



# *State of the Environment Report*

**SUPPLEMENTARY  
REPORT 2005**

**A guide to the condition of the environment**



**KEMPSEY SHIRE COUNCIL**

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## 1.0 TOWARDS SUSTAINABILITY

### 1.1 INTRODUCTION

The following Supplementary State of the Environment (SoE) Report has been prepared as an ancillary to the 2004 Comprehensive SoE Report, for the Kempsey Shire LGA for the period from 1 July 2004 to 30 June 2005, in accordance with the requirements of the Local Government Act (1993).

As highlighted in the 2004 Comprehensive SoE Report, Kempsey Shire Council formally adopted an Ecologically Sustainable Development (ESD) Policy following the newly elected Council in 2004. Through this policy Council made a commitment to adopting ESD principles in decision-making and to undertake a Local Agenda 21 program to assist Council in embracing ESD practices and for developing Action Plans and ESD Performance Indicators.

The aim of this SoE Report is to provide an update on the trends in environmental indicators of the core environmental sectors; the land, water, atmosphere, biodiversity, human settlements and aboriginal and non-aboriginal heritage. While doing so the report will provide a “snapshot” of the present day environment in Kempsey Shire with that of previous years and identify any new environmental pressures since the previous report.

### 1.2 OBJECTIVES

The objectives of the 2005 Supplementary State of the Environment Report are summarised as follows:

- ♦ To provide a snapshot of the state of the environment of the Kempsey Shire in the year 2004/2005 to enable monitoring of Council and the communities performance in moving towards sustainability.
- ♦ To identify any new environmental pressures and comment on trends in environmental indicators of the core environmental sectors; the land, water, atmosphere, biodiversity, human settlements, aboriginal and non-aboriginal heritage.
- ♦ To provide usable information and data to enable more effective environmental decision-making across all departments of Council.
- ♦ To provide open and transparent accountability of Council’s operations and environmental performance.

### 1.3 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Ecologically Sustainable Development (ESD) aims to provide for the social and economic needs of the community of Kempsey Shire, while protecting and enhancing the essential natural life processes for the benefit of future generations. Council is required to consider the principles of ESD in all of its activities as is outlined by the Local Government Act 1993.

## LOCAL AGENDA 21 PROGRAM - UPDATE

Kempsey Shire Council has committed to undertaking a Local Agenda 21 program.

Local Agenda 21 provides an operating framework for all of Council's operations and decision-making. It is about visioning, integrating policy, promoting innovation and establishing an Action Plan with targets and goals for achieving sustainable outcomes. Sustainability can be closely linked to resource efficiency, cost management and performance indicators. It involves Council looking toward the future while considering the principles of ESD.

In May 2005, Kempsey Shire Council finalised the appointment of community representatives forming part of the Agenda 21 team. The first meeting of this Committee is scheduled for the end of September 2005, with the objective of providing an introductory session for all members of the committee, involving a brief training workshop on ESD Principles and examples of other Local Agenda 21 Programs. It is envisaged that this committee will help guide the process of preparing an overall ESD Strategy for the Shire.

### 1.4 TRIPLE BOTTOM LINE REPORTING

Kempsey Shire Council has adopted a Triple Bottom Line i.e. Environmental, Social and Economic, reporting template for all business paper reports. The aim of the template is to ensure that social, economic and environmental considerations are duly addressed to enable informed decision making for sustainable outcomes.

### 1.5 ENVIRONMENTAL MANAGEMENT

Following on from the 2004 Comprehensive State of the Environment Report, this year's report aims to continue to establish the document as an environmental management and planning tool. As more data is collected and as the report develops in coming years, it is envisaged the report will take a more strategic environmental focus that establishes performance targets and goals for future years.

The Northern Rivers Catchment Management Authority (NRCMA), which incorporates the Kempsey Shire area, is largely responsible for the coordination and funding of Natural Resource Management programs in the region. The NRCMA is developing a Catchment Action Plan (CAP) for the Northern Rivers Region. The 10 year CAP will guide natural resource management across the Northern

Rivers Region. The CAP will build on the Northern Rivers, Upper North Coast and Mid North Coast Catchment Blueprints that currently operate across the Northern Rivers Region. The NRCMA is currently conducting consultation on the Draft CAP to gain the northern rivers communities input.

### 1.6 SOE REPORT STRUCTURE

In keeping consistent with the previous Comprehensive SoE Report, the structure of this Report has been organised into the following Chapters:

- ♦ Chapter 1 – Towards Sustainability
- ♦ Chapter 2 – The Land
- ♦ Chapter 3 – Water
- ♦ Chapter 4 – The Atmosphere
- ♦ Chapter 5 – Biodiversity
- ♦ Chapter 6 – Human Settlements
- ♦ Chapter 7 – Aboriginal and Non-Aboriginal Heritage
- ♦ Chapter 8 – Council Environmental Performance

All areas required by legislation have been incorporated into the above headings. Each chapter addresses the State, Pressure and Response as required by NSW legislation and also offers comments for Future Directions.

### 1.7 ENVIRONMENTAL INDICATORS

Following a similar reporting style to the 2004 Comprehensive SoE Report, environmental indicators presented within this report will provide updated information on environmental conditions and trends for the Kempsey Shire LGA. These indicators include physical, chemical, biological and socio-economic measures of the natural or built environment in order to assess natural resources or environmental quality.

The indicators are presented with an explanation to why they have been chosen and what they demonstrate. A basic conclusion regarding the current state of the indicator has also been included in the format provided below to enable ongoing monitoring of performance for the indicator in future State of the Environment Reports.

**CONCLUSION:**

**Situation Improving**

**Steady**

**Pressure Increasing**

## 1.8 ENVIRONMENTAL LEVY

The collection of an Environmental Levy continued throughout the 2004/2005 reporting period. Council first implemented the collection of an Environmental Levy in 2003/2004, with the purpose of the Levy to supplement a portion of Council's Environmental programs.

A summary of Council's Environmental Works Program for 2004/2005 and proposed future works are presented in Section 8.11 (Chapter 8 – Councils Environmental Performance) of this report.

## 1.9 REGULATORY ENVIRONMENT

This Supplementary State of the Environment (SoE) report has been prepared by Kempsey Shire Council in accordance with the requirements of the Local Government Act 1993 and the Local Government (General) Regulation, taking into account the 1997 amendments to the Act.

## 1.10 REGIONAL SETTING

### 1.10.1 Location

The Kempsey Shire Local Government Area (LGA) is located on the Mid-North Coast of NSW, approximately 450km north of Sydney and 550km south of Brisbane. Kempsey Shire covers a geographical area of 3,376km<sup>2</sup> and is bounded by Nambucca Shire to the north, Port Macquarie Hastings Council to the south and the Walcha and Armidale Dumaresq Shires to the west. The Macleay River transects the Shire from west to east from high rugged country at the eastern extent of the New England Tableland, through to the lower floodplain and discharging at the coastal township of South West Rocks. While the majority of the Shire is contained within the Macleay River catchment a smaller area to the southeast drains into the Maria River catchment.

Figure 1 – Location Plan



### 1.10.2 Climate

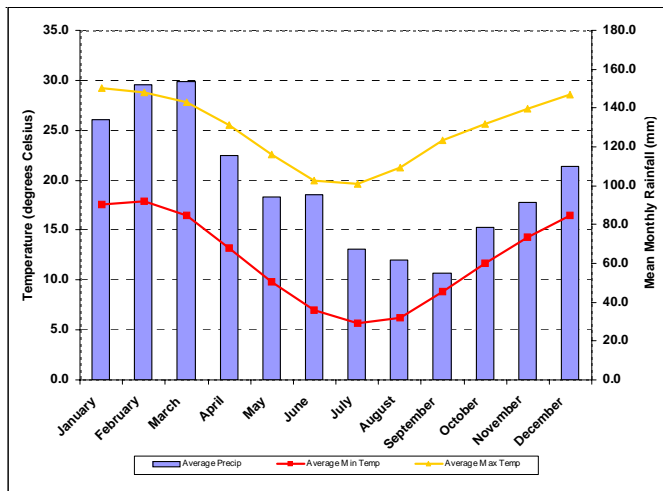
The majority of the Kempsey Shire falls within the warm temperate climatic zone, however, higher elevations (up to 1560m) to the west experience a cooler temperate climate. The climate across Kempsey Shire is strongly influenced by the range of elevations from sea level to the high country, the distance from the coast and the latitude.

#### INDICATOR – CLIMATE DATA

#### Why use this indicator?

Ongoing review of climate data sourced from the Bureau of Meteorology enables the identification of trends and any significant variations in weather patterns. Updated with 2004/2005 data, Figure 2 provides the average rainfall and temperature conditions from 1882 to date, as recorded in Kempsey only.

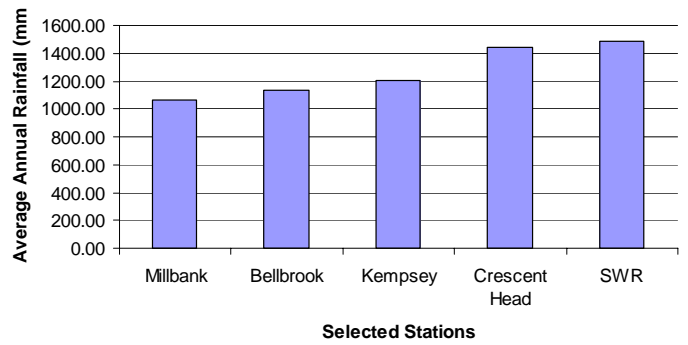
**Figure 2 – Average Temperature and Rainfall for Kempsey**



Source: BOM 2005

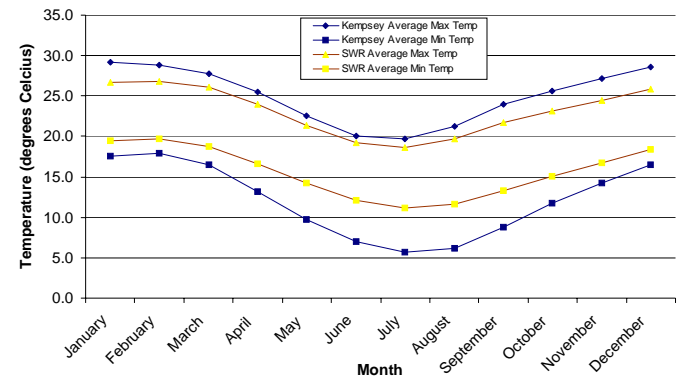
As recommended by the previous Comprehensive SoE Report, further data was reviewed from weather stations from across the Shire in an attempt to provide a more detailed picture of the Shire's Climate. Figure 3 below provides mean annual rainfall for selected weather stations across the Shire and Figure 4 shows mean monthly maximum and minimum temperatures for Kempsey and South West Rocks.

**Figure 3 – Average Annual Rainfall for Selected Stations Across Kempsey LGA**



Source: BOM 2005

**Figure 4 – Average Maximum and Minimum Temperature Variation for Kempsey and South West Rocks**



#### What does this show?

Approximately 60% of the average annual rainfall occurs between the months of December to April with highest concentrations usually between January and March. Temperature is strongly influenced by elevation with higher elevations experiencing considerable lower temperatures during winter months.

Figure 3 shows increasing rainfall towards the coast, with the coastal towns of Crescent Head and South West Rocks experiencing, on average, approximately 300 to 400 mm more rainfall per year compared to the inland towns of Millbank and Bellbrook. There also appears to be a trend of increasing rainfall from south to north across the Shire. Temperature range also shows a subtle variation when comparing that experienced on the coast (South West Rocks) and that experienced inland at Kempsey. As expected the data shows that there is less variation between maximum and minimum temperatures on the coast, with South West Rocks, on average experiencing a 7.5°C variation in temperature, compared with an average 13°C variation for Kempsey.

## 1.11 POPULATION

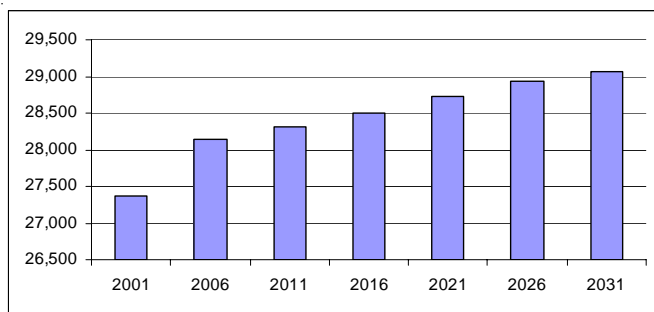
The population of Kempsey Shire from the ABS 2001 statistics stands at 26,934. However, the estimated residential population (ERP) for the Kempsey LGA determined by the then Planning NSW Department for 2001 was 27,700. This figure was based on ABS census data, which was adjusted to include people who live in Australia but were not counted on census night. It also includes Australian residents who were overseas at the time and excludes overseas visitors. The estimated figure of 27,700 for 2001 is higher than the actual figure of 26,934 (Basic Community Profiles) where overseas visitors have been included.

### INDICATOR – POPULATION GROWTH

#### Why use this Indicator?

Population growth, including population distribution and migration, combine with high-consumption patterns to put stress on the environment, through increased demand for land resources and the need to increase infrastructure requirements to support new and growing human settlements.

