- A comparative analysis on mine rehabilitation plans in 1998 and 2020.
- Principles for an integrated approach towards landscape management for the coalfield.

The study is confined to an area of 260 900 hectares comprising the coalfield of the Upper Hunter Valley extending from south west of Singleton to north of Muswellbrook. Mine holdings cover approximately 23.4% of the study area.

Requirements in development consent condition of new / amended mining operations are now being implemented ensuring that mining operations address and implement the objectives of the Synoptic Plan in mine rehabilitation.

3.4.4 NATIVE VEGETATION CONSERVATION ACT

The Native Vegetation Conservation Act, came into force on the 1 January 1998 and provides framework for government and community to work together to achieve sustainable native vegetation management. The Act is administered by DLWC, and its main features are:

- *Regional Vegetation Management Plans*
The RVMP's are developed by Regional Vegetation Committees and will provide a comprehensive strategy for managing native vegetation, by:
 - Identifying areas where native vegetation can be cleared without application;
 - Identify areas where an application to clear will be necessary;
 - Allow clearing exemptions to be developed in accordance with regional requirements;



- Highlight areas where the condition of native vegetation should be approved;
- Recommend areas that should be revegetated.

The Hunter Regional Vegetation Management Plan is coming close to completion.

- *Property Agreement*

A Property Agreement is a voluntary agreement between a landholder and the Department of Land and Water and Conservation outlining the management of native vegetation on an individual property.

- *Clearing Native Vegetation*

In areas with an approved RVMP, clearing that is not consistent with the plan will not require development consent. In areas without a RVMP, native vegetation can be cleared if the clearing is consistent with the exemptions in the Act and other clearing restrictions do not apply. Where exemptions do not apply, clearing can only be carried out after an application has been made to the DLWC and development has been granted.

The Native Vegetation Conservation Act provides for the management of native vegetation still evident within our Shire with the objective of conserving native vegetation where appropriate. The Act is a big step towards the protection of vegetation in areas not conserved (such as National Parks etc).

3.4.5 CATCHMENT MANAGEMENT PLAN

The Hunter Catchment Blueprint, endorsed by the NSW State Government in late 2002 is a 10 year plan for integrated catchment management in the Hunter. The Blueprint addresses priority issues related to land use, aquatic health, soil degradation, vegetation and biodiversity. It proposed a strategic approach to the sustainable use of natural resources, recognising resources are limited and there is a need for a whole-of-government and community partnership approach to targeting investment in locations where action will yield greatest returns. The Blueprint sets catchment and management targets against which investment performance can be measured and recognises the importance of "triple bottom line" (environmental, social and economic) indicators of catchment health.

The objectives of the Blueprint are:

- Native vegetation, biodiversity and ecological integrity are valued, maintained and enhanced.
- Water bodies are managed to balance natural ecosystem requirements with community needs
- Adverse impacts of salinity on ecosystem health and the community are minimised
- The physical structure and vegetation of rivers, estuarine and wetland riparian zones maintain healthy ecosystems while achieving adequate protection from floods
- Sustainable agriculture, human settlement, industry and other land uses occur while protecting Aboriginal cultural heritage, ecosystem health, soil and water.



3.4.6 UPPER HUNTER REMNANT VEGETATION PROJECT

The Hunter Remnant Vegetation Project, an initiative of the Hunter Catchment Management Trust, with the support of NSW NPWS and NSW DLWC, was established in mid 1996 to determine the composition, condition and distribution of native vegetation cover throughout the study area, which covers approximately 3150km² of the mid to Upper Hunter Valley, including the areas and surrounding towns of Singleton, Denman, Muswellbrook, Aberdeen and Scone.

3.4.7 VEGETATION CONTRIBUTION SCHEME

The Hunter Catchment Management Trust (HCMT) has developed a Vegetation Contribution Scheme whereby landholders (either individuals or groups) may apply for a contribution towards vegetation projects on properties within the Hunter catchment.

The purpose of the scheme is to assist landholders who wish to establish native vegetation on their properties. The scheme provides incentives for the establishment of vegetation which will provide multiple catchment-wide benefits such as reduced erosion, increased habitat for biodiversity, improved water quality, improved farm productivity and natural pest control.

Projects eligible for a contribution under the scheme are:

- Planting of seedlings;
- Fencing to protect establishment of direct seeding and natural regeneration;
- Fencing to protect remnant native bushland.

Preference for funding under the scheme is given to projects which:

- Provide catchment wide benefits;
- Are not confined to tree species - a diversity of trees, understorey and groundcover species including native grasses and herbs;
- Form part of an overall property plan and / or natural resource management plan or strategy (eg Rivercare Plan).

The scheme therefore aims to increase landholder responsibility and action in the management of their properties in an environmentally responsible manner, through the fencing off of stream and native vegetation, and the planting of native species.

3.4.8 LANDCARE

Landcare is a movement of volunteers who are dedicated to restoring and maintaining our environment for future generations. In the Muswellbrook Shire there are currently five active Landcare Groups (Muscle Creek, Dartbrook Kayuga, McCully's Gap, Yarrowa and Baerami), all of which are working to address a variety of issues. These groups have a total core membership of approximately 70. Over the last twelve months these groups have worked with other community groups on occasions to achieve their desired outcomes. These groups include service groups such as APEX and Lions, Scouts, Girl Guides (Brownies) and the Rural Fire Service. Landcare activities have also involved partnerships with schools (eg Muswellbrook Primary have propagated plants for Landcare activities), local businesses large and small, Muswellbrook Shire Council, the Department of Infrastructure, Planning and Natural Resources, Green Corps (a trainee program of the Australian Trust for Conservation Volunteers) and Work for the Dole.



3.4.9 COMMERCIAL FORESTRY TREE TRIALS

Muswellbrook Shire Council is currently supporting two commercial forestry trials on mine overburden areas at Bayswater and Drayton Mnes. The trials are being undertaken to determine the most effective species, irrigation rates, densities etc of commercial forestry plantations. It is envisaged that commercial forests may become a viable landuse and industry to supplement and replace coal mining as it declines.

The Bayswater trial is examining the use of treated effluent applied at varying rates and the effect it has on growth rates of various species of trees. The effectiveness of compost is also being examined.

The Drayton trial is examining the use of saline mine water and soil amendments on a number of different species. Such soil amendments include biosolids, topsoil, compost, fertiliser and overburden (no amendment).

Results of the trials will enable further forests to be planted, with the aim of rehabilitating mine sites using tree species as opposed to traditionally used pasture species. The results for the Drayton trial are expected to be submitted to the University of Armidale by the end of 2003. The results for the Bayswater trial are not available at this stage.

3.4.10 CONTAMINATED LAND MANAGEMENT POLICY

Muswellbrook Council adopted a Contaminated Lands Policy (DCP No. 10) on the 12th July 1999. The policy provides a legislative basis for identifying lands potentially contaminated, and details the procedural processes for identifying, evaluating and remediating contaminated land. The Contaminated Lands Policy, and other documented guidelines referred to in the Policy are mandatory references for consultants / applicants assessing contamination levels and undertaking remediation works on land within the Muswellbrook Shire.

The Contaminated Lands Policy, together with Council's Contaminated Sites Register (which has 75 premises identified as contaminated / potentially contaminated), provide the basis for ensure contaminated sites are identified and appropriate actions are undertaken to remediate the contamination. All development applications for lands contaminated / potentially contaminated, must abide by the Contaminated Lands Policy.

The Contaminated Sites Register is currently being reviewed and updated to ensure all potentially contaminated sites are identified and any investigation / remediation works are known.

3.4.11 EROSION AND SEDIMENT CONTROL POLICY

On the 12th July 1999 Council adopted a Erosion and Sediment Control Regional Policy and Code of Practice (DCP No. 9). It provides for uniform control and regulation for sediment and erosion control for the Hunter, Central Coast, Karuah – Great Lakes and Manning local government areas. The objectives of the policy and code 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.

3.4.12 LEP REVIEW

Council formed a Sub Committee to oversee the review of the Muswellbrook LEP 1985. The reason for undertaking the review is that the LEP has been in existence for 15 years, it has upwards of 95 amendments, has restrictive practices/clauses and does not address the development issues currently facing Council in regards to the mining, tourism, commercial, residential and rural sectors.

The Review Committee identified the specific areas of concern:

- (i) too many zones, particularly rural zones which do not reflect the original intentions or objectives of Council
- (ii) minimum rural lot sizes and associated restriction of intensive agricultural land developments
- (iii) building establishments in rural areas
- (iv) zone tables being too prescriptive and restricting future developments

The following issues were identified to form the basis of the review:

- (i) the assessment of current amendments to the LEP to determine zoning strategies for future developments
- (ii) the assessment of the number of zones in the Shire including a less formal descriptive zone table for such zones
- (iii) the elimination of zones with the LEP with development being considered by an individual merits basis
- (iv) more use of sterilised coal related land for industrial developments for example
- (v) more flexibility in the planing assessment process rather than the present prescriptive process

The Committee noted that the Rural Lands Strategy 1993 was not formally adopted as a Development Control Plan and therefore could not be used as a regulatory tool in formulating development assessment and control under the LEP. The Committee further recommended to undertake a review of the Rural Lands Strategy 1993 with specific reference to:

- (i) assessment of small lot rural subdivisions involving rural residential and rural retreat allotments and the provision of services to these developments
- (ii) assessment and proper identification of alluvial land
- (iii) assessment of minimum rural lot development ranging from less than 40 hectares on high yield to greater than 40 hectares for poor quality land
- (iv) clear definition for existing lots and associated building entitlement status

The proper review of the Rural Lands Strategy 1993 will allow Council to use the document in its consideration of future rural land developments such as subdivisions and various land use planning. This will be consistent with the objectives of the Department of Urban Affairs and Planning (DUAP) in its support of Council's future direction in the control and development rural lands.



In terms of rezonings/amendments, DUAP has restricted any further fragmentation of Rural Lands in the Shire until the review of the Rural Lands Strategy has been completed. DUAP advised that until the Rural Lands Strategy is in place, Council has no basis from which to assess rezonings/amendments in rural areas of the Shire. Accordingly, a moratorium has been placed on rezonings/amendments that relate to the fragmentation of rural land pending the completion of the Rural Lands Study.

At the time of writing the SoE report, Council had endorsed a 'Draft Shire Development Strategy and LEP 1985 Review' that encompasses the rural, urban, industrial and commercial aspects of the Shire. The Strategy has also been endorsed by relevant Government Authorities and is pending concurrence of the Department of Infrastructure Planning and Natural Resources.

The main directions of the Strategy are:

- The creation of Sector based planning in line with Plan First principles
- Consolidate zonings in Urban areas
- Change Denman Town zonings to Village zonings to provide more flexibility
- Maintain the minimum lot size for Classes I & II agricultural land at 40ha
- Increase the minimum lot size for Classes III, IV & V agricultural land to 100ha
- Avoid conflicts between industry/agricultural/residential areas by incorporating more forward planning into the LEP

Following the concurrence of the 'Draft Shire Development Strategy and LEP 1985 Review' Department, Council will proceed to develop a major amendment to the LEP in line with the recommendations of the Strategy.

3.4.13 EXTRACTIVE INDUSTRIES

Audits have been undertaken of many of the quarry sites in Muswellbrook which also helps to educate the operators about sound environmental practice.

Each coal mine is required by the conditions of their development consent to employ staff to manage environmental issues at the site, such as complaints from the community and general environmental monitoring and reporting.

Each of the mines in the Shire is the subject of an individual Community Consultative Committee which aims to address any issues that may concern the community or nearby residents, and helps keep the community informed with regard to the activities of each individual mine.



4. AIR

4.1 WHAT IS AIR QUALITY?

Air quality is the status of the air quality of a particular area, and can be described with various parameters. The parameters used to describe the quality of air, may include Ozone depletion, the status of the greenhouse effect, dust deposition, and the particulate matter in the air (PM10 & PM2.5), just to name a few.