**Figure 5 – Projected population, Kempsey LGA, 2001 – 2031**



Source DIPNR 2004

#### What does this show?

The population of the Kempsey LGA is predicted to grow at a steady rate from 2001 to 2031, reaching just over 29,000 in 2031. Population growth is expected to rise over the coming decades as the area attracts retirees and others seeking lifestyle changes or wishing to escape the pressure of living in Sydney and other larger urban centres. The coastal town of South West Rocks for example is expected to experience rapid population growth in the Kempsey Shire.

**CONCLUSION:**

**Pressure Increasing**

# At a GLANCE

## THE LAND

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<p><b>Acid Sulphate Soils (ASS)</b> – The lower Macleay flood plain is one of the most significant areas affected by ASS in NSW.</p>	<p><b>Aid Sulphate Soils Assessment</b> – 11,275ha of low risk ASS and 47,556ha of high risk ASS occur in the Shire. There 364km of drains within the floodplain.</p>	<p><b>Acid Sulphate Soils Management</b> – 2 ASS Hot Spot remedial projects have been completed and a 2 more are nearing completion in late 2005.</p> <p>Remedial works undertaken during the reporting period included 30 floodgate and 19 drain modifications</p>	<p><b>ACID Sulphate Soils</b> – The Second Stage of ASS remediation at Rafferty's Drain is proposed to take place in 2005 and a funding application for \$120,000 has been submitted to the NRCMA to address further acid sulfate soil problems within the Macleay Floodplain.</p>
<p><b>Land Use</b> – No major change in land use zoning has occurred during the past 12 months.</p>	<p><b>Development Pressure</b> – Although, overall there has been a significant increase in development within the Shire over the last five years, a slight decrease in the number and value of development applications has been recorded in the past 12 months.</p>	<p><b>Planning Controls</b> – LEP 2004 to supersede LEP 1987.</p>	<p><b>Comprehensive Vegetation Mapping</b> – Kempsey Shire Council plans to undertake Comprehensive Vegetation Mapping in the 2005/2006 financial year.</p>
<p><b>Contaminated Sites</b> – There are a number of known contaminated sites in the Shire including landfills, fuel depots, stock dips, sewer treatment plants, quarries and mine sites.</p>	<p><b>Land Degradation</b></p> <p><b>Soil Erosion</b> –resulting from continued land clearing for development and agriculture, ASS.</p>	<p><b>Rezoning</b> – Potential rezoning of the former Shell Petroleum Terminal site, South West Rocks to residential land use. A Remediation Action Plan (RAP) has been developed for the site outlining requirements for remediation.</p>	<p><b>Land Degradation Assessment</b> – A land degradation assessment is needed to affectively manage this issue.</p>
<p><b>Environmentally Sensitive Land</b> – there are 6,706ha of land zoned for protection within the Shire.</p> <p>A further 313 ha of land in the shire was designated as wildlife refuges within the reporting period.</p>	<p><b>Agricultural Practices</b> – can place increased pressure on land through the use chemical sprays, drainage of land, land clearing and inappropriate stock and crop management.</p>		

## 2.0 THE LAND

### 2.1 INTRODUCTION

Land development within the Kempsey Shire is putting increasing pressure on land resources within parts of the Shire. The land is a fundamental part of ecological systems and is essential to sustaining human existence.

## STATE

**What are the issues for sustainability that are affecting the Land?**

### 2.2 TOPOGRAPHY

The Kempsey Shire experiences varied topography, ranging from the upper reaches of the New England Tablelands (approx. 900-1200m elevation) to the west and eastern escarpment gorge country, traversing down to rugged hill country, lower hill country and extensive floodplains to the east. The coastal fringe is characterised by dunefields, estuaries and some elevated headlands.

### 2.3 SOILS AND GEOLOGY

The general geology is characterised by Carboniferous and Permian rocks of the Hastings Block to the south and Kempsey and Nambucca Beds to the north. Soils range from fluvial sediments in the floodplain of the Macleay River, including acidic clays, which are dispersive when wet and sometimes sodic, to strongly structured clays soils with low texture contrast originating from the Tertiary basic volcanics in the upper reaches of the valley (DWLC 2000).

Refer to the 2004 Comprehensive SoE Report for a more detailed description of the geology underlying the Kempsey Shire.

### 2.4 VEGETATION

The Shire has a significant amount and wide range of vegetative cover due to the large areas of National Parks and State Forests. Vegetation types within the Kempsey Shire LGA are discussed in detail Chapter 5 – Biodiversity.

### 2.5 ACID SULFATE SOILS

Acid Sulfate Soils (ASS) are natural soils that form in seawater or brackish water environments. They are common in every estuary and estuarine floodplain in NSW. These soils contain iron sulfides that are stable and do not cause a problem when waterlogged. However, when these natural occurring sulfides are disturbed and exposed to air, oxidation occurs and sulfuric acid is ultimately produced. This acid can leach into the surrounding area acidifying

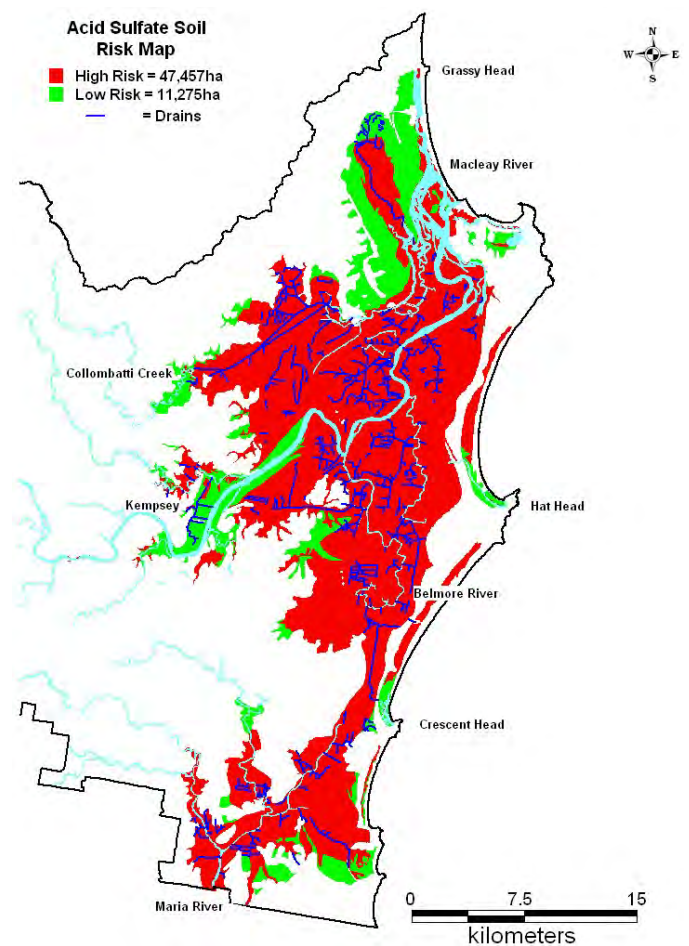
neighbouring drains, wetlands, creeks, estuaries and bays, causing severe short and long-term environmental damage. It can affect industries such as fishing and tourism, and can impact on public and private infrastructure by causing serious damage to steel and concrete structures such as the foundations (footings) of a building, floodgate structures or bridge pillars (LMCC 2005).

### INDICATOR – The Extent And Location Of Acid Sulfate Soils

#### Why use this indicator?

It is important to identify the presence of potential ASS to ensure any proposed future development does not have the potential to cause acid generation and runoff.

**Figure 6 – The Area and Extent of Acid Sulfate Soils**



#### What does this show?

There are approximately 11,275ha (3.34% of Kempsey Shire) of low risk ASS and approximately 47,456ha (14.06% of Kempsey Shire) of High Risk ASS.

## 2.6 LAND USE

### INDICATOR – Land Use Zoning

#### Why use this indicator?

Varying land uses will have differing impacts on the natural environment. Due to the difficulty in accurately identifying actual land usage, land use zoning is used as a measure of allowable potential land uses.

#### What does this Show?

No major change in land use zoning has occurred during the past 12 months. However as indicated in the previous Comprehensive SoE Report, land use zoning changed significantly from the Kempsey LEP 1987 to the draft Kempsey LEP 2005, with increases in land uses associated with human settlement and significantly more areas dedicated to National Parks and Nature Reserves.

However there are a number of environmental studies in preparation that are expected to result in rezoning of land from 1(d) Urban Investigation to a combination of urban zones and possibly environmental protection zones. Council has commissioned consultants to undertake preparation of two Local Environmental Studies (LES) to facilitate the rezoning of land at Saltwater and the former Shell petroleum terminal site, South West Rocks. Council has provided comments to the consultants on both projects with final submission of both reports by the end of 2005, and public exhibition of each LES in early 2006. A Local Environmental Plan (LEP) will be developed for each site to manage the sensitive environmental characteristics of the landscape to which these sites form part.

Preliminary investigations have also begun for the South Kempsey industrial land rezoning project, which proposes to rezone land from 1(d) Urban Investigation and 1(a1) Rural to 4(a) Industrial General (175ha), to accommodate the need for further industrial development in the Shire.

## 2.7 CONTAMINATED LAND

### INDICATOR – Contaminated Sites

#### Why use this indicator?

Information about sites where regulatory action involving the NSW EPA has been taken is compiled on a database kept by the Authority. These sites fall into three categories:

- ♦ Sites regulated under the Contaminated Land Management Act 1997;
- ♦ Sites which are, or were formerly, the subject of notices issued under sections 35 & 36 of the Environmentally Hazardous Chemicals Act 1985; and

- ♦ Land declared to be unhealthy building land, or being investigated for declaration, under the Unhealthy Building Land Act 1990.

Council is also required to identify contaminated lands under Section 79C of the Environmental Planning and Assessment Act 1979.

#### What does this show?

As of the 2003/2004 reporting period no sites had been formally listed as contaminated by the NSW EPA. Updated data for this reporting period (2004/2005) was not available at the time of preparation of this report.

No new potentially contaminated sites or unhealthy building land were identified within the Kempsey Shire LGA during this reporting period. However the previous Comprehensive SoE Report indicated that there are a number of known potentially contaminated sites and unhealthy Building Land in the Kempsey Shire LGA including, but not limited to: landfills, fuel depots, stock dips, sewer treatment plants, quarries and mine sites.

## 2.8 ENVIRONMENTALLY SENSITIVE LAND

There are currently 6,706ha of land within an Environmental Protection Zone (Zones 7(a), 7(d), 7(f1), 7(f2) and 7(h)). Land included in this zoning includes wetlands, scenic protection, coastal lands and historic lands. Development in these zonings is restricted to ensure that any proposed developments do not impact on these sensitive environments.

## PRESSURES

#### Why is it happening?

## 2.9 DEVELOPMENT PRESSURES

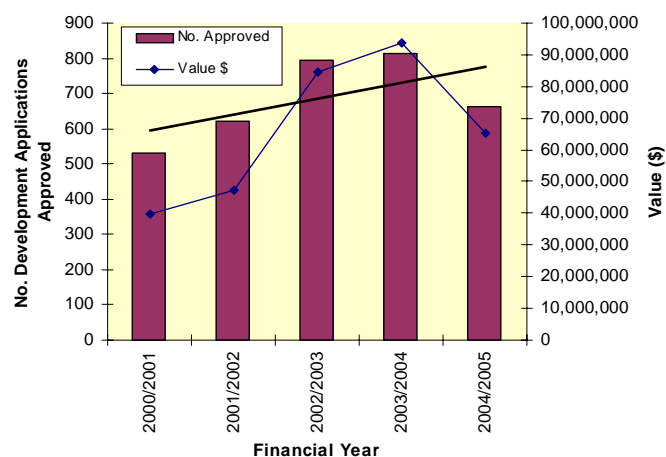
Development pressures impact on all aspects of the environment. As populations grow the demand for land and water resources and infrastructure subsequently increases. The growth of human settlement (eg. via subdivision of land) often displaces other land uses such as native vegetation, open space or valuable agricultural land. Construction and building place pressure on mineral resources, whilst increasing the potential for degradation of soils through poor management practices. Growing communities also increase the output of wastes, placing pressure on water resources and sanitation systems.

### INDICATOR – Development Applications

#### Why use this indicator?

This indicator provides a measure of the pressures of development within the Kempsey LGA.

**Figure 7 – Number and Value of Development Applications**



**What does this show?**

This indicator demonstrates that there has been a significant increase in development up until the period ending 30 June 2004. A decrease in the number of development applications being approved and associated reduction in the value has been experienced over the past 12 months. Although these figures show development pressure tapering off during the past 12 months, the overall trend indicates an increase in development pressure, with number and value of development applications for the last financial year still considerably higher than that just 5 years earlier.

**CONCLUSION:** Pressure Increasing

**2.9.1 Land Clearing**

**INDICATOR – Land Clearing**

Detailed in Section 5.4 of this report.

**2.9.2 Rural Residential Development**

**INDICATOR – Rural Residential Development Rates**

**Why use this indicator?**

Rural residential development (small rural acreages) is listed as a regional indicator. This type of development is considered a pressure as it fragments and modifies natural habitat (eg. via loss of understorey for firebreaks etc.), thus adding to the cumulative effect of habitat loss and modification.

Under Kempsey LEP 2004, zones 1(c) and 1 (g) allow for rural residential development

**What does this show?**

Rural subdivision data for the 2004/2005 reporting period, indicated that 29 rural properties, containing an average of 2 lots were subdivided to an average 4 lots. More specifically the data showed that of 66 existing lots, 112 lots were created, with a net creation of 56 additional lots. This indicates a substantial area of rural land has been transformed into a greater number of smaller rural acreages, further modifying and fragmenting habitats.

**CONCLUSION:** Pressure Increasing

**2.10 LAND DEGRADATION**

Land degradation is the decline in the condition or quality of land as a result of its use by individuals or society. Some common forms of land degradation include: soil erosion, rising water tables, invasion of introduced and feral species, declining soil fertility due to acidification or salinisation, and Acid Sulfate Soils. The full extent or nature of land degradation in the Kempsey Shire LGA is still yet to be fully quantified.

Acid Sulfate Soils (ASS) are the most significant land degradation issue in the Kempsey Shire, which impact not only on land and agricultural production, but also on aquatic systems and biodiversity.

**2.10.1 Acid Sulfate Soils**

The NSW Acid Sulfate Soil (ASS) Strategy identified two Stage 1 Acid Soil Hot Spots in the Kempsey Shire area, Clybucca and Upper Maria River, and five Stage 2 Acid Soil Hot Spots Yarrahapinni, Belmore, Frogmore, Kinchela and Rafferty’s. Hot Spot areas are areas where land management decisions in relation to ASS have contributed to, and can lead to further, severe soil acidification, poor water quality, reduction in agricultural productivity and capability, loss of estuarine habitat and/or degraded vegetation and wildlife (Tulau et al 1999).

Within the floodplain areas in Kempsey Shire there is over 364km of drains, of which 94.5km is managed by Council and 52km is jointly managed between Council and private landholders or drainage unions. Council also owns 173 floodgates within the drainage system and there are an unknown number of privately owned floodgates.

**2.10.2 Agricultural Practices**

The Kempsey Shire has had a long association with various agricultural practices throughout the history of the Shire. Agriculture has historically contributed a considerable

amount of the Shire's income. For example, total farm gate value from agriculture in 2001 was \$A 24.8M (ABS 2001) However, agriculture has also had a considerable impact on the environment including those associated with land clearing, chemical and pesticide use, weed introduction and drainage of lands.

The most intensive form of agriculture in the Shire is dairy farming. Dairy farming has become increasingly intensive in order to compete with interstate and overseas producers.

### 2.10.3 Extractive Industries

Quarrying is largely undertaken to provide resource for road base and construction needs. An increasing population will place increased pressure on the environment due to the subsequent need for more raw materials. Extractive industries have a significant impact on land resources as landform is transformed, vegetation removed and soil and rock is displaced from the natural state.

## RESPONSE

**What are the responses and how effective are they?**

### 2.11 PLANNING CONTROLS

Council regulates development in accordance with relevant legislation and the land zoning in the Kempsey LEP. Council undertakes regular and periodic review of LEPs as a requirement under Section 73 of the Environmental Planning and Assessment Act. The Kempsey LEP 1987 is soon to be replaced, following state approval, with Kempsey LEP 2005, which incorporates new planning controls and practices.

### 2.12 ACID SULFATE SOILS MANAGEMENT

#### 2.12.1 Existing Projects

#### **Maria Floodplain Project**

The Maria Floodplain Project was an extension of the Connection Creek-Upper Maria Acid Sulfate Soils Hot Spot Project, but also incorporated landholders from the Pipers Creek area. Works completed included the installation of a culvert system that incorporated drop-boards to allow the landholder to maintain higher water levels within a former lagoon. Preparation for the installation of two further water control structures at other sites has also commenced.

#### **Upper Belmore River Backswamp Project**

The purpose of this project is to address the over-drainage of a backswamp region within the Upper Belmore River area. The project's methods will be based on those adopted

from other similar projects undertaken. The aim is to position water retention structure at a strategic location on the Sillitoe's and Thurgood Drains to reduce over-drainage and provide for a mechanism to deliver water into the area.

### **Floodgate Modifications**

An auto-tidal floodgate was installed at the Saltwater Inlet floodgates to allow a limited tidal exchange upstream of the floodgates to improve water quality and fish passage.

### **Acid Scald Revegetation**

Funding from the Wetland and Drains Voluntary Project Fund was obtained for the fencing of two acid scald sites located at Kinchela and Belmore to restrict stock access and assist revegetation. Acid scald revegetation works at Clybucca that commenced in 2004 have now had significant results with areas of scalding being reduced by more than 40%.

### **INDICATOR – Number of ASS Remedial Projects undertaken on Floodplain Drainage Systems**

#### **Why use this indicator?**

There are approximately 115 floodplain drainage systems that discharge into waterways within the KSC area. They are in varying conditions and dimensions with 52 managed by KSC, 7 jointly managed and 56 privately managed. 105 of the drains are situated in High Risk ASS landscapes, although not all drains require ASS remediation works.

#### **What does it show?**

Remedial works to the end of June 2005 included 30 floodgate and 19 drain modifications using external and internal funding. These works have included installation of floodgate lifting devices, placing windows within floodgates, installing water control structures in drains to raise drain water levels and drain reshaping to reduce acid groundwater drainage. Further remediation projects are continuing but are always dependant on landholder support.

#### **CONCLUSION:**

**Situation Improving**

### 2.13 CONTAMINATED LAND REMEDIATION

#### **Former Shell Petroleum Terminal – Phillip Drive, South West Rocks**

Council is currently involved in assessing the potential for the former Shell Petroleum Terminal Site, located along Phillip Drive, South West Rocks, to be rezoned for residential land use. Part of this rezoning process requires

an assessment of the current condition of the site and proposed remediation measures in regards to any potential contamination resulting from the site's previous land use as fuel depot. The proponent has commissioned a consultant to prepare a Remediation Action Plan (RAP), which outlined the requirements for the site to be remediated sufficiently to allow for residential land use. Likely remediation options include excavation of contaminated surface soils and on-site treatment and/or offsite disposal to appropriately licensed landfill.

## FUTURE DIRECTIONS

### What more could be done?

#### 2.14 ACID SULFATE SOILS - PROPOSED PROJECTS

##### Rafferty's Drain

The Second Stage of the Rafferty's Drain project will commence in the later half on 2005 and will involve decommissioning of 3km of the former deep drain. A new shallow environmentally sensitive design will replace the old drain and reduce ground water discharge and generally improve water quality emanating from the Rafferty drainage area.

##### Coastal Floodplain and Acid Sulfate Soil Management Project

A funding application for \$120,000 has been submitted to the Northern Rivers Catchment Management Authority (NRCMA) to address further acid sulfate soil problems within the Macleay Floodplain. Discussions and meeting with landholders in the Belmore and Kinchela areas have commenced in preparation for this project.

#### 2.15 COMPREHENSIVE VEGETATION MAPPING

Council has allocated funding for the 2005/2006 financial year to commence comprehensive vegetation mapping of the Kempsey Shire. This will enable improved decision making with regard to achieving ecologically sustainable development.

#### 2.16 LAND DEGRADATION ASSESSMENT

A comprehensive Land Degradation Assessment should be undertaken to gain a better understanding of the condition of land resources within the Kempsey Shire. This will enable better short and long term planning for the Shire.

# At a **GLANCE** **THE WATER**

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<b>Inland Waters</b>			
<p><b>Rainfall/Riverflow</b> –Total rainfall was less than the long-term average in 2004 and the data up until the end of June 2005 suggests a similar trend. This was also reflected in low river flows.</p>	<p><b>Water Pollution</b> –</p> <ul style="list-style-type: none"> <li>On-Site Sewer Management;</li> <li>Stormwater;</li> <li>Agricultural Practices.</li> </ul> <p><b>Riparian Disturbance</b></p> <ul style="list-style-type: none"> <li>66.9% or 232 km having a HIGH degree of disturbance;</li> <li>13.8% or 48 km considered to be INTACT;</li> <li>10.1% or 35 km having a LOW degree of disturbance;</li> <li>9.1 % or 31.6km of the vegetation varying in disturbance from LOW - MODERATE disturbance levels.</li> </ul>	<p><b>Groundwater Borefield Assessment</b> – was undertaken to assist in ensuring sustainable extraction</p> <p><b>Stormwater Management</b> – Installation of various stormwater quality improvement devices.</p> <p><b>Pollution Reduction Programs (PRP)</b> – Council is undertaking PRPs for West Kempsey STP. A further PRP relating to the Reticulation Overflow Report, is being undertaken on South West Rocks and Crescent Head systems with the remaining systems to be addressed in later 2005 and 2006.</p>	<p><b>NRCMA Catchment Action Plan (CAP)</b> – The 10 year CAP will guide natural resource management across the Northern rivers Region</p>
<p><b>River Health</b> – based on macroinvertebrate assemblages the inland waterways in the Shire are generally classified as in good condition, with the exception of Christmas Creek (very poor) and Dungay Creek (poor).</p>			<p><b>Integrated Water Cycle Management Strategy (IWCMS)</b> – Ongoing review will take place over the coming years, incorporating planning and management of the three main urban water services of water supply, sewerage and stormwater.</p>
<p><b>Flooding</b> – the most recent significant flooding event occurred in March of 2001.</p>			<p><b>Kempsey Shire Urban Stormwater Management Strategy</b> – Action Plans provide the direction for future planning, education and infrastructure.</p>
<p><b>Riparian Vegetation</b> – 16 vegetation communities have been identified along the riparian zones of the Macleay River.</p>			
<b>Coastal Creeks and Estuaries</b>			
<p><b>Estuarine Habitats</b> – the Macleay Estuary Waterway is approx. 13km<sup>2</sup>. The lower Macleay (as of 1984) contained 5% of the state Mangrove habitat.</p>	<p><b>Acid Sulphate Soils</b> – have the potential to result in sulphuric acid leaching into waterways.</p> <p><b>Recreational Users</b> – the Shire offers a wide range of aquatic activities.</p> <p><b>Fishing and Fish Kills</b> – No fish kills were recorded during this reporting period, however, an increasing trend in the number of fish kills in the Kempsey LGA has been experienced from 1977 to present.</p>	<p><b>Beach watch</b> – Faecal sampling at 4 locations</p> <p><b>Waterway and Wetland Protection and Rehabilitation Projects</b></p> <p><b>Fisheries and Aquaculture Management</b></p> <p><b>Macleay River Estuary Management Compilation Study</b></p>	<p><b>NRCMA Catchment Action Plan</b> – (as above)</p>
<p><b>Coastal Wetlands</b> – there are over 150km<sup>2</sup> of coastal wetlands in the Shire.</p>			<p><b>Integrated Water Management Strategy</b>– (as above)</p>
<p><b>Beach Habitats</b> – there is approx. 80km of coastline forming the eastern boundary of the Shire.</p>			<p><b>Kempsey Shire Urban Stormwater Management Strategy</b>– (as above)</p>
			<p><b>Estuary Management Plan</b></p>

## 3.0 WATER

### 3.1 INTRODUCTION

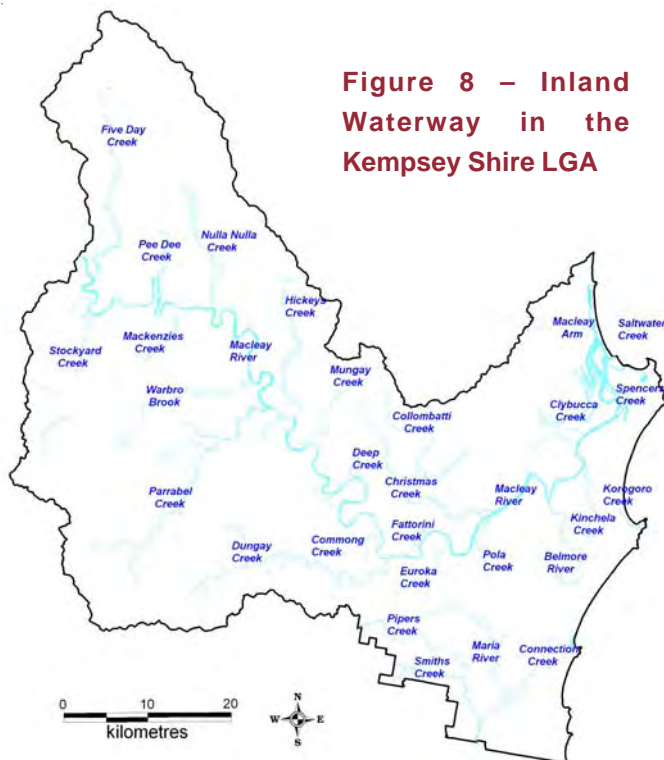
Water is essential to human life and to the health of the environment. It is a valuable natural resource, encompassing marine, estuarine, freshwater (river and lakes) and groundwater environments, across coastal and inland areas (NSW EPA 2005). Water resources are crucial for sustaining communities, agriculture, industry and most importantly the environment. Water has two dimensions that are closely linked - quantity and quality. This chapter of the SoER aims to bring together information about surface water and groundwater quality and usage to enable a better understanding of the condition of the aquatic environment in the Kempsey Shire LGA.