According to NSW EPA (1997) air quality can relate to various different scales including the local, regional or wider scale (global). A range of pollutants affect air quality, although pollutants of concern include, but are not limited to, the following:

- Oxides of Nitrogen
- Reactive Organic Compounds
- Particles
- Lead
- Carbon monoxide
- Sulfur dioxide

A range of natural and anthropogenic sources produce the above pollutants, including motor vehicles, industrial activities and some domestic and commercial activities. Once pollutants are in the atmosphere they are transported both within regions and between regions by wind and air currents.

4.2 STATE

4.2.1 AIR QUALITY MONITORING

The air in Muswellbrook is tested for particulate matter for a 24 hour period, twice weekly. The sampling program is part of the Aerosol sampling program headed by the Australian Nuclear Science and Technology Organisation (ANSTO). The air sampling unit is positioned behind the water treatment plant in Scoot Street Muswellbrook.

The study, funded by Muswellbrook Shire Council, is designed to determine the elemental composition of fine particulates with diameters less than 2.5 μm . Analysis of the hundreds of filter papers received from around the country every month is performed on accelerators at ANSTO, where a filter paper is characterised by its weight and elemental composition for up to 35 different elements, including carbon, silicon, iron, sulphur and lead. The data is presented as total particulate matter per cubic metre.

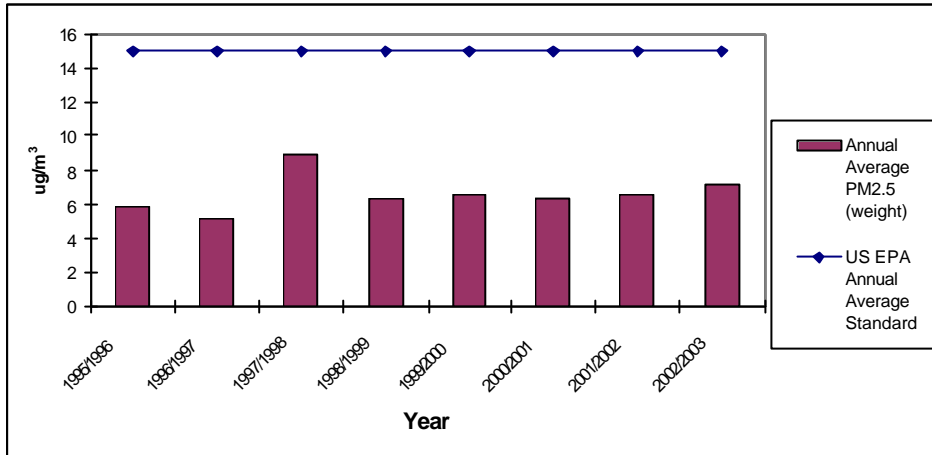
Figure 8 below illustrates a comparison between the results obtained in this reporting year and in previous years, since the monitoring program started in 1995. Also included in the figure is an indication of the US EPA guideline for maximum recommended levels of this size particle. The NSW EPA does not currently have a standard for PM_{2.5}, however a NEPM is anticipated to be developed shortly, setting the annual average goal for Australia at 8 $\mu\text{g}/\text{m}^3$.



The graph indicates that particulate matter in Muswellbrook's air was well under the US EPA's recommended goal. The elevated levels recorded in December 1997 were the result of a period of bushfires in the Hunter and therefore not indicative of the air quality produced by activities within the Shire. The emissions for 2002/2003 are slightly elevated from the previous year, however this is attributable to the weather conditions being drought conditions.

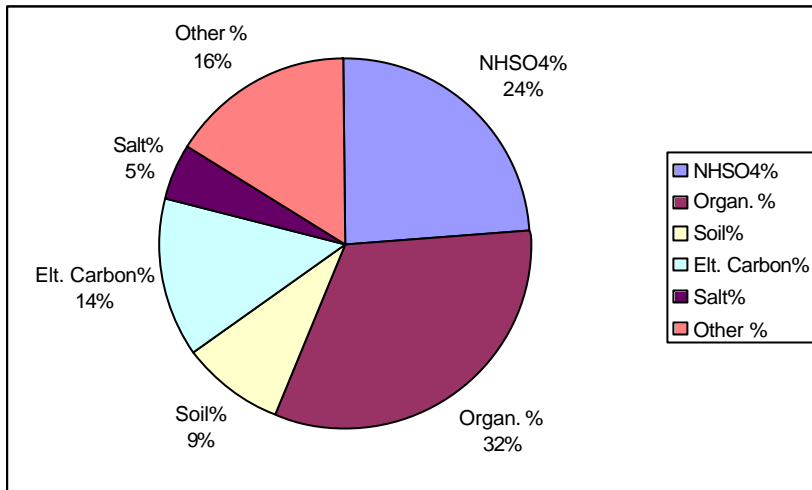
The weight (or mass) of the PM_{2.5} emissions over the 1995 – 2003 sampling period is generally measured between 5 – 8 ug/m³. There is a slight increase with time between 1995 and 2003 however this is probably due to differing long term meteorological conditions rather than any real increase in anthropogenic emissions.

Figure 8: Comparison of PM_{2.5} Results 1995 – 2003



The breakdown of the PM_{2.5} particulates in the air over the 2002/2003 financial year can be identified in Figure 9, which illustrate that organic matter is the most represented particulate, most likely due to the drought conditions, followed by ammonium sulphate, elemental carbon, and soils and salts. Please note that other includes trace elements of potassium, iron, zinc and lead.

Figure 9: Breakdown of Particulate Matter (PM_{2.5}) for 2002/2003



Ammonium Sulfate (NHSO₄) is the measurement of sulfur and hydrogen in the air. Ammonium Sulfate originates from the conversion of sulfur dioxide gas (SO₂), from coal burning, industry and motor vehicles, to sulphuric acid (H₂SO₄), which is then neutralised by ammonia present in the atmosphere. Air quality issues such as “Acid Rain” result when there is incomplete neutralisation of this acidic aerosol.

Organic matter is an estimate of any organic compound detected. Organics are those compounds generally containing carbon (C), hydrogen (H) and Oxygen (O). Organics are measured by ANSTO through the measurements of the hydrogen content with the removal of hydrogen associated with ammonium compounds.

Elemental Carbon concentration gives an indication of the amount of soot that is present in the air, and is usually produced by motor vehicles and burning biomass (bushfires and combustion fires).

Soils in the atmosphere occur from natural blown dust, agriculture and industries such as mining and quarrying. The fine particle soil concentration (<2.5µm diameter) is found from the sum of different oxides found in soils including silicon oxide, aluminium oxides, iron oxides, calcium oxides and titanium oxides. The average percentage of soils in the 2000/2001 period is only 5% of all particulates evaluated over the period.

4.2.2 TRANSPORT AND ACCESSIBILITY

Within the Muswellbrook Local Government Area, public transport is quite limited due to the extent and size of the area, as well as the population. Therefore the main form of transport within the Shire is by private vehicles. Table 16 indicates vehicle types and fuel types of all registered vehicles in the Shire. Comparisons made in Figure 10 indicate a slight reduction in the number of vehicles using leaded fuel and a slight increase in the number of vehicles using less polluting fuels such as LPG.

Table 16: Breakdown of registered vehicles by vehicle type and fuel type as at 30th June 2003

Vehicle Type	Fuel Type							Total
	Diesel	LPG	Unleaded Petrol	Petrol and LPG	Leaded Petrol	Unknown	Others	
Passenger Vehicles	17	13	4935	26	660	125	0	5776
Off Road Passenger Vehicles	400	1	706	6	2	0	2	1117
Small Buses	21	1	20	0	43	0	0	85
Buses	54	0	1	0	2	0	0	57
Mobile Homes	11	0	0	3	3	1	0	18
Motorcycles	0	0	335	0	79	3	0	417
Light Trucks	1193	21	961	30	338	48	0	2591
Heavy Vehicles	329	0	3	0	10	6	0	348
Prime Movers	58	0	0	0	0	1	0	59
Plant	91	0	1	1	2	4	0	99
Trailers	0	0	0	0	0	0	2907	2907
Other Vehicles	0	0	1	0	0	0	0	1
Total	2174	36	6963	66	1139	188	2909	13475

Source: RTA

Figure 10: Comparison of 2001/2002 and 2002/2003 fuel types of registered vehicles

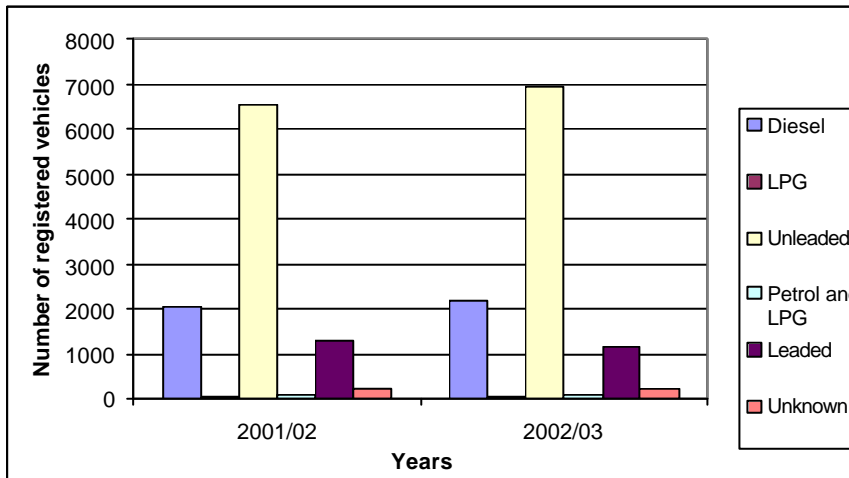
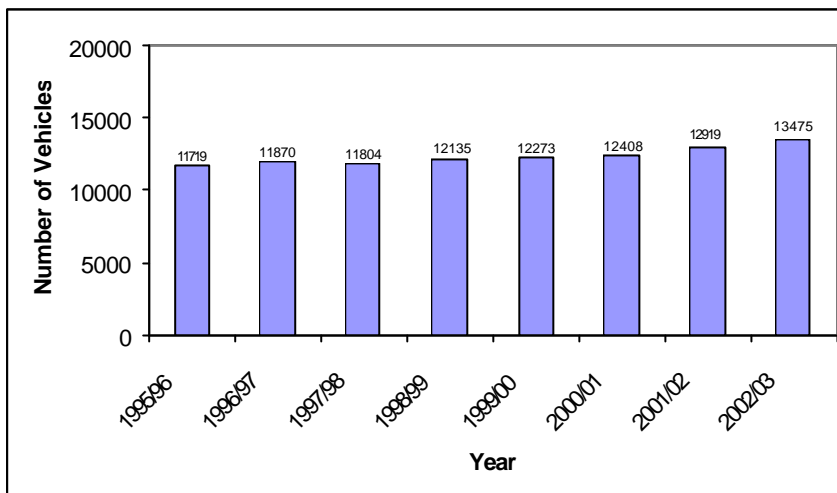


Figure 11: Comparison of number of vehicles registered in the Muswellbrook LGA from 1995 - 2003

4.3 PRESSURE

4.3.1 POWER STATIONS

Air quality is an important issue with regard to coal-fired power stations as impurities in the coal that are not fully combustible are emitted into the atmosphere, the most important of which is sulphur dioxide (SO₂). Health effects of SO₂ include respiratory tract damage, provoking wheezing and exacerbating asthma and chronic bronchitis. It can also increase susceptibility to respiratory tract infections.

Overseas experience has indicated that SO₂ and oxides of nitrogen (NO_x) emissions from power stations can also be associated with other air quality issues such as sulphate haze and acid rain. Australian research has indicated that the relatively low sulphur content of coal used in Hunter Valley power stations produces less SO₂ and NO_x emissions and therefore less problems than those experienced overseas.

4.3.2 COAL MINES

The major pollutant emitted by coal mining activity is particulate matter such as dust from stock piles and machinery. Other pollutants include:

- Emissions from accidental or spontaneous combustion of coal-reject material;
- Emissions from diesel-powered machinery;
- Emissions from blasting.