## STATE

**What are the issues for sustainability? And how are they changing?**

### 3.2 INLAND WATERS

The majority of the Kempsey Shire is contained within the Macleay River catchment, with the exception of south-eastern corner of the Shire, which drains to the Hasting River Catchment. There are many sub-catchments that drain into these main catchments as is demonstrated on Figure 8 below.



**Figure 8 – Inland Waterway in the Kempsey Shire LGA**

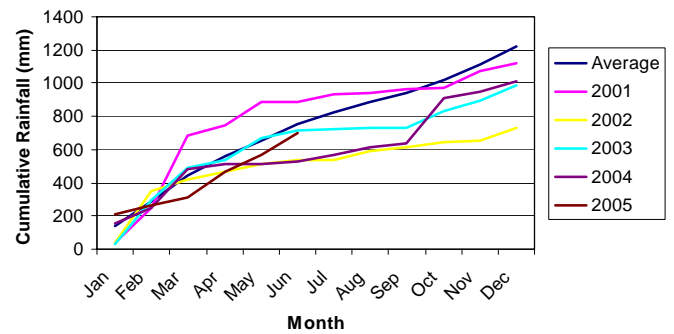
### 3.2.1 Rainfall

#### INDICATOR – Cumulative Rainfall

##### Why use this indicator?

The cumulative annual rainfall gives an indication of rainfall trends, which can be compared to the long-term average rainfall. This can be used to identify unusually high or low rainfall years and spikes relating to significant rainfall periods.

**Figure 9 – Cumulative Annual Rainfall for Kempsey**



##### What this shows:

The cumulative rainfalls for Kempsey generally indicates steady to heavy rainfall events through the early part of the year, up until June, when monthly rainfall totals decrease through the winter months, extending into September. From October through to December monthly rainfall totals increase once again reflecting spring and early summer storms.

This data also indicates that total rainfall was less than the long-term average in 2001, 2002, 2003 and 2004, which is consistent with draught conditions, experienced in other areas during this time. The data up until the end of June 2005 suggests a similar trend. The noted peak, above the long-term average, in March 2001 is consistent with the flood event that occurred during this period.

#### CONCLUSION:

**Pressure Increasing**

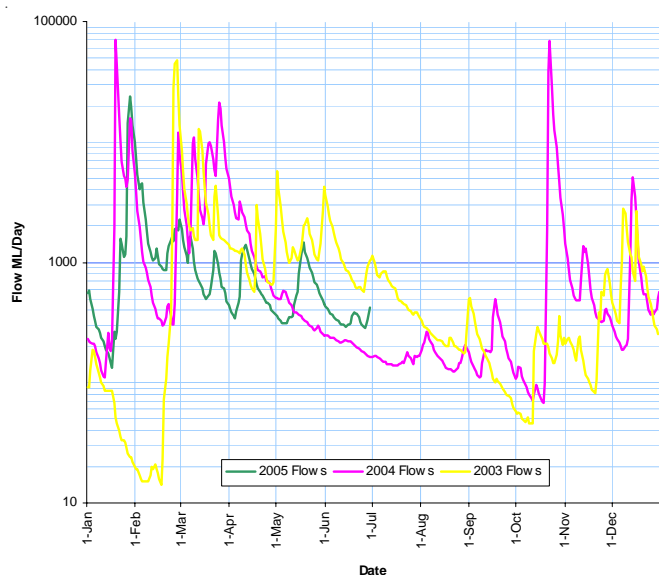
### 3.2.2 River Flows

#### INDICATOR – Macleay River Flow

##### Why use this indicator?

The upper Macleay River flow monitoring data was chosen as an indicator to identify trends that may assist in the management of water resources drawn from the river. The data is presented on a logarithmic scale to enable the full range of flows to be more easily viewed.

**Figure 10 – Macleay River Flows**



Source Macleay Water 2005

**What this shows:**

River Flow data is consistent with the cumulative rainfall data. A considerable decrease in flow rates is noted during the early part of February 2003. Flow rates up to June 2005 show a steady to slightly decreasing trend.

**3.2.3 Water Quality**

Water quality is commonly defined by its physical, chemical, biological and aesthetic (appearance and smell) characteristics. The quality of water in waterways and groundwater are generally dependant on the activities undertaken in the catchment. Water resources are of major environmental, social and economic value to the Kempsey Shire and if water quality becomes degraded this resource will lose its value. Effective management of water quality needs to ensure a sustainable supply of water is available for productive and recreational purposes, while sustaining aquatic ecosystems. Therefore, a whole of catchment approach is required to achieve sustainable water cycle management.

Water for the Kempsey District Water Supply Scheme is extracted from wells located in alluvial flats adjacent to the Macleay River at Sherwood, and wells immediately next to the river at Belgrave Falls. Drinking water sources are tested regularly for a variety of potential pollutants. The Kempsey supply is of relatively good quality and generally requires only basic treatment.

**INDICATOR – River Health (Macleay Catchment)**

**Why use this indicator?**

The importance of using biological criteria, or indicators, to assess the health of aquatic ecosystems, and in general

the need to adopt an ecosystem health perspective in monitoring and managing our rivers, is increasingly being recognised. Aquatic ecosystem health is a much broader concept than simple water quality: it aims at a balanced, adaptive community of organisms having a species composition, diversity and functional organisation comparable to that of natural, or pristine, habitats of the region.

The NSW EPA assessed the ecological health of running waters in 2004, using an interactive computer package, AusRivAS. This package outputs for samples collected from different stream habitats, and different seasons, at a stream site, which are used together to provide a more complete picture of the condition of macroinvertebrate communities within the stream at that location. (NSW EPA, 2004)

**What this shows:**

The data suggested that the overall health of the creek and rivers in the Macleay catchment is quite good, comprising a wide diversity and assemblage of macro invertebrates in comparison to ‘pristine’ reference conditions. Two notable exceptions were Christmas Creek (very poor) and Dungay Creek (poor). The 2004 Comprehensive SoE Report provides a full list of the creeks and rivers assessed within the Kempsey LGA and their rating. No updated information regarding ecological health of running waters was available from NSW EPA for inclusion into this SoE Report.

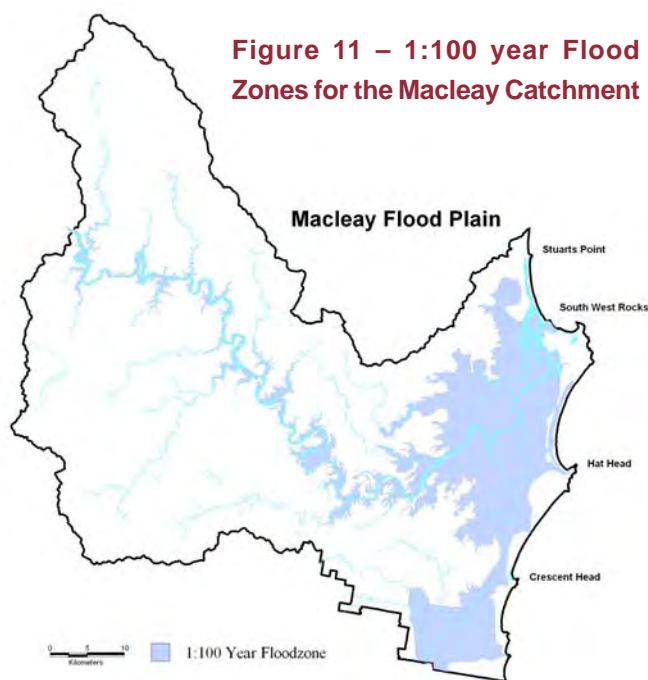
**CONCLUSION:**

**Steady**

**3.2.4 Flooding**

Flooding upstream of Kempsey is confined to areas close to the river and its tributaries though in the more severe events quite large areas can be inundated in the Temagog, Mooneba, Sherwood, Turners Flat, Dondingalong and Euroka areas. Much larger areas downstream of Kempsey are liable to flooding. During flood episodes, backwater flows up the tributary creeks and drains begin to fill the swamps. In larger events, flows also occur over the riverbanks, which in some areas have been augmented by levee building. The most recent significant flood event in recent times occurred in March 2001.

The 1:100 year flood zone is shown of Figure 11 below.



### 3.2.5 Riparian Vegetation

Riparian vegetation is vegetation on land that adjoins, directly influences or is influenced by, a body of water (NSW Fisheries 2005). Riparian vegetation plays an important role in stabilising the banks of watercourses, providing flora and fauna habitat and filtering out pollutants.

**Table 3.1: Major Vegetation Communities and Their Extent Along the Macleay River Estuary**

Vegetation Type	Length of Riparian Zone (km)	% of total length of riparian Zone surveyed
Mangrove Forest and Woodland	81.3	23.4
Maritime Rush and Sand Couch	7.2	2.07
Headland Brushbox	5.5	1.58
River Oak	4.7	1.36
Myrtle – degraded	4.7	1.36
Samphire – Sand Couch	4.1	1.19
Sand-hill Black-butt	4.1	1.17
Tuckeroo	3.9	1.11
Banksia	3.6	1.03
Swamp Oak	1.2	0.34
Grey Gum – Grey Ironbark	0.7	0.21
Brush Box	0.7	0.19
Improved Pasture and Cropland	207.3	59.74
Introduced Scrub	4.9	1.39
Cleared and Partially Cleared	3.3	0.95
Settlements and Roads	2.1	0.6
Breakwall	12.5	3.6
<b>TOTAL</b>	<b>347.1</b>	

Source GECO Environmental 2005

The draft Macleay River Estuary Data Compilation Study, completed in June 2005, identified 16 vegetation communities occurring along the riparian zones of the Macleay River from Belgrave Falls upstream of Kempsey to the entrance into the Ocean at South West Rocks. Table 3.1 below summarises the vegetation communities and their extent along the riparian zone of the Macleay.

### 3.2.6 Aquatic Habitat

Freshwater systems provide a diverse range of habitats. The type of habitat and suitability for different types of fauna is dependant on channel substrate, plants, woody debris, water depth, flow velocity and light infiltration.

There has not been a comprehensive survey of fish and aquatic invertebrates within the Macleay catchment. However, surveys have indicated that up to 53 of the 82 fish species identified in NSW fresh waters are known to occupy the north coast drainages, although not necessarily the Macleay and its tributaries. Approximately 60 species of birds and numerous reptiles, animals and frogs occupy or facilitate aquatic habitats in the Macleay.

### 3.2.7 Groundwater

The Kempsey Shire has two main sources of groundwater: the Macleay River Alluvium and the Macleay Coastal Sands. The Macleay River Alluvium (MRA) is a groundwater source linked to the flow of water in the Macleay River. The amount

of water stored in the MRA above Belgrave Falls is small. However, the water available is increased by rain falling over the aquifer and the recharge (causing water from the river to flow over the sands of the aquifer) of the alluvium with river water.

The Macleay Coastal Sands (MCS) are a fresh groundwater source in the sands below the coastal dune system. The water stored in these dunes is recharged by rainfall. These fresh water sources are bordered by salty seawater.

### 3.3 COASTAL WETLANDS, ESTUARIES AND OCEAN

#### 3.3.1 Estuarine Habitats

The Macleay River estuary waterway occupies approximately 18.2 km<sup>2</sup> in total area. In 1985 there was 5.201 km<sup>2</sup> of mangrove habitat in the Macleay Estuary, which represented approximately 5% of estuarine mangrove habitat in NSW. Other estuarine habitats included, 1.097 km<sup>2</sup> of seagrass (*Zosteraceae* family) and 3.652 km<sup>2</sup> of saltmarsh. The estuarine system of Korogoro Creek at Hat Head also has mangroves, but the extent has not been mapped due its small size.

The present extent of these communities has not been able to be ascertained for this report.

#### 3.3.2 Coastal Wetlands

The Macleay has over 150 km<sup>2</sup> of wetlands on the floodplain, mainly in the Clybucca, South West Rocks, Belmore-Kinchela and Crescent Head areas. SEPP 14 wetlands account for 12,951ha of the Kempsey Shire LGA.

The Clybucca Estuary (including the Yarrahapinni Broadwater), Belmore swamps and Kinchela swamps are listed in the *Directory of Important Wetlands in Australia* (ANCA 1996). Significant wetlands are also located in Hat Head National Park in dune hind-swamps. Goolawah Lagoon is also listed as being required to have “Significant Protection” under the *Coastal Lakes Strategy (CLS): An Assessment and Management Framework* (2002).

#### 3.3.3 Beach Habitats

The Macleay Valley has approximately 80km of coastline of which most is beaches extending from south of Crescent Head and north to Grassy Head.

Naturally occurring beach ecosystems are dynamic and consist of tidal zones, fore dune and hind dune areas. Dunal areas are critical for the protection of beaches, as they provide natural ‘buffer zones’ that reduce the impact of fluctuations of the shoreline and erosion by the sea. Native dunal vegetation can provide a significant refuge and source of food for local and migratory fauna species.

Many beach habitats across the Macleay Valley coastline have been impacted on by the activities of humans. Such activities include recreational use, establishment of environmentally inappropriate exotic vegetation, roads, car parks, beach access tracks, and mining.

## PRESSURE

### Why is it happening?

#### 3.4 SURFACE WATER EXTRACTION

The extraction of surface water for agricultural, industrial and domestic purposes occurs within the Macleay Catchment. This can place stress on creek and rivers and aquatic ecosystems, particularly during periods of low rainfall where flows are dramatically reduced.

Updated data regarding surface water licensing was not available from the Department of Natural Resources (DNR) at the time of reporting.

#### INDICATOR – Town Water Consumption

This indicator provides a measure of the pressure on the Macleay Catchments water resources.

See Chapter 6.0 - Human Settlements

#### CONCLUSION:

Steady

#### 3.5 GROUNDWATER EXTRACTION

Water for the Kempsey District Water Scheme is extracted from the bores located in the alluvial flats adjacent to Macleay River, and from near the river at Bellbrook. This supplies Kempsey and surrounds, Bellbrook, Willawarrin, Frederickton, Smithtown, Gladstone, Clybucca, Kinchela, Belmore River and contingent rural areas.

Water is also extracted from borefields located in coastal dunal areas to supply the coastal townships of South West Rocks, Crescent Head, Stuarts Point and Hat Head.

Updated data regarding groundwater extraction licensing was not available from DNR at the time of reporting.

#### 3.6 WATER POLLUTION

Water quality of aquatic ecosystems in the region is subject to degradation from both point source and non-point source pollution. The input of chemicals, nutrients, suspended solids, and rubbish into waterways are the main factors effecting aquatic ecosystems. Practices and systems directly affecting water quality include:

### 3.6.1 Sewage Discharges

Leaks in sewage pipes and insufficient treatment of sewage waters can have the potential to cause delivery of nutrients and faecal coliform either directly or indirectly into groundwater or waterways.

During the reporting period Macleay Water submitted Effluent Management Strategies (EMS) for the West Kempsey and Crescent Head Sewerage Treatment Plants (STP) addressing two of the three Pollution Reduction Programs (PRP) prompted by the NSW EPA in 2004.

Following on from the above, another draft PRP was created for an effluent reuse market assessment for West Kempsey STP to identify and bring into operation effluent reuse opportunities in accordance with the following program:

- ♦ **Stage 1** – Submission of a report which identifies specific reuse opportunities and short lists interested land owners – December 2005; and
- ♦ **Stage 2** – Submission of a report which details recommended reuse options, including their concept design, costing and confirmation of land owner interest – June 2006

The third PRP required by the NSW EPA in 2004 was more general and applied to all centralised sewerage licence holders and required Council to prepare a Sewage Overflow Investigations Report for its reticulation networks. The aim of this report was to determine the risk of pollution entering the environment from Council sewerage mains and pump-stations. During the reporting period, Council completed the appropriate studies for the South West Rocks and Crescent Head STP and are currently in the process of completing the studies for South Kempsey and West Kempsey STP. Once finalised, the report will serve as a precursor to the future sewerage licensing system where the entire sewerage system will be licensed rather than individual STPs.

#### INDICATOR – EPA Licensed Point Source Discharges

##### Why use this indicator?

The number of point source discharges is an accepted regional indicator. This provides information on the number and location of point source discharges and identifies activities that can have potential adverse effects on natural aquatic environment systems.

##### What this Shows?

At the time of reporting, NSW EPA did not have up to date licensing information available. However, as of 2001,

the NSW EPA, licensed 19 point source discharges, including 7 Council operated STP, 4 other council operated facilities (such as the Crescent Head Road Landfill Site and Stuart McIntyre Dam) and 8 privately owned operations.

### 3.6.2 On-Site Sewer Management

The On-site Sewer Management Strategy involved a system of assessment of areas with a high density of systems. Approvals from these inspections have generally been for a limited period of up to a 3 - 4 years and subsequently require re-submission. The current strategy implementation is focused on the assessment of systems in higher risk areas that have not yet been assessed. Another focus is on the facilitation of noncompliant system remediation.

#### INDICATOR – On-site Sewer Management (OSM) - Number and Compliance

##### Why use this indicator?

High residential densities, high water tables, inappropriate soil types or a combination of all three at some properties located in Jerseyville, Stuarts Point, Willawarrin, Greenhill, Aldavilla and Bellbrook are resulting in the failure of onsite sewerage disposal. These issues are contributing to poor quality effluent entering the environment and in some instances could potentially pose a public health risk.

During the 2004/2005 reporting period 529 inspections have taken place with 215 reported non-compliances.

##### What this shows:

Approximately 41% of systems inspected during 2004/2005 were reported as non-compliant. This figure is consistent with the overall number of non-compliances (40%) reported in the previous years Comprehensive SoE Report, showing a considerable proportion of on-site sewerage disposal systems potentially contributing to poor water quality entering the environment.

#### CONCLUSION:

**Pressure Increasing**

### 3.6.3 Stormwater Pollution

Stormwater can cause a variety of impacts depending upon the source of stormwater. Water quality degradation results from delivery of the following into waterways:

- ♦ Sediment, causing turbidity and sedimentation.
- ♦ Toxins, chemicals and nutrients from roads and infrastructure, gardens etc.
- ♦ Faeces from dogs and cats primarily in urban area as well as livestock in rural area.

- ♦ Litter which potentially carries chemicals etc, and can also be physically harmful to aquatic organisms.
- ♦ Vegetation material that increases nutrient levels while reducing the dissolved oxygen levels.

The level of treatment of stormwater is either none or primary (bulk screening and pollutant traps).

The Kempsey Shire Stormwater Management Plan 2004-2009 outlines the current and future management action and strategies for the Kempsey Shire.

### 3.6.4 Agricultural Practices

Stock access to waterways within the Shire continues to cause a number of problems for the aquatic environment. Most of these problems are caused by loss of riparian vegetation, which results in:

- ♦ Increased nutrient input to waterways;
- ♦ Stream bank instability;
- ♦ Erosion;
- ♦ Reduced water quality; and
- ♦ Spread and establishment of weeds.

### 3.6.5 Acid Sulfate Soils

ASS when disturbed can produce sulphuric acid that can drain into waterways and cause severe short and long-term environmental and potential socio-economic impacts. ASS is discussed in detail in Chapter 2 – The Land

## 3.7 RECREATIONAL USERS

The waterways of the Kempsey Shire provide a wide range of recreational opportunities. Recreational users rely on good water quality for health and safety, aesthetics, and for productive values (eg. Fishing).

The use of waterways for recreational purposes can potentially have an adverse impact on natural aquatic systems. Some examples include increase litter loading (including fishing line and tackle), bank erosion from wave action of boats and effluent discharge from watercraft.

## 3.8 DISTURBANCE OF RIPARIAN ZONES AND WEED INFESTATION

The draft Macleay River Estuary Data Compilation Study identified the degree of disturbance along the riparian zones of the Macleay and its major tributaries as:

- ♦ 66.9% or 232 km having a HIGH degree of disturbance;
- ♦ 13.8% or 48 km considered to be INTACT;
- ♦ 10.1% or 35 km having a LOW degree of disturbance;
- ♦ 9.1 % or 31.6km of the vegetation varying in disturbance from LOW -MODERATE disturbance levels.

Furthermore, 282.4 km or 81.4% of the mapped riparian zone contains Category 1 Weeds, which are the most serious environmental weeds on the North Coast, capable of displacing native communities. For approximately half of this length, 130.1 km, these Category 1 Weeds are ranked as Common – Heavy. Category 2 Weeds account for 24 km or 6.9% of the mapped riparian zone, while 40.5 km or 11.7% of the mapped riparian zone does not contain any significant environmental weeds (GECO Environmental 2005).

## 3.9 LOSS OF FISHERIES HABITAT AND WETLAND DRAINAGE

The following are recognised to have had significant impacts and influences on the Shire's aquatic systems:

- ♦ **Wetland and Fisheries Habitat Modification:** Impacts from drainage for flood mitigation and agricultural extension eg habitat loss, altered inundation cycles, increased sedimentation.
- ♦ **Effects of Acid Sulfate Soils on Aquatic Habitat and Biota:** Compounding the impacts of the above, ASS has had major impacts on water quality, habitat and biota directly (eg via mortality and altered growth/development) and indirectly (eg altered water quality and loss of habitat).

## 3.10 FISHING AND FISH KILLS

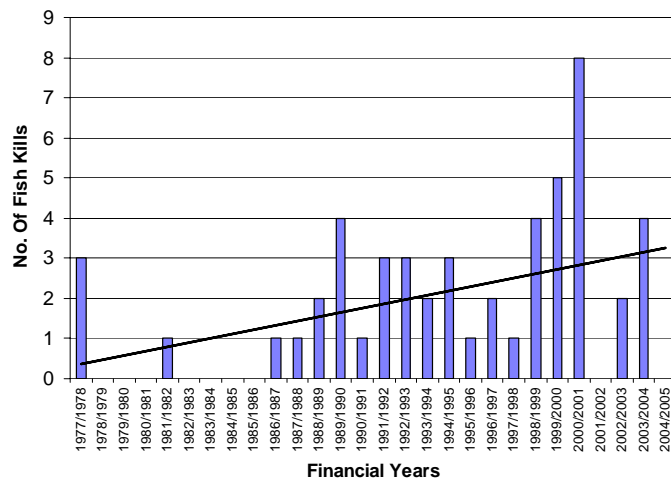
### INDICATOR – Fish Kills

#### Why use this indicator?

Identifying fish kills in the Shire may identify potential harmful activities causing pollution of waterways.

NSW Fisheries have a database per catchment for fish kills. Fish kills have been previously recorded with various causes in Killick Creek, Kinchela Creek, Clybucca Creek, Saltwater Creek (South West Rocks), the Macleay and Belmore Rivers, and the Golden Hole, South West Rocks. As expected, most records are on the lower reaches, but a few fish kills have occurred outside the Shire (eg Apsley Gorge and Wollombi River). Figure 12 below shows the number of reported fish kills from 1977 until present, as provided by NSW DPI (2005).

**Figure 12 – Number of Reported Fish Kills - 1977 to Present**



**What this shows:**

The above figure illustrates increasing trend in the number of fish kills in the Kempsey from 1977 to present, with a significant increase in fish kills during the 2000/2001 reporting period, following the major flood event in March 2001. However, it should be noted that this data may represent an increase in the number of reported cases rather than actual number of kills, due to better data recording processes in recent years.

Closer analysis of the data also revealed that fish kills were concentrated in the summer months into early autumn, with almost 41% of all fish kills since 1977 occurring within the months of February and March.

No fish kills were recorded during this reporting period (2004/2005).

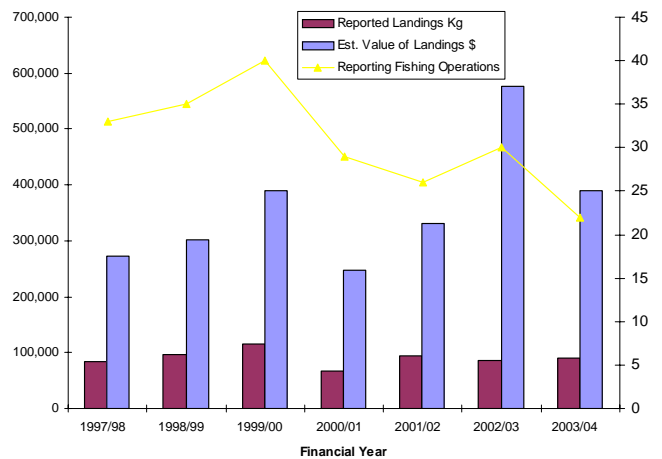
**CONCLUSION:** Pressure Increasing

**INDICATOR – Fish Catches**

**Why use this indicator?**

This indicator may provide a measure of the health of aquatic ecosystems as a result water of quality or overfishing. Figure 13 below shows the estimated dollar value and quantity in kilograms of commercial fish catches within the Macleay Estuary over the past 8 financial years as supplied by the NSW DPI (2005).

**Figure 13 – Commercial Fish Catches**



**Notes:** 1.No data was made available for those creeks and rivers where less than 5 commercial

fishing fleets operate (South West Rocks, Saltwater, Korogoro and Killick Creeks) due to

privacy/confidentiality agreements.

2. Data for 2004/2005 is not yet completely compiled, and therefore these figures have not been included within this report.

**What this shows:**

In general, the quantity (kg) and value (\$) of commercial fish catches within the Macleay have fluctuated over the past 8 financial years, with overall quantity caught per year remaining steady while experiencing a slight increase in dollar value. The number of commercial fishing operations has decreased from 33 in 1997-1998 to 22 2003-2004. Preliminary data for 2004/2005 suggests similar trends in the above data and will be reported on in the next SoE Report when the data has been fully compiled.

Common species caught include:

- ♦ Sea Mullet
- ♦ Luderick
- ♦ Long-fin River Eel
- ♦ Mud Crab
- ♦ Black and Yellow-fin Brim;
- ♦ Short-fin River Eel
- ♦ Mulloway
- ♦ Sand Mullet
- ♦ Dusky Flathead
- ♦ Pink-eyed Mullet

There is no quantitative data on the recreational catch, but given the popularity of the sport and numerous areas to fish, the catch is likely to be very significant, especially in smaller watercourses eg Belmore River, Killick Creek and Korogoro Creek.