Dust and air quality problems create difficult issues between coal mines and their close neighbours. Residents often protest against dust generation, with concerns about their health, especially if members of their family suffer from asthma or other respiratory difficulties. Rural households rely on rainwater for domestic water use, and this can be contaminated by dust fallout on their roof.



Coal mines are required, as part of their Environment Protection Licences to undertake environmental monitoring of air and blasts to ensure their operations are performing below the relevant standards / goals. The details of the monitoring undertaken, and actions being implemented by coal mines in the Muswellbrook Shire in relation to the environment over the 2002/2003 period are detailed below:

Mt Arthur Coal	2002/03	Target Limit
RAW (ROM) COAL PRODUCTION	7.1 million tonnes	-
Annual Avg Dust Deposition	3gm/m ² /mth*	Less than 4
Annual Avg PM ₁₀	25*	Less than 50
Annual Average TSP	N/A	-
Number of Blasts Fired	110**	-
Avg Ground Vibration (at nearest Private Residence)	0.1mm/s**	Less than 10
Avg Airblast Overpressure (at nearest Private Residence)	101dB**	Less than 120
Reportable Exceedances of EPA Limits or Non Compliance with Consent Conditions	None	-
Discharges Under the Hunter River Salinity Trading Scheme	Nil	-

- o *Average from a range of monitoring locations. Full details are contained in the Mt Arthur Coal Annual Environment Monitoring Report.
- o ** Additional details are contained in the Mt Arthur Coal Annual Environment Monitoring Report.
- o Copies of the Mt Arthur Coal Annual Environment Monitoring Report are held by the Muswellbrook Shire Council

Highlights

The Mt Arthur Coal Environmental Management System was externally certified under International Standard ISO14001 in May 2003. This provides an internationally recognised structure to environmental management at Mt Arthur Coal.

Mt Arthur Coal is a joint sponsor of the Upper Hunter River Rehabilitation Initiative (UNRRI). The UNRRI is a partnership between Industry, Government and the Community aimed at rehabilitation of a significant portion of the Upper Hunter River that has been impacted by land management practices over the last 150 years. At the same time as carrying out rehabilitation of the river a better understanding of river rehabilitation techniques is being gained through the associated University research programs. This addresses one of the significant environmental issues facing Australia.

Recycling of sewage effluent from the Muswellbrook sewage treatment works continued. The Mt Arthur Coal operation utilises the treated effluent on site. The onsite use of Council effluent beneficially uses effluent that in the past would have been discharged into the Hunter River. During 2002/03 of total of 725 million litres of effluent was recycled by Mt Arthur Coal.

Mt Arthur Coal has continued its commitment to develop best practice noise monitoring and mobile equipment noise attenuation. Over the last 2 years, Mt Arthur Coal has worked with Liebherr to develop the quietest mining trucks and excavators in the world, which are now 16 times quieter than they were prior to attenuation.

Mt Arthur Coal is continuing to refine its Australian-first noise monitoring system. This system can more accurately determine the source of noise at a particular location where a range of noise sources exists (eg different mines, road traffic, rural activities.).

During FY03, Mt Arthur Coal also commissioned a world first noise test facility to allow routine testing of mining equipment including trucks and dozers on an ongoing basis. The success of these projects including new benchmarks has been broadly recognised within and outside of the mining industry.

Progressive rehabilitation continued at Mt Arthur Coal during the year. Rehabilitation focused on overburden dumps, the noise attenuation bund around the new Coal Preparation Plant and the initial construction of the visual bund.



Bengalla Mining Company	2002/03	Target Limit
RAW (ROM) COAL PRODUCTION	7.1 million tonnes	-
Annual Avg Dust Deposition	2.7gm/m ² /mth *	Less than 4
Annual Avg PM ₁₀	26 µg/m ³	Less than 50
Annual Average TSP	56.5 µg/m ³	Less than 90
Number of Blasts Fired	112	-
Avg Ground Vibration (at nearest Private Residence)	0.32mm/sec	Less than 10
Avg Airblast Overpressure (at nearest Private Residence)	98.63 dB	Less than 120
Reportable Exceedances of EPA Limits or Non Compliance with Consent Conditions	None	-
Discharges Under the Hunter River Salinity Trading Scheme	Nil (over 2 years since last discharge under HRSTS)	-

* Annual average result for the northern boundary monitor.

Highlights

Bengalla has continued to implement noise mitigation measures throughout the mine operations, including the infilling of the Northern Loop Road, noise attenuation on trucks, night time noise surveys, mobile equipment noise testing and the realignment of the south haul road.

The 5 year state government external audit of compliance with development consent conditions was recently undertaken however results have not been released thus far.

Bengalla is a joint sponsor of the Upper Hunter River Rehabilitation Initiative (UNRRI). The UNRRI is a partnership between Industry, Government and the Community aimed at rehabilitation of a significant portion of the Upper Hunter River that has been impacted by land management practices over the last 150 years. At the same time as carrying out rehabilitation of the river a better understanding of river rehabilitation techniques is being gained through the associated University research programs. This addresses one of the significant environmental issues facing Australia.

The commitment to the local community continued with the following being undertaken:

- Schools National Tree day - planting with Muswellbrook Primary School on Overton Ridge
- Community Open Day (in which over 1200 people attended)
- Daintree residence used for palliative care
- Community support program

Drayton	2002/03	Target Limit
RAW (ROM) COAL PRODUCTION	4.57 million tonnes	-
Annual Avg Dust Deposition	2.21gm/m ² /mth*	Less than 4
Annual Avg PM ₁₀	20.2 µg/m ³	Less than 50
Annual Average TSP	48.8 µg/m ³	Less than 90
Number of Blasts Fired	194	-
Avg Ground Vibration (at nearest Private Residence)	0.087mm/sec	Less than 10
Avg Airblast Overpressure (at nearest Private Residence)	100.6 dB	Less than 120
Reportable Exceedances of EPA Limits or Non Compliance with Consent Conditions	Bushfires in October and November 2002 resulted in HVAS exceeding limits	-

Discharges Under the Hunter River Salinity Trading Scheme	Nil **	-
* Annual average result for the northern boundary monitor. ** Drayton is a point holder in the HRSTS but does not hold a licence to discharge. Water is managed on site without the need to discharge.		
Highlights		
<p>Drayton has undertaken noise screening works in the coal handling plant to minimise operational noise.</p> <p>A "Flame Out" spontaneous combustion trial is currently being undertaken to manage and minimise the occurrence of spontaneous combustion at the mine site.</p> <p>Drayton has an environment management system in place to minimise environmental impacts. Drayton is currently in the process of seeking ISO 14001 environmental accreditation.</p>		

Dartbrook Coal	2002/03	Target Limit
RAW (ROM) COAL PRODUCTION	2.9 million tonnes	-
Annual Avg Dust Deposition	2.08 g/m ² /mth*	Less than 4
Annual Average PM₁₀	N/A	-
Annual Average TSP	67.91 µg/m ³	Less than 90
Number of Blasts Fired	N/A	-
Avg Ground Vibration (at nearest Private Residence)	N/A	-
Avg Airblast Overpressure (at nearest Private Residence)	N/A	-
Reportable Exceedances of EPA Limits or Non Compliance with Consent Conditions	<ul style="list-style-type: none"> ○ On-going problems with high pH in treated sewage effluent. Waste water irrigated – does not leave the site. Licence modification sought. ○ Road traffic issues with development consent condition. Modification sought to clarify approved access. ○ Additional noise monitoring being undertaken to confirm status of noise levels from west site. 	-
Discharges Under the Hunter River Salinity Trading Scheme	Nil	-

○ *Average from a range of monitoring locations.

Highlights		
<p>Dartbrook continues to seek improved environmental outcomes and performance. Development of an Environmental management System consistent with ISO 14001 is underway with certification planned for 2004. Additional staff resourcing in the environmental department has assisted in environmental management of the site.</p> <p>The construction of the Dartbrook Extended mine is on schedule for completion in April / May 2004. Roadway development is well underway with crews now working on three panel areas. The transition from the Wynn seam operations to the Kayuga seam is ongoing with crews gradually moving over to the new area. One longwall remains in the Wynn seam before the longwall equipment is also moved over to the Dartbrook Extended mine. Coal clearance still relies on trucking to the coal handling and preparation plant, with the decline drift and conveyor systems to link with the Hunter Tunnel still being constructed. Modifications to the CHPP to handle the Kayuga seam coal are still being undertaken. All surface infrastructure has been constructed.</p>		



Muswellbrook Coal	2002/03	Target Limit
RAW (ROM) COAL PRODUCTION	1.145 million tonnes	
Annual Avg Dust Deposition	2.0 gm/m ² /mth*	Less than 4
Annual Avg PM ₁₀	N/A	-
Annual Average TSP	N/A	-
Number of Blasts Fired	186	-
Avg Ground Vibration (at nearest Private Residence)	0.616 mm/s	Less than 10
Avg Airblast Overpressure (at nearest Private Residence)	103.9 dB	Less than 120
Reportable Exceedances of EPA Limits or Non Compliance with Consent Conditions	None	-
Discharges Under the Hunter River Salinity Trading Scheme	Nil	-

o *Average from a range of monitoring locations.

Highlights

Muswellbrook Coal has implemented a Freecall Blasting Information Line which allows the community to access blasting details, dates and times. The information is updated daily for the information of the community.

A review was undertaken of blasting and its impacts on neighbours. An outcome of the review was the re-design of blasting patterns which have been designed to minimise the effects on surrounding land owners.

The minimise operational noise, certain aspects of the operation were modified during adverse weather conditions to ensure noise impacts were minimal.

Liddell Coal	2002/03	Target Limit
RAW (ROM) COAL PRODUCTION	3.22 million tonnes	-
Annual Avg Dust Deposition	2.05 gm/m ² /mth*	Less than 4
Annual Avg PM ₁₀	25.9 µg/m ³	Less than 50
Annual Average TSP	69.4 µg/m ³	Less than 90
Number of Blasts Fired	107	-
Avg Ground Vibration (at nearest Private Residence)	0.29 mm/s	Less than 10
Avg Airblast Overpressure (at nearest Private Residence)	104.59 dB(L)	Less than 120
Reportable Exceedances of EPA Limits or Non Compliance with Consent Conditions	Reporting timeframe non compliances	-
Discharges Under the Hunter River Salinity Trading Scheme	One discharge event of 11.5ML (commenced on 24 th Feb 2003, ended 25 th Feb 2003) under HRSTS	-

o *Average from a range of monitoring locations.



4.3.3 WOOD HEATERS

Smoke from wood heaters releases air pollutants into the atmosphere, contributing to air pollution in the Shire. Most of the smoke is concentrated in the urban areas as the emission of pollutants is higher due to the greater density of wood heaters.

4.3.4 MUSWELLBROOK COUNCIL: VEHICLE FLEET AND FUEL USAGE

Muswellbrook Council, in undertaking its day to day operations, runs a series of heavy and light vehicle fleet. This fleet uses fuel which in turn releases pollutants into the atmosphere. In 2002/2003 the size of the fleet, and the amount of fuel consumed were:

Table 17: Vehicle Fleet and Fuel Consumption, Muswellbrook Council

Type of vehicle	Number of vehicles	Fuel Type and amount consumed (litres)			
		Unleaded	Diesel	Super	LPG
Heavy vehicles and equipment	29	3025	119,965	75	-
Light vehicles	40	86,360	21,589	-	15,421

4.4 RESPONSE

4.4.1 POWER STATIONS

Fabric filters have been installed on the stacks within the Liddell and Bayswater power stations to trap 99.9 percent of airborne emissions. Along with this stack emission, source monitoring takes place to measure particulate matter, sulphur dioxide, nitrogen oxides and fluorides.

Monitors are located in a number of areas beyond the perimeter of the station to measure ambient air levels of sulphur dioxide and fluoride. Stations are included at Muswellbrook and Singleton. Weather stations are also located at Mount Arthur and Liddell to record wind and rainfall data.