**CONCLUSION:** Steady

## What are the responses and how effective are they?

### 3.11 INTEGRATED WATER MANAGEMENT STRATEGY

In early 2005 Macleay Water (a business unit of Kempsey Shire Council) completed an IWCMS Strategy as part of its continuing pursuit of best-practice management of its water supply and sewerage businesses.

The IWCMS is based on a number of previous investigation studies and incorporates planning and management of the three main urban water services of water supply, sewerage and stormwater. Planning and managing these services together will help to:

- ♦ Meet customer needs;
- ♦ Maximise the value of water resources; and
- ♦ Minimise the impact of water use on the environment

Several major infrastructure items were identified as part of the IWCMS. This included works to be undertaken on the Crescent Head, Hat Head, Kempsey district, and South West Rocks water supply schemes.

As a result of the Effluent Management Strategy undertaken as part of the IWCMS, new infrastructure to service potential irrigation opportunities has been planned for all existing sewerage schemes. Significant new sewage treatment works have been planned for the South Kempsey, South West Rocks, and West Kempsey Schemes. New reticulated sewerage schemes are planned to replace Onsite Sewage Management Systems at Bellbrook, Willawarrin and Stuarts Point.

Council adopted the IWCMS strategy and its preferred integrated scenarios at its May 2005 meeting. Actions to implement this plan are incorporated in, but not limited to, the new Macleay Water Strategic Business Plan (SBP). The SBP is driven by Council's Corporate Management Plan, and in turn provides supporting information to the corporate Management Plan. The IWCMS and SBP will be reviewed no less than once every five years.

### 3.12 STORMWATER MANAGEMENT

Council formally adopted the Kempsey Shire Urban Stormwater Management Plan (SMP) in July 2004. The SMP focuses on environmental protection through improved stormwater management and is based on the principles of Ecologically Sustainable Development (ESD) and Total Catchment Management (TCM).

The SMP identified a range of general actions applicable to all of Council's urban areas and a range of actions specific

to each individual urban catchment. Many of the actions listed reflect activities already being undertaken or proposed to be undertaken by Council, including aligning existing operations across all of Council's departments to ensure the outcomes meet the objectives of the stormwater management plan.

The urbanised catchments of Crescent Head and South West Rocks were identified as priority areas for stormwater management due to the nature of each of the receiving water bodies, ie relatively small size and high recreational use. A Stormwater Management Plan was prepared for Crescent Head, and a Stormwater Trust Grant was obtained for the Saltwater Creek Catchment at South West Rocks. Both of these projects involved a community education programme and a structural (end of line) component involving the installation of gross pollutant traps (GPTs). The community education programmes were completed and a limited number of GPTs installed by early 2004 and reported on in the previous comprehensive SoE Report. A further series of GPTs have been installed throughout the current reporting period as outlined below.

#### 3.12.1 Installation of SQUIDS

As part of the SMP, Council has recently provided stormwater quality improvement devices (SQUIDS) at two high priority locations, Crescent Head and South West Rocks, with funding provided from Stormwater Trust Grants. Council's Environmental levy is also funding the installation of SQUIDS in the Spencerville Creek Catchment and this levy could be used to fund further works in future years.

#### Crescent Head

Of all the stormwater outlets, the most critical outlets are those discharging directly into Killick Creek adjacent to the caravan park. A GPT was previously installed on the largest line that services two-thirds of this catchment, while a second GTP was installed during this reporting period on the stormwater line that services the CBD area. The purpose of these GPTs is to limit the amount of litter and sediment discharging into the Creek and also aid in the reduction of faecal coliform numbers in the receiving water body.

A further SQUID is proposed to be installed at Lee Street during the 2005/2006 financial year to service stormwater from the associated urbanised catchment before discharging into Killick Creek.

#### Saltwater Creek Catchment – South West Rocks

Stormwater pollution at this location has been identified as a key concern in Council's Stormwater Management Plan and in the Saltwater Creek Estuary Management Plan.

A GPT was previously installed near the entrance of Saltwater Creek to capture gross pollutants carried in stormwater from the South West Rocks CBD. Another GPT was installed during the reporting period within the Horseshoe Bay Caravan Park to service the remaining part of the CBD and Caravan Park. The installation of the gross pollutant traps will ensure that under normal conditions up to ninety percent of all litter emanating from the South West Rocks CBD Catchment will be captured, retained and prevented from entering Horseshoes Bay and the lagoon at the Saltwater Creek.

A further 3 GPT are proposed for the South West Rocks area during the 2005/2006 financial year. One of these is to be located on Mitchell Street, north of Paragon Avenue to further service the CBD and urban catchment in this area. Two other GTPs are proposed along Lindsay Noonan Drive to service the associated industrial area within the Spencer Creek catchment.

### 3.12.2 Inspection and Maintenance of SQUIDS

Council has implemented a regular inspection and maintenance program for each of the stormwater quality improvement devices. Each device is inspected on a monthly basis, noting the percentage of litter and any damage that may have occurred. Regular cleaning and maintenance is also carried out, with the percentage of litter, leaf and sediment within each device recorded, along with the total volume of material removed. Regular inspections and maintenance of these devices is vital to ensure they operate correctly and thus reduce the gross pollutant load to the receiving water bodies.

## 3.13 SEWAGE AND EFFLUENT DISPOSAL MANAGEMENT

### 3.13.1 Water Quality Monitoring

Council continues to operate its water quality monitoring program for a number of selected downstream tributaries of the Macleay River. Ten permanent telemetry water quality stations are installed in Clybucca/Collomatti Creek, Kinchela Creek, Belmore River and Killick Creek. The stations continually measure dissolved oxygen, pH, electrical conductivity, temperature and water levels, while some stations are capable of recording rainfall data. The recorded data is transmitted back to Councils central computer every 15 minutes. The monitors also have the capability to

physically collect samples for further laboratory analysis if required.

The water quality data from all ten monitoring locations is updated in real-time (every 15 minutes) and displayed on Council's website: <http://www.kempsey.nsw.gov.au/>. The data is displayed as graphs, in easy to understand format for landholders or any other interested parties to view online.

Macleay Water also carries out monitoring at various locations within the Shire to ensure wastewater discharged from its STPs to the environment is of acceptable quality. The monitoring points are located at all of Council's Sewage Treatment Works, the Glenrock outfall – Macleay River and sand dune disposal points for the South West Rocks and Hat Head Sewage Treatment Works.

### INDICATOR – STP Effluent Discharge Quality (% Compliance)

#### Why use this indicator?

Monitoring the compliance of effluent discharge quality is an important indicator in as it provides a measure of the quality of a potential pollution source. If a non-compliance is found actions can then be taken to rectify the problem. Table 3.2 below summarises the percentage compliance for the latest annual licence agreement.

**Table 3.2: Shire STW Effluent Quality**

Site	% COMPLIANCE FOR LATEST ANNUAL LICENCE RETURN							
	BOD	TSS	O&G	FC	NH3	PH	TN	TP
West Kempsey	100	88	100	100	100	62	70	100
South Kempsey	100	100	100	NR	NR	NR	NR	NR
South West Rocks	100	100	100	NR	NR	NR	NR	NR
Crescent Head	100	100	100	92	100	100	100	100
Gladstone	100	100	100	NR	NR	NR	NR	NR
Frederickton	100	92	100	NR	NR	NR	NR	NR
Hat Head*								

Notes: \* Hat was not licensed to Council during the reporting time period. NR – Not Recorded

#### What this indicator shows:

This indicator shows some parameters exceeding the NSW EPA's licensing requirements over the past 12 months, most notably at West Kempsey STP. Council is continuing to address this problem as discussed below.

### 3.13.2 Sewage Infrastructure

The Pollution Reduction Programs (PRPs) for West Kempsey are being addressed in the Integrated Water Cycle Management Plan. The third PRP, which relates to the

Reticulation Overflow Report, is being undertaken on South West Rocks and Crescent Head systems with the remaining systems to be addressed in later 2005 and 2006 (See Section 3.6.1).

In response to current issues in regard to the West Kempsey Sewerage Treatment Works, a strategy report has been completed outlining the costs and logistics associated with plant augmentation or total replacement. The decision on works to be implemented will be decided by Council after considering this report and IWCMS outcomes.

### 3.13.3 Septic Tank Controls

Council is conducting an ongoing inspection process to determine if existing and new OSMS installations are compliant.

## 3.14 GROUNDWATER

During the reporting period, a consultant undertook a detailed Borefields Assessment and Management Strategy for the coastal borefields that supply South West Rocks, Hat Head and Crescent Head. The purpose of this strategy was to identify locations of observation bores at South West Rocks, Crescent Head and Hat Head and determine the preliminary location of production bores at Crescent Head and Southwest Rocks. Council is currently reviewing the outcomes of these studies.

## 3.15 BEACHWATCH

Kempsey Shire Council continued its faecal coliform monitoring program throughout the beach season in 2004/2005.

Council collects (as per recommended guidelines developed through the NSW EPA's Pilot Beachwatch Program 2002) and analyses water samples collected at eleven (11) locations which include: Killick Creek, Killick Beach (Crescent Head), Horseshoe and Trial Bays (SWR). The samples are collected weekly. The daily sample program is based around collecting samples at Killick Creek and Killick Beach at an ebbing low tide.

### INDICATOR – Sewerage Pollution

Faecal coliforms are generally associated with faecal waste of warm-blooded animals and so, are a useful indicator of the level of faecal contamination. The number of faecal coliform recorded is used as a primary indicator of sewerage pollution in the environment.

For primary contact (swimming) the median bacterial content in samples of fresh or marine waters taken over the bathing season should not exceed:

- ♦ 150 faecal coliform organisms (CFU)/100mL (minimum of five samples taken at regular intervals not exceeding one month, with four out of five samples containing less than 600 CFU/100mL).

For secondary contact (boating/fishing) the median bacterial content in fresh and marine waters should not exceed:

- ♦ 1000 CFU/100mL (minimum of five samples taken at regular intervals not exceeding one month, with four out of five samples containing less than 4000 CFU/100mL).

Council's Beachwatch Program continued throughout the 2004/2005 beach season from October 2004 through to March 2005. A summary of results of the faecal coliform testing during this period, from selected locations, is listed in Table 3.3.

**Table 3.3: Faecal Coliform Levels (CFU/100ml)  
Selected Locations 2004/2005**

	Killick Beach	Killick Creek	Trial Bay	Horseshoe Bay
12-Oct-04	<2	4	<2	4
19-Oct-04	<2	82	34	45
26-Oct-04	<2	4	2	<2
1-Nov-04	<2	<2	<2	<2
8-Nov-04	<2	22	<2	<2
16-Nov-04	<2	5	<2	<2
22-Nov-04	42	498	5	92
29-Nov-04	<2	12	4	<2
8-Dec-04	<2	<2	<2	2
15-Dec-04	5	<2	<2	<2
20-Dec-04	2	8	<2	<2
29-Dec-04	2	4	<2	122
5-Jan-05	14	103	6	6
12-Jan-05	-	6	-	60
19-Jan-05	<2	58	<2	4
24-Jan-05	<5	9700	5	10
1-Feb-05	11	18	4	7
9-Feb-05	15	37	50	35
16-Feb-05	6	29	<2	<2
23-Feb-05	<2	4	2	<2
2-Mar-05	20	5	<2	<2
09-Mar-05	0	166	0	0
16-Mar-05	0	16	0	0

Star ratings have also been developed to provide an ongoing indication of compliance on a weekly basis. The star ratings are based on but not identical to the NHMRC guidelines. The ratings are split up into for categories as follows:

- ♦ **Good** – 4 Stars– Passes Beachwatch Guidelines – Suitable for swimming -
- ♦ **Fair** – 3 Stars – Passes Beachwatch Guidelines – Suitable for swimming
- ♦ **Poor** – 2 Stars – Fails Beachwatch Guidelines – Not Suitable for swimming
- ♦ **Bad** – 1 Star – Fails Beachwatch Guidelines – Not Suitable for swimming

The following star ratings have been supplied for the periods as shown for a number of locations across the Shire's coast:

**Table 3.4: Star Ratings for Selected Locations 2004/2005**

Period	Location	Star ratings
12/10/2004 to 8/11/04	Horseshoe Bay	4
	Trial Bay	4
	Saltwater Creek	4
	Killick Beach	4
	Killick Creek	4
08/11/2004 to 08/12/04	Horseshoe Bay	4
	Trial Bay	4
	Saltwater Creek	3
	Killick Creek	4
	Killick Beach	4
29/11/2004 to 29/12/04	Horseshoe Bay	4
	Trial Bay	4
	Saltwater Creek	4
	Killick Creek	4
	Killick Beach	4

**What this indicator shows:**

Generally the number of faecal coliforms present at the monitoring locations did not exceed the recommended concentration, with all locations (with the exception Saltwater Creek during the period 08/11/2004 to 08/12/04) receiving a 4 star rating.