Bottom ash is collected at the bottom of the boiler and is disposed of at Pykes Gully. Fly ash is collected by large fabric filters which ensure that airborne emissions are no more than 0.01 grams per cubic metre. Fly ash is disposed of in the old Ravensworth open cut mining void.

4.4.2 COAL MINES AND EXTRACTIVE INDUSTRIES

4.4.2.1 Coal mines

The coal mining operations in the Shire implement dust minimisation measures to mitigate the impact of airborne particles as a result of mining operations. Dust suppression measures include:

- Installation of stockpile sprays to prevent the possibility of windblown coal dust and to maintain the moisture control of the stockpiled material;



- Dampening of trafficked areas;
- Topsoil stripping being restricted to two strips ahead of the pre-strip to minimise the area of exposed ground;
- Drills being fitted with dust suppression equipment.

As part of their conditions of consent, coal mining companies must undertake regular dust monitoring to ensure that the levels of dust emitted as a result of coal mining operations, are within the criteria set by the EPA.

Spontaneous combustion is, besides dust, the other main cause of air pollution within mining operations. Due to the coal mining seams of the upper Hunter having a high sulphur content, spontaneous combustion is a common problem for many of the coal mining sites in Muswellbrook.

Coal mining companies have completed and are implementing Spontaneous Combustion Management Plans for their mining lease areas, which indicates the importance of "spon com" management. Spontaneous combustion is able to be kept to a minimum on operating open cut coal mines if managed carefully. Management involves dumping 5m lifts to aid compaction and cover carbonaceous material to ensure the material is not exposed to air.

4.4.2.2 Quarries

Council carries out environmental audits of sand and gravel quarries on a regular basis. This is a good way for Council to monitor these operations, but it also helps in the education process for operators. The greater the awareness of environmental issues among operators of potentially harmful activities, the greater the potential that problems will be rectified before harm is caused to the environment.

4.4.3 ANSTO

Council continues to fund the ANSTO air sampling program. The program is proving a scientifically sound data on the quality of the air within Muswellbrook and an indication of the possible sources of particles which are analysed through the program.

The main use of the data received from the air sampling unit is to determine the possible impacts of coal mining developments (both existing and proposed) on the air quality of Muswellbrook. The program has been operating since 1995, with continued funding from Muswellbrook Shire Council.

4.4.4 CITIES FOR CLIMATE PROTECTION

The Cities for Climate Protection (CCP) Program, a joint initiative of the Australia Greenhouse Office and the International Council for Local Environmental Initiatives, aims to encourage Councils to facilitate and encourage a reduction in greenhouse gases. The program is a world-wide initiative in which over 370 Councils through the world have joined. The program involved an initial formal commitment to the program by Council and subsequent achievement of the five "Milestones", which are:

1. Establish an inventory of greenhouse gas emissions within Council and the general community and forecast emissions;
2. Set an emissions reduction goal for the Shire;
3. Develop and adopt a Local Greenhouse Action Plan to achieve the reduction goal;



4. Implement the Local Greenhouse Action Plan;
5. Monitor and report on greenhouse gas emissions and implementation of actions and measures.

Muswellbrook Shire joined the Cities for Climate Protection Program late 2000 and has progressed through Milestone 1, 2 and 3 of the program. Council adopted a Greenhouse Gas Reduction Strategy in February 2003 and is currently implementing actions to reduce greenhouse gas emissions.

4.4.5 COMMERCIAL FOREST PLANTATIONS

Muswellbrook Council has funded two commercial forestry trials in the Upper Hunter. These trials, and the development of further commercial forestry plantations in the Shire, will aid in improving the air quality of the Muswellbrook Shire through acting as a sink of greenhouse gases. These commercial forestry trials are therefore not only valuable as an alternative commercial industry in the future, but are additionally an important technique in reducing greenhouse gas emissions.

4.4.6 UPPER HUNTER COMMERCIAL FORESTS STEERING COMMITTEE

The Upper Hunter Commercial Forests Steering Committee aims to achieve 30,000ha of commercial forests in the Upper Hunter within 5 years. The Committee, which is comprised of the Mayors of both Muswellbrook and Singleton Councils, NSW State Forests, NSW DIPNR, NSW Minerals Council, DMR, coal mining personnel and community representatives, is an all of government approach to the strategic planning of commercial forestry in the Upper Hunter. Whilst, as stated previously in this report, commercial forestry may be a future viable industry for the Upper Hunter, commercial forests also have great worth as sinks for greenhouse gases and carbon credits.



5. WATER

5.1 WHAT IS WATER QUALITY?

According to the Public Health Unit "Water is a community's prime resource. Where water quality is good, and its quantity is adequate, it will enhance public health and sustain a community, in a wider social sense. Where the water quality is poor, and its supply is inadequate, it will affect human health and undermine a community's ultimate sustainability – economically, socially, politically and environmentally." Therefore it is essential that water quality and water quantity be of a standard at which the wider community, including urban, rural and industrial users are satisfied that the water can be safely used for their purposes.

5.1.1 HUNTER RIVER CATCHMENT

Muswellbrook Shire is part of the Hunter Valley catchment, which covers an area of 22 400 km², with the majority of water flow originating in the Barrington Tops area. A number of large towns are located in the Hunter Valley, including Newcastle, Maitland and Cessnock, all of which lie downstream of Muswellbrook. Upstream of Muswellbrook Shire, and within the Shire itself, lie Denman (pop>1500), Merriwa (pop>1200), Scone (pop>6000), Murrurundi (pop>1500) and of course, Muswellbrook (pop>11000).

As discussed in previous sections, the Hunter Valley is predominantly rural, with intensive agricultural production on the alluvial floodplains, which can have an adverse effect upon water quality if not managed effectively. Extensive coal deposits under or near the alluvial floodplains means that major coal mining activities are undertaken, and the proximity of good quality coal makes the power generation industry a strong one in the Valley, with two coal-fired power stations generating the majority of electricity for New South Wales.

Water quality is regarded as a critical issue in water management in the Hunter Valley by the community. Poor water quality has the potential to severely restrict human activities in the Hunter Catchment, both in terms of human health and economic costs due to loss of production and increased costs of water treatment.

European land uses have increased nutrient loads exported to the river system, via both point and diffuse sources.

5.2 STATE

5.2.1 OVERVIEW

Geology, climate, riparian vegetation cover, groundwater quality, stream flow and landuse all influence the quality of water in rivers and streams. The condition of the water in the Muswellbrook Shire and of Shires within the same catchment is a direct reflection of the overall quality of the Hunter catchment. The Department of Land and Water Conservation's *State of the Rivers and Estuaries Report 2000* is an extensive study into the region that has used the following *indicators* to determine the *state* of water quality in the Shire:



1. phosphorus and nitrogen concentrations, turbidity, salinity, pathogen presence (faecal coliform concentration) measured against Australian & New Zealand Environment & Conservation Council (ANZECC) guidelines
2. abundance and diversity of macroinvertebrate communities
3. confirmed blue-green algal blooms – extent, location, duration, intensity, toxicity etc.

Significant impacts identified in the condition (state) of the rivers and estuaries include:

- 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
- nearly all original floodplain vegetation has been cleared
- streamflow has been affected due to regulation
- the demand in unregulated streams has increased the frequency of low and zero flow periods
- most salt, nutrients and bacteria are delivered to the rivers during high run-off events
- groundwater levels are rising in some areas
- blue-green algal blooms have occurred periodically in many of the storages of the Hunter catchment

5.2.2 MONTHLY WATER QUALITY MONITORING – HUNTER RIVER AND MUSCLE CREEK

Water quality monitoring of the Hunter River and Muscle Creek is carried out monthly by Muswellbrook Shire Council. The annual average results for the 2002/2003 year are detailed in the graphs below:



Figure 12: Annual Average Electrical Conductivity (Salinity) ($\mu\text{S}/\text{cm}$)

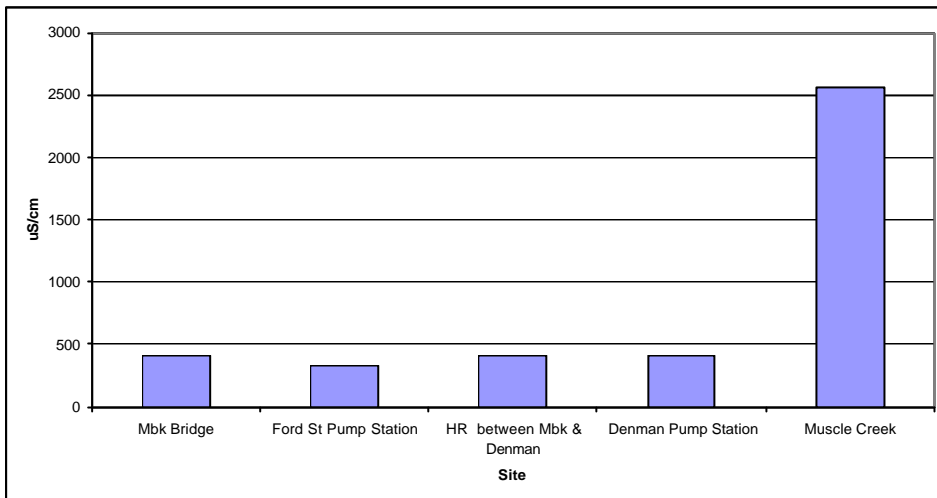
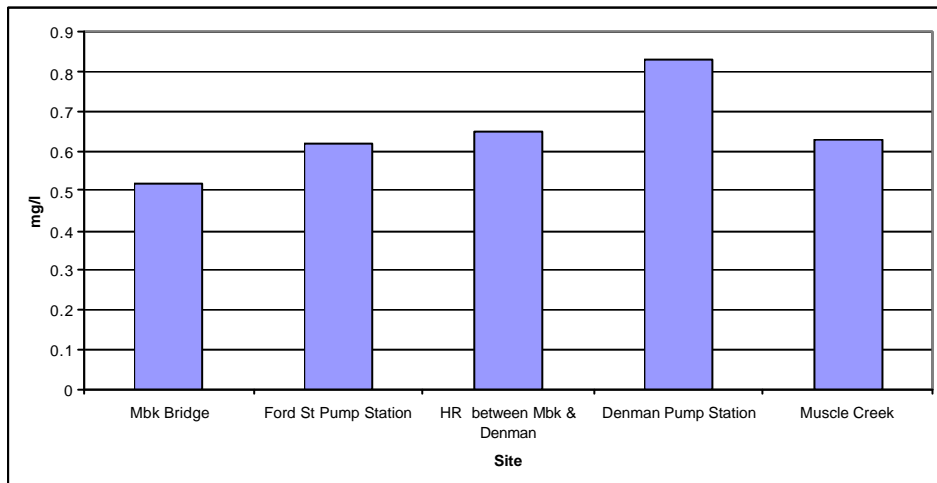
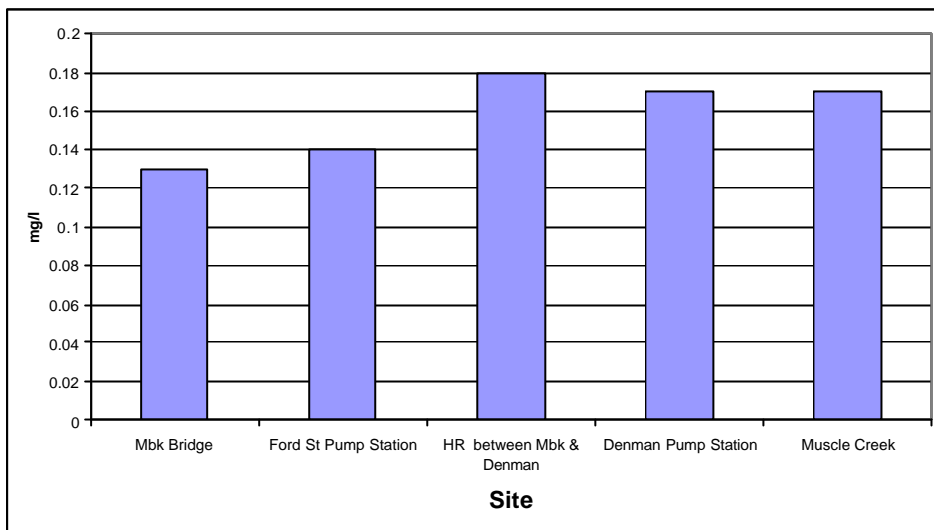


Figure 13: Annual Average Phosphorous (mg/L)



**Figure 14: Annual Average Nitrate (mg/L)**

5.3 PRESSURE

5.3.1 AGRICULTURE

Agricultural activities contribute high levels of nitrogen and phosphorus to the river system in run-off. Major agricultural discharges of water from irrigation areas come in the form of:

- surface drainage water, which is tailwater or rainwater run-off from irrigated land;
- sub-surface drainage water drawn from the ground via either tile drains or shallow groundwater pumps to maintain the watertable at a desirable depth.

5.3.2 POWER STATIONS

Drainage effluent from Bayswater Power Station has minimal impact on existing water quality in the catchment. Diversion of regulated flow from the Hunter River via Lake Liddell for cooling water makeup enhances the quality of the water stored in Lake Liddell. Desalination of condenser circulating water ensures that dissolved salts are not returned to the Hunter River and the station therefore has limited detrimental effects on salinity levels in the Hunter River.

The quality of the water in the tributaries downstream of the ash disposal areas is monitored and appropriate actions are taken should it be found that the storage areas are causing a deterioration in water quality. This is done by grouting or blanketing to make the facility "water tight" or by collecting seepage by means of wells or trenches and returning it to the ash disposal system.



5.3.3 COAL MINING

Water pollution from coal mining may arise from a number of specified sources. Drainage water from mine workings and associated operations may contain excessive quantities of environmentally unacceptable substances including mineral salts, acid, suspended solids and organic material. Surface and sub-surface drainage systems are modified by mining, and long-term control of potential pollutants rests primarily in the containment and disposal of hazardous substances, and the re-establishment of effective drainage systems and stable soil profiles.

Runoff water from roads, coal-handling, storage and working areas around the coal mines is frequently of similar quality to mine drainage water, but may also contain organic contaminants such as soil, grease and fuel residues from work areas. Organic effluent from amenity blocks and bathhouses may cause pollution of receiving waters if not managed appropriately.

Hunter River Salinity Trading Scheme (HRSTS)

Coal mines in the Upper Hunter catchment need to periodically discharge excess saline water off-site. While some more modern mines have a water management system which result in "nil off-site discharge", this is not possible at all mines in the area. Factors such as high groundwater seepage into mine workings, on-site coal washing, dust suppression, and limited capacity to build storage dams mean that these mines have more water than they can use or recycle at the mine sites.

Staged discharge under a credit point system has been established as a strategy which can utilise the dilution capacity of a river, especially in high to flood flow conditions, to dispose quantities of saline water. The strategy entails the storage of excess water by each coal mine until such time as conditions in the river meet certain requirements for discharge. The stored water is then discharged at a set rate so that predefined water quality parameters in the river are maintained. The pre-determined EC levels are 600 μ s/cm at Denman and 900 μ s/cm at Singleton.

5.3.4 STORMWATER

Stormwater runoff 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. Stormwater structures play an important role in reducing the effects of flooding, and improving public health and safety, but they also provide an efficient and all too convenient carriageway for pollutants to enter directly into the river. The activities from which stormwater pollutants may originate include:

- Clearing of native vegetation in the catchment reduces the potential for rainfall to infiltrate the ground surface, thereby increasing runoff;
- Sealing of the ground surface for driveways and roads increases runoff;
- Earthworks exposes soil to the eroding effects of heavy rainfall, and increases sediment loads in runoff;
- Wet weather discharges from over-loaded sewers increases bacteria and nutrient levels;
- Application of fertilisers, pesticides and herbicides can reach stormwater;
- Contaminated runoff from commercial and industrial premises is flushed into the stormwater system;



- Hosing leaf litter and grass clippings into the drains can clog pipes and increase nutrient loads and BOD (Biochemical Oxygen Demand) levels;
- Washing cars on the street or near stormwater drains contaminates storm water with high nutrient loads from detergents and introduces grease and oil into the system; and
- Allowing pet faeces to enter stormwater drains also increase the nutrient load and contaminates stormwater with faecal coliforms.

5.4 RESPONSE

5.4.1 WATER QUALITY ACTIVITIES AND PROGRAMS

Muswellbrook Shire Council and relevant government departments, organisations and committees have carried out a number of activities and programs, which have helped to minimise pressures on the water and its quality within the LGA. The following activities and programs have been implemented to sustain the ecology of the water resources within the Muswellbrook Shire and the wider Hunter Valley Catchment they include:

- Councils Water Quality Monitoring, including drinking water, effluent and river water monitoring programs
- The Denman Effluent Reuse Program
- The Muswellbrook – Bayswater Effluent Reuse Program
- Hunter Salinity Trading Scheme
- Trade waste Audit
- Septic Tank Inspections
- Stormwater Management Plan
- Rivercare

5.4.2 WATER QUALITY MONITORING – DRINKING WATER

In conjunction with the NSW Health Unit, Council has for a considerable time period been undertaking bacterial, pesticide and chemical analysis of potable water samples in river waters abstracted for drinking purposes from selected sites around the Shire. Daily water analyses is undertaken by Councils Water & Waste Works for six major water quality parameters, and weekly analyses from the Hunter River and Muscle Creek.

5.4.3 TREATED EFFLUENT – WATER QUALITY MONITORING

Council undertakes an analysis of sewage entering the sewage treatment works, as well as the quality of the sewage through the various treatment processes. The water is tested for BOD, pH and Suspended Solids.

Muswellbrook Shire Council achieves a 100% reuse of waste water produced by the two sewage treatment plants. All effluent produced at the Denman plant is utilised by the Denman Golf Course for irrigation. This has many benefits to the environment and to the community, including a reduction in the need for fertiliser on the golf



course, elimination of the need to buy water for irrigation, prevention of effluent being disposed of to local waterways, and reducing the costs to Council of having to pay to dispose of effluent to the river.

Effluent produced at the Muswellbrook plant is reused by both the Denman golf course (15%) and Bayswater Colliery (85%). The effluent used by the Colliery is stored and further treated in constructed wetlands on the Bayswater site before being used for such activities as dust suppression, coal processing and in the tree lot irrigation trial on the site (discussed in the "response" section to follow).

5.4.4 MONTHLY WATER QUALITY MONITORING – HUNTER RIVER AND MUSCLE CREEK

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 successfully for over 6 years. The program was reviewed throughout 2002/2003 to ensure it continues to deliver effective outcomes to the community.

The program involves taking five samples every month and analysing them for:

- pH;
- Phosphate;
- Electrical conductivity;
- Hardness;
- Coliforms;
- Nitrates; and
- Temperature
- 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, stock watering etc. Results for the 2002/2003 year for Electrical Conductivity, Phosphorus and Nitrates are detailed above in Section 5.2.

5.4.5 UPPER HUNTER COMMUNITY WATER QUALITY MONITORING PROGRAM

Muswellbrook Shire Council, together with support from Dept Land and Water Conservation, Murrurundi and Scone Shire Councils, Denman and District Development Association, and the Murrurundi and Scone Landcare Groups, received funding of \$67,000 for the implementation of a water quality monitoring in the Upper Hunter. The monitoring will compliment and add to the existing monitoring network currently in existence in the Hunter River. Of particular importance to the program is the monitoring of many tributaries which have had no previous monitoring undertaken before.

The program was being implemented through a coordinated approach between the organisations named above, including the combined provision of \$66,600 worth of in-kind support.



Sampling commenced in July 2001 and finished in December 2002, with monitoring results being disseminated through the community and water quality advertisements being placed in the local papers.

5.4.6 DENMAN REUSE PROGRAM

The Denman Sewerage Treatment Plant used to be a point source of pollution that entered into the Hunter River. Since 1996/97 Council has entered into a partnership with the Denman Golf Course, and all effluent produced at the Sewerage Treatment Works is reused and recycled to water the golf course. The system works with the treated effluent being pumped from the Sewage treatment works to a holding pond on the Denman recreational land, where it is stored until, it is required for use on the golf course. The use of the effluent on the course has ruled out the use of fertilisers required to be added to the course, and has eliminated the buying of water for irrigation.

The reuse system has numerous benefits, including:

- the removal of effluent entering natural watercourses
- the reuse and recycling of the effluent water on the golf course
- reducing the amount of clean water and fertilisers used by the golf course
- reduction in EPA licensing fees in the coming years

5.4.7 BAYSWATER REUSE PROJECT

Council and Bayswater Colliery Company entered into a partnership in 1997 to prevent effluent entering into local watercourses including Ramrod Creek and the Hunter River; while at the same time providing Bayswater Colliery with much needed water for dust suppression and coal processing.

The partnership involved setting up a pump station at Muswellbrook Sewerage Treatment Works and implementing a water pipe system from the sewerage treatment works to the Bayswater Colliery. The effluent from the treatment works is then pumped overland and into the constructed wetlands on Bayswater Colliery Holding where it can be used in mining operations day to day activities.

5.4.8 HUNTER RIVER SALINITY TRADING SCHEME

The EPA recognised that the coal mines were adding to the salinity of the Hunter River, and the Hunter River Salinity Trading Scheme and new licensing arrangements were made in January 1995.

The aim of the Scheme is to reduce the salinity levels in the Hunter and improve the quality of irrigation water particularly during periods of low flow. Coal mines with licenses to discharge are only able to discharge during high or flood flow conditions, which only occur 10% of the time. The amount of salt each mine is able to discharge is dependent on the number of credits held by the mine, and the salinity of the river at the time of discharge. Under any release event, the target EC levels at Denman (600 microsiemens) and Singleton (900 microsiemens) must be achieved after the discharge event.



The EPA has recently completed a major review of the scheme, resulting in the development of the POEO (HRSTS) Regulation to formalise the scheme in legislation.

5.4.9 URBAN STORMWATER MANAGEMENT PLAN

The Muswellbrook Stormwater Management Plan was developed under the direction of the NSW Environmental Protection Authority (EPA). The stormwater plan includes the two main urban catchments in the Muswellbrook LGA which are Muswellbrook and Denman. 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 of the Hunter River downstream.

5.4.10 RIVERCARE PROGRAM IN THE MUSWELLBROOK SHIRE

Council, together with technical assistance from the Department of Land and Water Conservation, has commissioned the development of two Rivercare plans for the Hunter River, one covering Muswellbrook to Aberdeen and the other covering 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.

5.4.11 ON SITE SEWAGE MANAGEMENT SYSTEMS

Council has continued with the auditing of established On – Site Sewage Management Systems throughout the Shire. A total of 1167 systems have been registered, of which 458 were inspected during 2002/2003.

The performance of the 458 systems audited throughout 2002/2003 was:

Unsatisfactory systems:

AWTS	25
Septic	237
Modified Septic	4

Those systems found unsatisfactory in their operation have been due primarily for the following reasons:

- structural problems such as cracked tank lids and air vents
- functional problems such as the tank needed to be pumped out
- disposal problems such as the disposal area being overloaded, non – existent or inappropriate for the location.

Satisfactory Systems

AWTS	36
Septic	108
Modified Septic	3

Works Completed

The number of systems that have undertaken rectification works on previously identified unsatisfactory systems:

AWTS	4
Septic	30
Modified Septic	0



Decommissioned Systems

A total of 11 systems have been decommissioned during 2002/2003 (ie systems that are attached to a dwelling that is no longer habitable, or are located on a vacant property).

Council has additionally approved the installation of 49 new wastewater treatment plants throughout the shire, comprising 43 aerated systems and 6 standard septic systems.

5.4.12 TRADE WASTE AUDIT

Council has continued the auditing of trade waste premises (commercial / industrial) and the issuing of Trade Waste Agreements 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. Such wastes discharged into the sewer are then treated at the sewage treatment plant. Types of operations which typically have trade waste agreements are food premises, mechanical workshops, medical facilities, printers/photography shops and hairdressers.