The above results are displayed on Council's website (<http://www.kempsey.nsw.gov.au/beachwatch.htm>) and updated regularly throughout the swimming season.

**3.16 WATERWAY AND WETLAND REHABILITATION AND PROTECTION**

**3.16.1 Pola Creek Rehabilitation Project.**

Stage 1 of the Pola Creek Rehabilitation Project is now complete. Works included the installation of a lifting device to allow the opening of one of the Pola Creek floodgates during non-flood periods to allow fish passage and increased exchange of water with the Macleay River. Removal of weeds from the banks of Pola Creek near South West Rocks Road and their replacement with native riparian species has also been completed. Stage 2, which involves further riparian revegetation work along the banks of Pola Creek, will commence within the coming months.

**3.16.2 Nestle Community Vegetation Project - Jerseyville**

Council is currently at Stage 3 of a 4 stage process in rehabilitating a section of Council managed road reserve, off Plummers Lane, near the Jerseyville Bridge. This project was a joint initiative between Nestle, Council and the local

community. The project involved the planting of native plant species to allow for riparian rehabilitation of the reserve. The construction of a walking path through the reserve was also undertaken, with the finalisation of the project to include descriptive signs placed next to each species of native plants to serve as an educational tool, describing the importance of native vegetation along riparian zones.

**3.16.3 Yarrabee Park Wetland Restoration Project**

This was a joint project between Kempsey Shire Council, Port Macquarie Hastings Council and a landholder to restore a SEPP 14 wetland that was damaged by illegal drainage works. The works have included the installation of a weir that has helped restore wetland water levels and reduce acid discharge into the Maria River.

**3.16.4 Boyters Lane Playing Fields and Wetland Plan of Management**

In early 2005, a Plan of Management was completed for the Boyters Lane playing fields and wetland, South West Rocks. The Plan was undertaken as a result of Council's proposal to construct sporting fields on land adjoining the Wetlands. The Plan of Management recommended that Council call for members for a working group to manage the site, with an adaptive management approach strongly recommended. Monitoring and review of works and processes over time will ensure a flow of information for the site manager to adjust management in response to trends or emerging problems.

**3.17 ESTUARY MANAGEMENT**

A draft data compilation study for the Macleay Estuary has recently been completed and Council is currently in the first stage of the development of the Estuary Management Plan.

In conjunction with consultants, Council is also in the final stages of producing an Estuary Management Plan and Study for Killick Creek at Crescent Head and Saltwater Creek and Lagoon, at South west Rocks. These plans are designed to provide clear directions regarding responsibilities for actions to help achieve sustainable waterways.

**3.18 FISHERIES AND AQUACULTURE**

**3.18.1 Key Threatening Processes**

The following are formally listed as Key Threatening Processes listed by NSW fisheries:

- ♦ Current shark meshing program in NSW waters.
- ♦ Hook and line fishing in areas important for the survival of threatened fish species.
- ♦ The introduction of fish to fresh waters within a river catchment outside their natural range.

- ♦ The removal of large woody debris.
- ♦ The degradation of native riparian vegetation along New South Wales water courses.
- ♦ The installation and operation of in-stream structures and other mechanisms that alter natural flow regimes of rivers and streams.

No relevant new species (i.e. not likely to occur in the Shire), populations or ecological communities have been listed.

### 3.18.2 Removal of Causeway at McCoys Crossing

Council was selected by the NSW Department of Primary Industries to be part of a trial for its Stream Health – Road Crossings and Fish Passage Project. The program aims to identify and prioritise waterway crossings important to fish passage in the Northern Rivers Catchment Management Area, to document remedial options and to assist Local Government with on-ground works at key demonstration sites.

Willi Willi Road causeway at McCoys Creek was identified as an appropriate demonstration site for this program because of the high invert restricted water flows impeding the passage of native fish through the river system. The existing causeway was removed in late 2004 and replaced with a new timber bridge. This has improved the flow of water and increased the free passage of fish along the creek. The overall success of the project will become more obvious over time, as the improved health of the aquatic ecosystem creates the right environment for fish populations to flourish.

## FUTURE DIRECTIONS

### What more could be done?

### 3.19 INTEGRATED WATER CYCLE MANAGEMENT STRATEGY

Ongoing review of the Integrated Water Cycle Management Strategy (IWCMS) will take place over the coming years, incorporating planning and management of the three main urban water services of water supply, sewerage and stormwater. Planning and managing these services together will help to:

- Meet customer needs;
- Maximise the value of water resources; and
- Minimise the impact of water use on the environment.

### 3.20 ESTUARY MANAGEMENT PLAN

Council is currently in the first stage of the development of the Estuary Management Plan (EMP). The focus of the

EMP will be on improving or maintaining the overall health and functionality of the estuary. Emphasis is placed on maintaining the integrity of the whole system, including its chemical, physical, and biological properties, as well as its economic, recreational, and aesthetic values. It is envisaged that the EMP will encourage local communities to take responsibility for managing their own estuary.

The Estuary Management Plan and Study for Killick Creek and Saltwater Creek and Lagoon are to be finalised and adopted during the 2005/2006 reporting period. Funding has also been obtained to develop a similar plan and study for Korrogoro Creek at Hat Head.

### 3.21 KEMPSEY SHIRE URBAN STORMWATER MANAGEMENT STRATEGY

The action plans outlined in the Kempsey Urban Stormwater Management Plan (SMP) provide direction for future planning, education and provision of appropriate sustainable stormwater management infrastructure from 2004 – 2009. The SMP identifies a range of general actions applicable to all of Council's urban areas and a range of actions specific to each individual urban catchment. Many of the actions listed reflect activities already being undertaken or proposed to be undertaken by Council, including aligning existing operations across all of Council's departments to ensure the outcomes meet the objectives of the stormwater management plan.

Specific actions set to take place during the 2005/2006 reporting period include, community education programs and water sensitive planning and design across all urban areas, upgrade of the stormwater system at Kempsey Sale Yards and a review of stormwater treatment at Saltwater Lagoon and Saltwater Creek, South West Rocks.

# At a **GLANCE** **ATMOSPHERE**

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<p><b>Air Pollution</b> - is relatively low in the Kempsey Shire compared to larger urban centres, although smoke and other air borne particles can be prevalent during the bushfire season.</p>	<p><b>Nuisance</b> – Council recorded 13 Air and 12 Odour complaints during 2004/2005, while the NSW EPA recorded 5 Air complaints.</p> <p><b>Vehicle Emissions</b> – impact most on the urban centres of Kempsey and Frederickton due to heavy traffic on the Pacific Highway.</p>		
<p><b>Green House Effect</b> – Kempsey Shire is regarded as a relatively minor producer of greenhouse gases.</p>	<p><b>Burning Off</b> – this is often cause for complaint when waste is burnt in urban areas.</p> <p><b>Solid Fuel Stoves and Heating</b></p> <p><b>Agriculture</b> – crop and weed spraying, land clearing and methane from stock.</p>	<p><b>Landfill</b> – there is now only 1 operating landfill site in the Shire as the 3 of the former sites have been capped and transformed into waste transfer stations.</p> <p><b>Sewer Treatment Plants</b> – ongoing odour management.</p>	<p><b>Ecologically Sustainable Development</b> – consideration of alternative technologies, cleaner production, life-cycle analysis and green purchasing, along with native conservation and enhancement.</p>
<p><b>Ozone Layer</b> – Kempsey Shire is not regarded a significant potential producer of ozone depleting compounds.</p>	<p><b>Landfilling</b> – production of methane and other greenhouse gases.</p> <p><b>Sewer Treatment Plants</b> – can cause odour problem in urban areas.</p> <p><b>Dust</b> – from unsealed roads and unstable development sites</p>		

## 4.0 THE ATMOSPHERE

### 4.1 INTRODUCTION

The atmosphere consists of a relatively narrow shell of air encircling the earth that supports animal and plant life. Human activity affects the atmosphere in a variety of ways. Although some of the impacts occur on a global scale, such as ozone depletion and global warming, the source of these problems are often occurring on a local scale. The quality of the air in major urban and regional centres is also of concern to the community and may be associated with a range of adverse health effects (NSW EPA 2000).

## STATE

**What are the issues for sustainability? And how are they changing?**

### 4.2 AIR POLLUTION

Substances not naturally found in the air or at greater concentrations or in different locations from usual are referred to as 'pollutants' (NSW EPA 2005). Air pollution is caused by many of the activities that are common to our way of life. The quality of the air we breathe can have significant health impacts particularly with regard to respiratory diseases, asthma and cancer. Air pollutants can also produce odour issues.

Common causes of air pollution can include bushfire, controlled burning, industry, vehicle emissions, solid fuel stoves and heaters. Table 4.1 shows the sources and human health affects of common air pollutants.

Air pollution in the Kempsey Shire LGA is relatively low compared to larger urban centres, although smoke and other air borne particles can be prevalent during the bushfire season.

### 4.3 GREEN HOUSE EFFECT

The Kempsey Shire is a relatively minor producer of Greenhouse gases in comparison to more heavily populated and industrialised areas, particularly as there are no major fuel-based power generators in the region. However, significant historical land clearing has reduced the regions current potential as a sink for carbon dioxide. Major sources of Greenhouse emissions in the area are likely to come from bushfires, controlled burning, forestry, agriculture, and transport (particularly the Pacific highway). Council does not currently have any specific measures to reduce Greenhouse gas emissions.

### 4.4 OZONE LAYER

The historical use of the ozone depleting compounds such as chlorofluorocarbon compounds (CFCs) within the Kempsey Shire is expected to be minimal, with the main

**Table 4.1: Common Air Pollutants**

Pollutant	Sources	Health effects
Carbon monoxide	Motor vehicles, burning of fossil fuels.	Blood absorbs carbon monoxide more readily than oxygen, reducing the amount of oxygen being carried through the body. Carbon monoxide can produce tiredness and headaches. People with heart problems are particularly at risk
Sulfur dioxide	Coal and oil burning power stations, mineral ore processing and chemical manufacture.	Attacks the throat and lungs. People with breathing problems can suffer severe illness.
Nitrogen dioxide	Fuel combustion.	Affects the throat and lungs.
Volatile organic compounds	Motor vehicles, fuel combustion, solvent use.	Some VOCs cause eye and skin irritation, headaches or nausea, while some are classed as carcinogens.
Ozone	Formed from nitrogen oxides and hydrocarbons in sunny conditions. These chemicals are released by motor vehicles and industry.	Ozone attacks the tissue of the throat and lungs and irritates the eyes.
Lead	Exhaust gases from motor vehicles that use leaded petrol, smelters.	Particles containing lead in the air can enter the lungs. The lead can then be absorbed into the blood stream. Over a period lead can affect the nervous system and the body's ability to produce blood.
Particles	Motor vehicles, burning of plant materials, bushfires.	May cause breathing difficulties and worsen respiratory diseases. Some particles contain cancer-producing materials.

Source: CSIRO 2003

source originating from old household items such as aerosol cans, air conditioning units and refrigerators.

## PRESSURE

### Why is it happening?

Air quality is generally not considered to be a major issue within Kempsey Shire in the short term due to the absence of heavy industry in the Shire, relatively small and dispersed population, good air flow characteristics and large areas of native vegetation retained in undeveloped lands.

#### INDICATOR – Air Pollution Licences for the Kempsey Shire

### Why use this indicator?

Licensing provides an assessment of the number and types of potential air polluters in the Kempsey Shire.

The NSW EPA did not have current up to date licensing information available at the time of reporting.

## 4.5 NUISANCE

Air pollution can give rise to nuisance issues in urban areas, caused by odours or dust settling on washing etc. Such issues directly affect the quality of the environment in which people reside. These generally occur where people live in close proximity to potential sources of air pollution (eg. STPs, landfill, industry, unsealed roads).

#### INDICATOR – Number of complaints regarding air pollution

### Why use this indicator?

Council and NSW EPA record air complaints on an annual basis. This allows an assessment to be made of the extent of air pollution issues in the Kempsey Shire.

**Table 4.2: Air Pollution Complaints**

	Complaints Received			
	Council		NSW EPA	
	2003/2004	2004/2005	2003/2004	2004/2005
Air	18	13	10	5
Odour	17	12	-	-

### What this shows:

The current data suggest a slight decrease in the number of air and odour complaints reported to council in the past 12 months, along with the number of air complaints reported directly to the EPA.

## 4.6 VEHICLE EMISSIONS

Vehicle emissions are not a major issue for local air quality. However, the increasing amount of traffic and particularly heavy vehicles using the Pacific Highway directly impact upon the communities located along the highway and the Kempsey Business district. Increased vehicle numbers adds to carbon monoxide, volatile organic compounds, lead and other atmospheric particulates in the immediate vicinity of the highway.

The proposed Highway bypass will alleviate conditions through much of Kempsey itself, but completion of this bypass is not expected for sometime yet.

## 4.7 BURNING OFF

Controlled burning for the purpose of reducing potential bushfire load, along with backyard or on-farm burning of vegetative refuse and waste add to pollution load in the atmosphere.

## 4.8 SOLID FUEL STOVES AND HEATING

Solid fuel stoves and heaters are common in older residential areas. Weather conditions, inappropriate fuel and poorly located, or designed flues can cause smoke nuisance and odour issues. The smoke from burning wood contains various pollutants including carbon monoxide, volatile organic compounds and fine particulates along with a range of other toxic and odour causing elements.