Number of premises with a current trade waste agreement: 49

Number of new premises audited and new agreements issued: 18

5.4.13 DRAYTON SALINE IRRIGATION TRIAL

Commercial forestry on mine spoils in the Upper Hunter Valley has not been previously considered viable due to low rainfall, high evaporation, the low water capacity and poor nutrient quality of the spoil. However, the financial incentive of carbon credits and the need for an alternative land use to coal mining has led to the investigation of establishing commercial forestry plantations on mine sites under irrigated conditions and using nutrient amendments such as biosolids, fertiliser and compost.

The trial has looking to determine the feasibility of irrigating a Eucalypt plantation with saline water. The project was funded by the Muswellbrook Shire Council because of their interest in finding an alternative and profitable land use to coal mining. The trial includes four species, chosen for their relative salt tolerance and good timber qualities, a range of nutrient amendments and the comparison of irrigated and non-irrigated conditions. It is hoped that the results from the trial will be helpful in determining if saline irrigation is a viable option for large scale commercial plantations on other mine sites throughout the Upper Hunter Valley. The results of the trial are expected to be available at the end of 2003.

5.4.14 BAYSWATER EFFLUENT REUSE FORESTRY TRIAL

Historically, rehabilitating mined land in the Hunter Valley concentrated solely on minimising the loss of agricultural and pastoral productivity, and the prevention of erosion and stream pollution. There is, however, the opportunity to develop the rehabilitated land to produce a valuable commodity such as timber, while utilising waste products to provide the necessary nutrients and organic matter for optimal plant growth.



The CSIRO designed a trial to be implemented by a PhD student as a research project. The major objectives of the project are to:

1. Examine the response of a eucalypt plantation grown in mine spoil, to effluent irrigation and composted biosolids application, and to determine the suitability of this land use as a rehabilitation practice on mine sites in the Hunter Valley;
2. Estimate the greenhouse gas mitigation effect of such plantations;
3. Maximise the trial's value as a research and development site and as a demonstration site, enabling results to be generally applied to rehabilitation of other mines in the region; and
4. Make recommendations to MSC and Bayswater Colliery regarding the use of effluent and biosolids for mine site rehabilitation and plantation growth, and recommend future species evaluation and silvicultural strategies.

It is not known when the results of the trial will be available.

5.4.15 WATERWATCH

Waterwatch is a schools and community water quality education and action program. Waterwatch groups carry out investigations and water quality monitoring including physical, chemical and biological parameters. During the 2002/2003 financial year, Muswellbrook High School and the Riverview Community Salinity Monitoring Project, Sandy Hollow participated in the Waterwatch program.

5.4.16 MURDER UNDER THE MICROSCOPE

Murder under the Microscope is an annual on line eco-game where students participate through intensive study of water quality issues, to identify victims, villains and the crime site of an environmental crime. Muswellbrook High School and St Joseph's Primary School, Denman participated in the competition in 2002/2003. St Joseph's Primary School's team, the 'Denman Legends' won an Eco-Planner Bronze Award in NSW for their Catchment Management Plan.

5.4.17 WATER BUG SURVEYS

The Hunter Catchment Management Trust, in addition to the Waterwatch initiative, also coordinates a water bug survey program with school students. The species of insects found are used as an indication of the overall health of the waterway. The surveys provide greater community awareness of the ecology of the streams and the ecological impact of catchment activities. During the 2002/2003 financial year, Muswellbrook High School and St Joseph's Primary School Denman participated in the water bug surveys during Spring 2002.



6. BIODIVERSITY

6.1 WHAT IS 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 diversity, species diversity and ecosystem diversity”* (NSW NPWS, 1999).

These three levels of biodiversity can be summarised below:

1. Genetic Diversity

Genetic diversity refers to the variety of genetic information contained in all individual plants, animals and micro-organisms.

2. Species Diversity

This refers to the variety of species on Earth. Species diversity is usually a measure of the number of species (richness) and their relative abundances for a given area at a given point in time.

3. Ecosystem Diversity

Ecosystem diversity refers to the variety of habitats, biotic communities and ecological processes. An ecosystem consists of plant, animal, fungal and micro-organism communities and the associated non-living environment interacting as an ecological unit.

Ecosystem diversity has two inter-related components: the diversity of communities of species; and the diversity of interactions between community members (processes).

Source: NSW Biodiversity Strategy (NSW NPWS 1999).

6.2 STATE

6.2.1 HUNTER REMNANT VEGETATION PROJECT

The following is a review of the aims and goals of the Hunter Remnant Vegetation Project, and the progress of the study to date. The study is being undertaken by Mr. Travis Peake.



Background

The Hunter Remnant Vegetation Project (HRVP) commenced in September 1996 with the aim being:

To collate scientifically sound information on the state of vegetation management and conservation in the upper Hunter catchment and use this information to encourage and support appropriate land management practices in the future.

The project is primarily funded and coordinated by the Hunter Catchment Management Trust, with additional primary funding from the Natural Heritage Trust. NSW National Parks and Wildlife Service (Muswellbrook District Office) and the Department of Land and Water Conservation (DLWC) provide some funding and in-kind support.

The objectives of the project are:

1. To develop and implement a public awareness and consultation program regarding the project's activity and findings;
2. To determine the distribution and ecological significance of remnant native vegetation in the Hunter Valley floor and identify potential corridors which may link them;
3. To encourage participation in the survey, and continuing conservation and appropriate management of remnants by government agencies, local government, community groups and individual landholders;
4. To work with landholders to develop strategies for the appropriate management of remnants; and
5. To develop resource information, based on data obtained, to assist land managers in the conservation and management of remnant vegetation.

The study area of the project currently covers approximately 3,200 km² of the mid to upper Hunter catchment. It stretches south from the Murrurundi / Scone shire boundary, south-west to Denman, and south-east to Branxton. In Muswellbrook Shire the study area extends south from Scone Shire, west to Wybong, and east to McCully's Gap, Grasstree and Lake Liddell. Approximately 30% of the Shire will be mapped by the project.

Initial Findings

While the process of digitising and reporting has not yet been completed for the Project, some initial findings can be mentioned. These include:

- Much of the tree cover of the area has been removed (primarily for agricultural purposes) since Europeans first settled the area from the 1820s onwards. There is some disagreement over what the vegetation of the valley floor was like in pre-European times, however it appears that much more of the area was covered with trees and a sparse understorey (probably a woodland) than is presently. Recent broad-scale surveys have indicated that up to 99% of the tree cover of the valley floor has been removed or significantly altered. Large numbers of trees are affected by dieback, with problems being particularly evident in isolated, scattered trees and those nearer riparian areas and floodplains. The Hunter Trust has a number of scientific tree trials designed to determine which species are more dieback-resistant.
- Over 1200 plant species have been recorded, of which around 25% are non-native (introduced) species. The flora of the valley floor is remarkably diverse, and includes numerous species that occur at the limit of their known distribution. It is expected that the total number of plant species in remnant vegetation of the



valley floor will ultimately be about 15-20% of all plant species recorded in New South Wales.

- At least five threatened plant species are expected to occur in the Muswellbrook valley floor area.
- While surveys results are not finalised, a number of areas within the Muswellbrook study area are considered to be significant because of the vegetation they contain. Some of these remnants are located on land that is used for agricultural purposes, military areas, roadsides, riparian areas and some areas designated for open cut mining operations.
- A number of opportunities are likely to exist for the creation of vegetation corridors in locations that will have an important ecological function. Such areas primarily exist on land utilised for agriculture (mainly grazing) and open-cut mining.
- Many landholders are eager to learn about the benefits, uses and appropriate management of remnant vegetation, however are deterred by the limited support available in the area, both in terms of advice and financial support. Council's role in native vegetation management and biodiversity conservation to date has not utilised all possible opportunities.

Project Progress

Mapping of the project area has been completed and digitising of this information is expected to be completed shortly. The date of completion of the final report is currently not known. It is anticipated that maps of remnant vegetation will be provided to Councils at the completion of the project.

The Hunter Bushland Resource Kit has been developed as part of the program to provide to landholders a guide to management native vegetation on private land in the Hunter Catchment. It provides guidelines and suggestions for effective bushland management on properties, both to increase the productivity and amenity of the land while maintaining the biodiversity of the catchment.

6.2.2 THREATENED AND ENDANGERED SPECIES

The Threatened Species Conservation Act provides for the conservation and recovery of threatened species and makes provision for the management of threats to species under the Act. The Act also introduces extensive community input into management strategies for threatened species conservation.

The Act delineates two categories of threatened species under which specific mechanisms for their protection have been implemented. The categories are:

1. Endangered (Schedule 1) – including:

- endangered species;
- endangered populations;
- endangered ecological communities;
- species presumed extinct;

2. Vulnerable (Schedule 2) - vulnerable species

Within the Muswellbrook LGA there are currently:

- 13 flora species listed as Vulnerable under Schedule 2 TSC Act;
- 2 flora species listed as Endangered under Schedule 1TSC Act;



- 9 flora species listed as Protected under Schedule 13 (Protected Native flora) TSC Act;
- 26 fauna species listed as vulnerable under Schedule 2 TSC Act;
- 4 fauna species listed as endangered under Schedule 1 TSC Act;

6.3 PRESSURE

6.3.1 PRESSURES ON BIODIVERSITY

There are numerous pressures on the biodiversity, and the following part of the report relates to the pressures on biodiversity within the Muswellbrook Shire Local Government Area. According to NSW NPWS (1999):

“There are a number of threats to our biodiversity. Some of these result from clearance of native vegetation, pollution, population growth, settlement patterns, excessive resource consumption, fire and the introduction of exotic species.....Loss of biodiversity presents not only a threat to our natural systems, but also has social and economic implications through the impact on industries such as agriculture, forestry, fishing and tourism, and the communities which depend on these industries for their economic and social well-being”.

Within the Muswellbrook Shire, the following activities threaten our biodiversity:

- Population growth and settlement
- Habitat change and fragmentation
- Urbanisation
- Development
- Mining
- Feral Animals
- Domestic animals
- Fires

6.4 RESPONSE

6.4.1 COMPANION ANIMALS ACT 1998

The Companion Animal's legislation came into force on 1 July 1999, which is outside the reporting period for this report. This legislation aids in the control of cats and dogs and help ensure that people have their pets registered, and desexed if appropriate.

6.4.2 NSW BIODIVERSITY STRATEGY

The NSW Government released the NSW Biodiversity Strategy on 9 March 1999. It provides a framework for coordinating and integrating government and community efforts to protect and State's native biodiversity, ensuring that available resources are efficiently and effectively applied.

The strategy highlights the need for a balanced approach to conservation measures for areas both within and outside the reserve system.



6.4.3 RECOVERY PLANS / THREAT ABATEMENT PLANS

Under the Threatened Species Conservation Act, a Species Recovery Plan must be prepared for species listed under Schedule 1 of the Act (Endangered). There a number of recovery plans currently being prepared by NSW NPWS for species which are known to occur within the Muswellbrook LGA.

6.4.4 NATIVE VEGETATION CONSERVATION ACT

The Native Vegetation Conservation Act, came into force on the 1 January 1998 and provides framework for government and community to work together to achieve sustainable native vegetation management. The Act is administered by DLWC, and its main features are:

- *Regional Vegetation Management Plans*
The RVMP's are developed by Regional Vegetation Committees and will provide a comprehensive strategy for managing native vegetation, by:
 - Identifying areas where native vegetation can be cleared without application;
 - Identify areas where an application to clear will be necessary;
 - Allow clearing exemptions to be developed in accordance with regional requirements;
 - Highlight areas where the condition of native vegetation should be approved;
 - Recommend areas that should be revegetated.
- *Property Agreement*
A Property Agreement is a voluntary agreement between a landholder and the Department of Land and Water and Conservation outlining the management of native vegetation on an individual property.
- *Clearing Native Vegetation*
In areas with an approved RVMP, clearing that is not consistent with the plan will not require development consent. In areas without a RVMP, native vegetation can be cleared if the clearing is consistent with the exemptions in the Act and other clearing restrictions do not apply. Where exemptions do not apply, clearing can only be carried out after an application has been made to the DLWC and development has been granted.

The Native Vegetation Conservation Act provides for the management of native vegetation still evident within our Shire with the objective of conserving native vegetation where appropriate. The Act is a big step towards the protection of vegetation in areas not conserved (such as National Parks etc).

6.4.5 HUNTER REMNANT VEGETATION PROJECT

As stated in Section 6.2.1 the Hunter Remnant Vegetation Project has identified the presence of a number of flora species which are rare or threatened. As a result of the findings of the project, areas with significant biodiversity and regional importance may be identified for conservation purposes.



6.4.6 SYNOPTIC PLAN

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 corridor 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.

6.4.7 MUSWELLBROOK TREE PLANTING PROGRAM

Muswellbrook Shire Council has undertaken a tree planting program throughout 2002/2003 which has resulted in the planting of approximately 2000 trees within the parks and gardens of the Muswellbrook Shire. These plants will not only provide aesthetic value to the community, but will additionally provide habitat for birds and other animals.

6.4.8 UPPER HUNTER RIVER REHABILITATION INITIATIVE (UHRRI)

The Upper Hunter River Rehabilitation Initiative (UHRRI) is a joint program coordinated by Macquarie University, the Hunter Catchment Management Trust, Department of Infrastructure, Planning & Natural Resources with additional input from NSW Fisheries, University of New England, Griffith University, the mining industry, local government, local landholder groups, the Wanaruah Aboriginal Land Council and local community. This program is focussed on an 8 km stretch of the main Hunter River between Muswellbrook and Denman.

The aim of UHRRI is to create a self sustaining riparian plant community dominated by native species and a more natural pool and riffle river system, on the Hunter River, to provide habitat for native species, improved river health, a model for future riverine restoration efforts and a valued community asset. The project has continued throughout 2002/2003.

6.4.9 MUSCLE CREEK REHABILITATION

Council, together with the assistance of Dept Infrastructure, Planning and Natural Resources, gained \$37,079 funding through the Environmental Trust for the implementation of river rehabilitation works on a section of Muscle adjacent to the Muswellbrook Swimming Pool. The project achieved the aim of addressing streambank and streambed erosion, resulting in the re-instatement of fish passage, aquatic pools and ripples, and the stabilisation of the degrading riparian environment of Muscle Creek.



7. WASTE

7.1 INTRODUCTION

The average rate of domestic refuse in NSW is about 1.1 tonnes per person per year. This does not include wastes from commercial and industrial premises, service industries or building activities. As the amount of waste being produced in cities and towns increases, the management of waste is becoming increasingly important. There is also a greater realisation of the need to handle and dispose of waste carefully as the environmental implications of poor management practices are becoming apparent.

The topics covered in this section of the report will be broken into solid waste generation and recycling and the activities of the sewage treatment plants in the Shire.

7.2 STATE

7.2.1 SOLID WASTE GENERATION AND COLLECTION

Muswellbrook Shire Council is responsible for the collection and disposal of waste within the Shire. Within Muswellbrook Shire Council LGA, there is one Landfill in operation and one Transfer Station.

7.2.1.1 Muswellbrook Landfill

The Muswellbrook landfill is located 2.5km from the centre of Muswellbrook, on the Coal Road. The landfill is located within an unused open cut coal mine void by the Muswellbrook Coal Company. The Muswellbrook landfill is owned by Muswellbrook Shire Council (MSC) and is operated under contract by JR Richards Pty Ltd. The landfill is licensed by the NSW Environment Protection Authority (EPA) under the Protection of the Environment Operations Act.

7.2.1.2 Denman Transfer Station

Due to the large area of the Muswellbrook LGA, a transfer station has been positioned and established in a location northwest of the town of Denman on the Rosemount Road. The transfer station has been provided for residents who live in the Denman township and the rural areas that surround Denman. The transfer station is manned and open seven days a week from 10am –2pm (excluding Christmas Day and Boxing Day).

Table 18: Waste Produced in Muswellbrook Shire

Type of Material	Amount (Tonnes)
Green Waste	1351
Glass	192
Plastics	18
Paper	345
Aluminium	66
Steel	395



Total Recycled	2367
Domestic waste (non-recyclables)	14996
Industrial Waste	1079
Waste Diverted from Landfill	15%

7.2.2 SEWAGE TREATMENT PLANTS

Within the Muswellbrook LGA there are two sewerage treatment plants; the Muswellbrook Treatment Plant and the Denman Treatment Plant. These plants are operated by Muswellbrook Shire Council, approved by the Department of Public Works and licensed by the Environment Protection Authority.

7.2.2.1 Muswellbrook Sewage Treatment Works

The Muswellbrook sewage treatment works services an area of approximately 2196ha, with a population of approximately 12 300 residents. Waste from a total of 3651 residential and 187 non-residential premises is treated by the Muswellbrook Treatment Plant.

In past years the treated effluent would then progress through a mini-wetland system to Ramrod Creek, and then eight kilometres to the Hunter River. Since April 1997 the effluent has been recycled with approx 15% of the total effluent being used on the Muswellbrook Golf Course (the effluent is filtered and chlorinated before being pumped for reuse). The total amount of treated effluent pumped to the Golf Course was 180ML. The remaining 85% of the effluent is pumped to Mt Arthur Coal where the effluent progresses through a managed wetland before it is used in their day to day operations, including dust suppression on haul roads and use in the coal preparation and handling plant. The total amount of effluent pumped to Mt Arthur Coal was 725ML.

7.2.2.2 Denman Treatment Plant

The Denman Sewage Treatment Works services an area of approximately 653.6 ha, with a community of approximately 1820 residents. A total of 487 residential and 43 non-residential premises are connected to the Denman Treatment Plant.

The treated effluent is then pumped to a holding dam on the Denman Recreation area where it is used to irrigate the Denman golf course and sporting fields. A total of 107ML of treated effluent was pumped and re-used at the Denman Recreation Area.

7.3 PRESSURE

7.3.1 WASTE GENERATION

Waste generation is the largest pressure on the environment, with all outputs from activities carried out contributing to the landfill. Waste generating activities require modification to reduce the resources being used, reusing all materials that are able to be, and recycling all material in one way or another before the product is labelled futile and enters landfill.



Reducing resource consumption is essential to minimising wastes produced by society. It is essential that a reduction in the rate, at which natural resources are being depleted, to manufacture products, is gained to minimise the impacts on the environment, not only through using the resource but also dealing with the waste after the products are used. Product design and packaging is required to be changed to ensure that resource consumption is minimised, in turn reducing the waste created.

7.3.2 INCORRECT DISPOSAL OF WASTES

Incorrect disposal of wastes is another large pressure on the environment, and it is difficult to monitor and access. Illegal dumping of wastes not only leads to the littering of the area affected but may also lead to pollution of waterways and contamination of land. Due to the large area that the Shire covers it is difficult to police illegal dumping or the incorrect disposal of wastes, and Council usually deals with incorrect disposal events in response to complaints received.

7.4 RESPONSE

7.4.1 CLEAN UP AUSTRALIA DAY

Clean up Australia Day 2003 was very successful in Muswellbrook Shire, with approximately 60 volunteers participating in the Clean-up throughout the Shire at a number of locations within Muswellbrook, Denman and Wybong.. The clean up also targeted the removal of dumped car bodies within the Muswellbrook Common and at the bottom of Denman Lookout.

7.4.2 COMPOST PRODUCTION

In a quest to reach the 60% reduction of wastes entering landfill, Muswellbrook Council has been working on the production of compost, for commercial sale to business and community members. The compost is a result of combining sewage biosolids from the Muswellbrook Sewage Treatment Plant, and green waste collected at the Muswellbrook landfill. A total of approximately 4500m³ of compost was produced in 2002/2003.

Council's Waste Management and Forestry Committee is currently assessing the viability of bagging the compost and selling it either directly to the public, or through a retail nursery.

7.4.3 WATER REUSE SCHEMES – BAYSWATER AND DENMAN

During the 2002/2003 financial year Council has prevented effluent being discharged into the Hunter River from both Denman and Muswellbrook sewerage treatment plants through the use of effluent reuse schemes as previously discussed in the report.

7.4.4 ENVIRONMENTAL MONITORING AT THE WASTE DEPOT

Council undertakes numerous environmental monitoring at the landfill to ensure the landfill is operating in an environmentally sensitive manner. Such monitoring includes the monitoring of groundwater from three bores within the landfill DA area, monitoring of the leachate sump for leachate generated at the landfill through the filtration of water through the disposed waste (the water becomes contaminated by the waste



and is thus termed leachate), and the monitoring of methane, which is a gas which is typically emitted at landfill sites as a result of the degradation of waste.

7.4.5 RECYCLING PROGRAM

Council's Administration Centre participates in a waste recycling scheme. The scheme ensures that all paper and other recyclables that are used in the Administration Building are reused in cases 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 now is recycled into quality recycled products.



8. NOISE

8.1 INTRODUCTION

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. It can be annoying, interfere with relaxation and with sleep, reduce enjoyment of activities and conversation, and prevent people from carrying out tasks satisfactorily. Noise can impact adversely on health by causing tension, headaches and fatigue and permanent hearing loss over time.

The results of an Australian wide survey by the Australian Environment Council showed the following noise sources, ranked in descending order as the most annoying:

- traffic
- barking dogs
- lawn mowers
- aircraft
- trail bikes
- noisy neighbours
- noisy parties

The pressure of noise on community members is increasing as the population and subsequent development increase in our environment. According to the EPA (1997) "noise pollution can be defined as unwanted or offensive sounds that unreasonably intrudes into our daily activities."

The EPA (1997) explain there are a number of factors which are contributing to the problem of high levels of noise which include:

1. the increase in population, especially where it leads to increasing urbanisation and urban consolidation
2. the increase in volumes of road, rail and air traffic; and
3. an increase in industrial developments

Effective control of noise on the environment is a difficult issue for the community and 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.

8.2 STATE

8.2.1 NOISE COMPLAINTS

Noise levels within the Muswellbrook Shire are a significant concern to Council particularly with regard to 'background creep' which can occur in areas where heavy industry such as coal mining is located. The sensitivity of residents to noise, particularly from industrial sources, is increasing as the number of mines increase and their proximity to residents become closer and closer.



The number of noise specific complaints received by Council has remained fairly constant compared to the last 2 years. During the 2002/2003 financial year, 30 noise complaints were received by Council. This represents a significant decrease in the number of noise complaints when compared to the 1997/1998 year. The decrease in noise complaints may be due to:

- Residents have become more tolerant of noise;
- Residents tired of complaining – same noise but residents are no longer making the complaint;
- Residents are utilising the coal mining companies own complaint mechanisms and are not forwarding their complaints to the EPA or Council as well;

It should be noted that the total number of noise complaints received by Council is actually higher than the numbers outlined in the report indicate. This is due to not all complaints being recorded in the complaints register due to the complainants not wanting to lodge an 'official' complaint.

8.2.2 INDUSTRIAL NOISE

The major source of the complaints relates to mining operations and associated operations and facilities. The complaints received were usually associated with episodic and infrequent noise events that resulted in disturbing residents from sleep at night, or distracted resident's concentration during the day.

The majority of the EPA received noise complaints relate to noise generation from mining operations or industrial activities within the Shire, where EPA is the regulatory authorities for the noise aspect of the operation / activity that was in question. These noise complaints were generally for noise from everyday mining operations and blasting events.

8.2.3 RESIDENTIAL NOISE

As communities become more urbanised and industries expand, noise can increasingly intrude on our lifestyles and have an adverse impact on the environment.

It should be noted that not all noise complaints can be suitably recorded and acted upon because the complainant often does not like to leave their names and contact numbers. In a majority of cases the matter involves the seeking of information on time restrictions on certain activities.

8.2.4 TRANSPORT NOISE

Transportation noise is another major source of noise within the Shire. These major sources include the New England Highway and the Great Northern Railway. The majority of the noise complaints received regarding transport are related to coal train noises.

The traffic on both the New England Highway and the Great Northern Railway effect the township due to the routes which runs right through the centre of Muswellbrook Urban Area.



8.3 PRESSURE

8.3.1 EFFECTS ON INCREASING INDUSTRIAL ACTIVITIES

As the number and size of the industrial developments throughout the shire increase, in particular the number and operational capacity of coal mining developments, the number of people affected by noise may increase. Whilst the number of noise complaints over the 2002/2003 financial year have remained constant, community members may be utilising other avenues for lodging their concerns, such as coal mine complaint hotlines, or the EPA's Pollution Line.

8.3.2 INCREASE IN POPULATION

As the population of the area increases, and urbanisation increases as a result, residential areas encroach into noisy areas such as central business districts and industrial areas. Also, with increased population there is an increase in traffic and transportation of products. The end result of an increase in population is an increase in noise created and therefore an increase in noise complaints received.

8.4 RESPONSE

8.4.1 COUNCIL'S GENERAL RESPONSE TO NOISE COMPLAINTS

Council has a service request system in place which provides residents in the LGA with a response to a noise complaint, after Council Officers have carried out the procedure process. The procedure process usually involves carrying out the following:

- Taking down the full details of the service request from the resident, including the Event Location, details of the person who called (name, address, phone number), and Reasons for calling (event details).
- The service request is then passed along to the appropriate officer (Environment Officer or Ranger usually).
- The Officer investigates the complaints and contacts the person who was responsible for the event (noise episode), and advises the person of correct procedures and associated legislation relating to the activity carried out.
- When the issue is resolved the Officer calls the person who submitted the service request or complaint, to provide outcomes of the procedure.
- The service request is then signed off and dated, and logged into the computer system and filing system.
- Conditions of Development Approval for coal mines include that the mine provide a complaint mechanism whereby they provide a manned telephone line at all times to receive complaints. This has substantially reduced the number of noise complaints received by Council.

8.4.2 ENVIRONMENTAL NOISE CONTROL MANUAL (ENCM)

The EPA released the Environmental Noise Control Manual (ENCM) in 1985. The manual is comprised of noise control policies and procedures which recognises the potential for noise pollution to occur, our subjective and emotional response to it and the diversity of agencies able to achieve control. The manual was the first of its type for the control of noise within communities, including noise associated with specific



sources, such as motor sport, public address systems, sporting activities, shooting ranges etc.

The manual aimed to facilitate the most effective use of the control resources available, and encouraged practicable and equitable solutions to noise problems.

The ENCM is currently being replaced by the "Environmental Management Series". The previous Road traffic noise and industrial noise sections of the ENCM have already been replaced with the 'NSW Industrial Noise Policy' and the 'Environmental Criteria for Road Traffic Noise'.

Council still uses and refers the community to the limits imposed on the operation of certain articles during specific hours as detailed in the ENCM. There are times during which restrictions apply to the operation of certain articles (for example: amplified sound equipment, domestic air conditioners, lawnmowers, motor vehicles etc) if noise emitted from the article can be heard in a room of another dwelling.

8.4.3 NSW INDUSTRIAL NOISE POLICY

The NSW Industrial Noise Policy replaces chapters 19, 20, 21 and 82 of the Environmental Noise Control Manual (except for the sleep disturbance section in chapter 19). The Policy seeks to promote environmental well-being through 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. The assessment of potential noise impacts from industrial facilities and activities are required to be undertaken in accordance with the Policy.

8.4.4 ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE

The Environmental Criteria for Road Traffic Noise replaced chapter 157 of the Environmental Noise Control Manual and was released by the EPA in June 1999. The environmental criteria for road traffic noise aims to institute a more comprehensive and effective approach to managing road traffic noise;

8.4.5 PUBLIC ENTERTAINMENT LICENCES

During the 2002/2003 financial period 4 annual public entertainment licences were issued by Muswellbrook Council to places of public entertainment within the Shire. The annual licences provide conditions relating to the noise levels acceptable for functions in relation to particular days and times. Council reviews licences and facilities on an annual basis.

8.4.6 NOISE MONITORING

All mining operations within the Muswellbrook Shire Council carry out their own noise monitoring. Council receives results of this monitoring on a monthly basis for some mines and for others the noise results are provided in the Mining Companies annual environmental report. Industry is being made more aware of its responsibility in the noise control requirements and appropriate conditions are being placed on development consents to address the problems. The conditions imposed on the operations/activities attempt to, wherever possible, reduce noise levels at the source, regulate the times of occurrence and install barriers between the noise source and the receiving environment.



9. ABORIGINAL HERITAGE

9.1 ABORIGINAL HERITAGE AND CULTURE

A detailed account of the heritage and culture of the Aboriginal people in the Muswellbrook Shire can be found in the 1999/2000 State of the Environment Report.

9.2 STATE

9.2.1 ABORIGINAL SITES AND RELICS

There are currently **1103 known Aboriginal sites** within the Muswellbrook LGA, **within which there are 1115 site features found**. These site features, detailed below, are recorded on the NSW National Parks and Wildlife Service's Aboriginal Heritage Information Management System. The site features include:

Table 19: Aboriginal Site Features

<i>Site Type</i>	<i>Number of features</i>
Aboriginal resource and gathering	0
Aboriginal Ceremony and Dreaming	1
Art (Pigment or Engraved)	11
Artefact	1069
Burial	3
Ceremonial Ring (Stone or Earth)	1
Conflict	0
Earth Mound	1
Fish Trap	0
Grinding Groove	6
Habitation Structure	0
Hearth	0
Non-human bone and organic material	0
Ochre Quarry	1
Potential Archaeological Deposit (PAD)	0
Shell	2
Stone arrangement	3
Stone Quarry	3
Modified Tree (Carved or Scarred)	14
Water Hole	0
TOTAL	1115



9.3 PRESSURE

9.3.1 IMPACTS ON ABORIGINAL HERITAGE AND CULTURE IN THE MUSWELLBROOK SHIRE

The major impacts on Aboriginal sites, heritage and culture in the Muswellbrook Shire are: -

1. Open Cut Coal Mines

Within any one area proposed for an open cut coal mine in the Muswellbrook Shire, you have a destruction rate of approximately 98% for Aboriginal sites and relics.

2. Proposed Housing Subdivisions

Within any one area proposed for a housing subdivision, you have the destruction rate of approximately 90% for Aboriginal sites and relics.

3. Proposed Land Clearing for Agricultural Purposes

The clearing of land for agricultural purposes would have a destruction rate of approximately 98% for Aboriginal sites and relics.

4. Proposed Sand and Gravel Extraction

Areas proposed for sand and gravel extraction along rivers and creeks would have a destruction rate of 90% for Aboriginal sites and relics.

Other minor impacts on Aboriginal sites and relics are: -

- ◆ Proposed roads
- ◆ Proposed telecommunications cable laying and towers
- ◆ Proposed Shire Developments
- ◆ Proposed electrical towers and poles
- ◆ Proposed underground coal mines.

9.4 RESPONSE

9.4.1 VOLUNTARY CONSERVATION AGREEMENTS

Two areas within the Mt Arthur Coal lease area have been proposed for the establishment of voluntary conservation agreements. These will be the first areas designated as aboriginal conservation areas within the Shire. The management of these areas once formally created will be undertaken in conjunction with NSW NPWS and local aboriginal groups.

9.4.2 SECTION 90 – NATIONAL PARKS AND WILDLIFE ACT

Aboriginal sites in New South Wales are protected under Section 90 of the National Parks & Wildlife Service Act 1974. This protection covers all sites, regardless of who owns the land and makes it an offence to knowingly damage, destroy or deface an



Aboriginal Site or Aboriginal Place without prior written consent of the Director of the National Parks & Wildlife Service of NSW.

9.4.3 DEVELOPMENT ASSESSMENT

Development Applications involving local Aboriginal interest are referred to the local Aboriginal Land Council for consideration and comment. In some cases further discussions take place with members of the Council to identify specific issues relating to the development. The results of these discussions and the subsequent submissions made by the Land Council are, in the first instance referred to the applicant for consideration and comment, and subsequently addressed by Council, as conditions of consent, if the application is supported.

In the majority of cases it has been found that direct discussions between the applicant and the land Council has resulted in an early determination of the application, as all issues are normally addressed on site by both parties with a satisfactory resolution being obtained. Aboriginal sites are taken into consideration in Development Assessment as they are considered to be part of the environment under Section 90 of the Environmental Planning and Assessment Act 1979.



10. NON ABORIGINAL HERITAGE

10.1 NON ABORIGINAL HERITAGE IN THE MUSWELLBROOK SHIRE

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 Local Government Area is essential to preserving the history of the region.

10.2 STATE

10.2.1 THE STATE OF NON-ABORIGINAL HERITAGE

Within Muswellbrook Shire Council's Local Government Area different authorities have recognised many cultural items of environmental heritage as being worthy of statutory protection and other conservation action by public bodies. The *Register of the National Estate* lists 39 (possibly 40) historic sites as well as one indigenous site and 3 (possibly 4) natural sites. The *Register of the National Trust of NSW (NSW)* lists 57 'items' (including 3 urban conservation areas, 2 landscape conservation areas and 4 cemeteries). The Royal Australian Institute of Architects' *Register of Twentieth Century Buildings of Significance* lists 31 items within the Shire.

The *Hunter REP (Heritage) 1986* (which prevails over the *Muswellbrook LEP 1985*) gives statutory protection to 26 regionally significant, 23 locally significant items of environmental heritage (all of which are of European cultural significance) and two urban Conservation Areas. This REP lists also 32 other items, which were listed as requiring 'further investigation'. The NSW Heritage Council has listed one item under s130 of the *Heritage Act 1977* and 7 items which have Permanent Conservation Orders over them as being 'of state significance'. The State, Regional and Local items of heritage significance within the Muswellbrook Shire are detailed in Appendix 2. Of the abovementioned items, three have been approved for demolition due to condition/safety or for redevelopment purposes.

A 'Shire Wide Heritage Study 1996' reviewed the items listed in the REP and also any other items put forward by the public. This Study is the basis for a Heritage Amendment to the Muswellbrook LEP 1985 and the creation of a Heritage DCP.

The Shire contains parts of two National Parks, the Wollomai and the Goulburn National Parks, which contain items of cultural as well as aboriginal and natural items of heritage significance.

10.3 PRESSURE

10.3.1 PRESSURES ON HERITAGE

Many identified items of heritage value are under threat from neglect, inappropriate alterations or unsympathetic development in their vicinity. Development pressures



on items of environmental heritage and on heritage conservation areas include those from:

- Mining – including blasting / vibration, dust deposition and visual impacts;
- Traffic (such as on the New England Highway which passes through Muswellbrook);
- Subdivision;
- Urban change;
- Development – such as the upgrading / renovation of heritage buildings

10.4 RESPONSE

10.4.1 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.

10.4.2 IMPLEMENTATION OF THE HERITAGE STUDY

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.

10.4.3 APPOINTMENT OF 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 to discuss issues with the Heritage Advisor along its normal business (terms of reference).

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 cemeteries in rural localities of Muswellbrook.

During 2002/2003 Council's existing Heritage Advisor retired, however a replacement was engaged to continue the valuable service.



11. LIMITATIONS

Opinions and recommendations contained in this report are based upon data provided by employees or representatives of Muswellbrook Shire Council and the information gained from contacts with relevant government authorities and other organisations.

This report addressed the current State of the Environment in Muswellbrook Shire as at June 2003, based on relevant in-house information which was available at that time.

This supplementary State of the Environment Report has been prepared for the purpose described solely in the Local Government Act 1993 (NSW) for the Minister for Local Government and no responsibility is accepted for use of any part of this report in any other context or for any other purpose.

For detailed maps pertaining to the State of the Environment in the Muswellbrook Shire, please refer to the 1999/2000 Comprehensive State of the Environment Report.