## 4.9 AGRICULTURE

Agricultural activities such as crop and weed spraying can have a detrimental effect on air quality with potential for health issues. A substantial amount of the Macleay floodplain has been cleared for grazing and other agricultural pursuits, hence removing potential carbon dioxide sinks. Methane production from intensive stock farming adds to the Greenhouse effect, while also giving rise to potential odour issues.

## 4.10 LANDFILLING

Landfills produce methane and other gases during decomposition, which add to the greenhouse effect. The Kempsey Waste Reveal & Disposal Facility (KWR&DF) is now the only operational landfill in the Kempsey Shire. Council is required under it's NSW EPA licence to monitor methane emissions to ensure levels escaping the landfill are not above threshold levels requiring further action. Landfill gas emissions also create odour problems. Council is required to maintain a buffer zone around the landfill site and cap wastes daily to reduce potential odour problem.

Older non-operational landfills within the Shire would also be producing greenhouse gases.

#### **INDICATOR – Total Waste to Landfill**

##### **Why use his indicator?**

The amount of waste going to landfill is directly related to greenhouse gas producing potential

See Chapter 6 – Human Settlements

**CONCLUSION:** **Pressure Increasing**

#### **4.11 SEWER TREATMENT PLANTS**

STPs produce greenhouse gases and can cause potential odour problems when prevailing winds pass over and direct the odour toward urban areas. The establishment of odour buffers aims to address this issue.

#### **4.12 DUST**

Dust pollution issues can be associated with unsealed roads, un-stabilised development sites, extractive industries and other similar industries.

#### **4.13 BUSHFIRES AND OTHER EMERGENCY SITUATIONS**

Bushfires can produce prolonged periods of smoke haze that can have detrimental health effects for sufferers of respiratory disorders such as asthma. Emergency situations such as traffic accidents or chemical spills are also of concern in the Shire due to the high traffic load, and particular road freight, on the Pacific Highway.

### **R E S P O N S E**

##### **What are the responses and how effective are they?**

#### **4.14 LANDFILLING**

Kempsey landfill has reduced its four operating landfills down to one central landfill facility located on Crescent Head Road - Kempsey Waste Receiving & Disposal Facility (KWR&DF). The three former landfills, located at Stuarts Point, South West Rocks and Bellbrook, have been either permanently or temporarily capped and are currently being used as waste transfer stations. A large section (2.3ha) of the KWR&DF has also been permanently capped including a passive gas ventilation layer.

#### **4.15 SEWER TREATMENT PLANTS**

An oxygen dosing plant was installed on the rising main to the North Street treatment work some years ago and is

generally effective in freshening the sewage sludge and reducing odours. Other steps taken to reduce odours at Council's STPs include reducing sludge levels in sludge lagoons and dosing of the sludge with patent biological chemicals for odour and volume reduction.

### **FUTURE DIRECTIONS**

##### **What more could be done to improve Air Quality?**

As previously discussed in this section air pollution is not regarded as a major environmental issue in the Shire. However, any means to reduce air pollution should be considered as the Shire moves toward sustainability.

Reducing point source emissions of pollutants such as odour and dust are important for improving local air quality within the Shire, but consideration of broader environmental issues such as reducing Greenhouse gas emissions should be explored. This may be achieved, by purchasing more efficient and renewable energy supplies. One such initiative could include Council becoming involved in the "Green Power Education Campaign" which aims to encourage local councils and their communities to switch to Green Power to reduce greenhouse gas emissions.

Other options include using materials that are produced with minimal to no Greenhouse gas emissions, promoting car pooling, cycling walking and choosing public transport where available as preferred methods of travel and increasing conservation of vegetated areas and revegetating cleared lands where possible.

# At a **GLANCE** BIODIVERSITY

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<p><b>Habitats within the Shire</b> – 30 of the 77 ecosystems recorded in the Shire have been identified as being of high conservation value. This incorporates 5,038 ha (or 2.25%) of Vulnerable communities and 32,678ha (or 14.31%)</p>		<p><b>Kempsey Shire Council DRAFT Ecologically Sustainable Development Policy</b></p>	
<p><b>Extent and Condition of Native Vegetation</b> – Information relating to changes in vegetation since pre-European settlement (1788) has not been described in any significant detail. However, as of 2003, approximately 63% of land within the Kempsey Shire consisted of woody vegetation, with 35% cleared and a further 2% on which there was no data.</p>	<p><b>Land Clearing and Development</b> – the population of Kempsey Shire is growing, particularly in the coastal areas and with rural subdivision.</p> <p><b>Feral Animals and Domestic Pets</b> – mainly concerned with feral dogs, dingos, rabbit, fox, cat and pigs, with increasing feral deer problems.</p>	<p><b>Vegetation and Habitat Management</b></p>	<p><b>Comprehensive Vegetation Mapping</b> - Council has allocated funding for the 2005/2006 financial year to undertake comprehensive vegetation mapping of the Kempsey Shire LGA.</p>
<p><b>Flora</b></p> <p><b>Threatened Flora Species</b> – There were 7 Vulnerable and 7 Endangered flora species identified in the Shire, which is 1 more of each compared to last year. This total of 14 threatened species (7 Vulnerable and 7 Endangered) represents approximately 1.3% of the species listed in the Shire</p>	<p><b>Exotic Plants</b> – of particular concern in the past 12 months:</p> <ul style="list-style-type: none"> <li>• Bitou Bush</li> <li>• Blackberry</li> <li>• Giant Parramatta Grass</li> <li>• Lantana</li> <li>• Groundsel Bush</li> <li>• Salvinia and Water Hyacinth</li> <li>• St Johns Wort (Hypericum perforatum)</li> </ul>	<p><b>National Parks, Nature Reserves, State Recreation Areas and Other Reserves</b> – 99,856 ha of land, representing 29.5% of the total land area in the Shire, is under formal reserve. This represents a slight increase from last years figure, reflecting 313 ha of land designated as a wildlife refuge during the 2004/2005 reporting period.</p>	
<p><b>Fauna</b></p> <p><b>Endangered and Vulnerable Species</b> – There were 86 (72 Vulnerable and 14 Endangered species) threatened fauna species (including marine) recorded to date in the shire, excluding fish and invertebrates. Threatened fauna make up 18.5% of all fauna species recorded in the shire, which is an approximate 3% increase in the past 12 months</p>	<p><b>Bushfire</b> – The total area burnt during reporting period was approximately 523.54 ha. Appropriate management is essential to avoid disruption of ecosystems</p>	<p><b>Exotic Animal Control</b> – concentrated on wild dogs and dingos with rabbit, fox and feral cat management ongoing throughout the shire and small scale pig trapping occurring in the south eastern portion of the Shire.</p> <p><b>Weed Management</b> – Macleay Valley Weeds Strategy</p>	<p><b>NRCMA Catchment Action Plan</b> - The NRCMA is developing a Catchment Action Plan (CAP) for the Northern Rivers Region. The 10 year CAP will guide natural resource management across the Northern rivers Region.</p>
<p><b>Endangered Ecological Communities</b> – there are 9 community types represented in the Shire including rainforest, woodland and saltmarsh.</p>		<p><b>Bushfire Management</b> – Mapping of Bushfire Prone Land and Fireguard for Kids Program.</p> <p>Volunteer Rural Fire Service brigades assisted with a total of 8 hazard reduction burns across the Kempsey Shire totalling 221 hectares of burning</p>	<p><b>Kempsey Shire Comprehensive Koala Management Plan</b> – is programmed within Council's 5-year budget.</p>
<p><b>Migratory Species</b> – there are at least 26 species or species habitats found in the Shire. No new species have been identified during the past 12 months</p>			

## 5.0 BIODIVERSITY

### 5.1 INTRODUCTION

Biodiversity is the variety of all life forms - the different plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part. The level of diversity is not fixed, but rather dynamic, increased by genetic changes and evolutionary processes, and decreased by extinction and habitat degradation” (DEH 2004).

One of the key aspects of Ecologically Sustainable Development is the requirement that the rate of biodiversity loss caused by human activity should not be sufficient to compromise ecosystem integrity.

## STATE

**What are the issues for sustainability? And how are they changing?**

### 5.2 HABITATS WITHIN THE SHIRE

The most detailed assessment to date, describing the type and extent of habitats within the Kempsey Shire is provided by the Comprehensive, Adequate and Representative (CAR) Assessment, completed in 1999-2000 for the Upper North East and Lower North East study areas (the latter incorporating the Kempsey Shire). The CAR Assessment identified the following major vegetation communities existing in the Shire:

- ♦ sub-tropical, warm temperate and cool temperate rainforest
- ♦ wet and dry sclerophyll forest
- ♦ swamp forest
- ♦ woodland eg Melaleuca, Eucalypt and Casuarina spp
- ♦ scrubland eg Banksia and Leptospermum spp
- ♦ grassland (native and modified) and pasture
- ♦ wetland, aquatic and marine eg saltmarshes, rushlands, mangroves, seagrass, etc.
- ♦ dunal communities eg littoral rainforest
- ♦ wet and dry heathland
- ♦ riparian vegetation

The CAR assessment described 30 of the 77 ecosystems identified in the Shire as being of high conservation value. This incorporates 5038 ha (or 2.25%) of Vulnerable communities and 32678ha (or 14.31%) described as Rare. A detailed list of these ecosystems is presented in the 2004 Comprehensive SoE Report.

Wetlands and littoral rainforests are communities of particular importance found in the Shire, meeting the criteria of SEPP 14 and SEPP 26. SEPP 14 wetlands occupy 12 951ha (3.84%) of the shire, with Littoral Rainforests occupying 63.57ha (0.02%) of the land use within the Shire.

### INDICATOR – Extent and Degree of Change to Native Vegetation

#### Why use this indicator?

The extent and condition of each type of native vegetation correlates closely to the ecosystems level and ability to maintain biodiversity. By monitoring this indicator we are able to see how effectively vegetation in the Shire is being managed, and therefore the associated effects on biodiversity.

#### What this indicator shows:

Information relating to changes in vegetation since pre-European settlement (1788) has not been described in any significant detail. However, as of 2003, approximately 63% of land within the Kempsey Shire consisted of woody vegetation, with 35% cleared and a further 2% on which there was no data.

Although there were no additional areas of land gazetted as National Park Estate during the 2004/2005 reporting period, 313 ha of land in the Shire was designated as wildlife refuges.

#### 5.2.1 Regional Corridors

Key vegetation areas in and surrounding the region are comprised of State Forest, conservation areas, Council land, and private property which are connected and/or a part of a greater network of regional and subregional wildlife corridors.

No new significant regional corridors have been identified during the 2004/2005 reporting period

### 5.3 FLORA

#### 5.3.1 General

The broad variety of habitats located in the Kempsey Shire enables this area to support a large variety of species. A search on the NPWS Atlas (2005) indicated 1,121 plant species have been detected in the Shire, from 155 different families. This total represents an additional 5 new families and 93 new species compared to last years total of 150 families and 1,028 species.

In terms of species richness, the families Poaceae (97), Fabaceae (92), Myrtaceae (86) and Asteraceae (75) contain the greatest number of species found in the Shire followed closely by Cyperaceae (58) and Orchidaceae (42).

This list is considered only to be indicative and not comprehensive.

### 5.3.2 Threatened and Rare Flora

#### INDICATOR- Threatened Flora species

##### Why use this indicator?

The conservation status of threatened species indicates which groups and associated habitat may need special management. Loss of species is best shown by the number of species considered endangered or vulnerable.

##### What this indicator shows:

The table above shows there are 7 Vulnerable and 7 Endangered flora species presently known to occur in the Shire, which is 1 more of each compared to last year. This

total of 14 threatened species (7 Vulnerable and 7 Endangered) represents approximately 1.3% of the species listed in the Shire. In 2000, only eight species (four vulnerable and four endangered) were listed in the Shire (2000 SoE Report). This difference has resulted from new species listings, changes to Shire boundaries and recent studies. Fourteen other species or species habitats are also considered likely to occur in the region as shown below.

##### Conclusion: Pressure Increasing

#### CONCLUSION:

Pressure Increasing

**Table 5.1: Threatened flora known or likely to occur in the Shire**

Species	Listed Act	Status	Occurrence
<b>Acacia chrysotricha</b>	TSC	E1	recorded
<i>Acronychia littoralis</i>	TSC/EPBC	E1	recorded
<i>Allocasuarina defungens</i>	TSC	E1	recorded
<i>Amorphaespermum whitei</i>	TSC	V	recorded
<i>Arthraxon hispidus</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Asperula asthenes</i>	TSC/EPBC	V	recorded
<i>Bothriochloa biloba</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Callistemon pungens</i>	EPBC	V	Species or species habitat likely to occur within area
<b>Chamaesyce psammogeton</b>	TSC	E1	recorded
<i>Cryptostylis hunteriana</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Cynanchum elegans</i>	EPBC	E1	Species or species habitat likely to occur within area
<b>Diuris disposita</b>	TSC	E1	recorded
<i>Gaultheria viridicarpa</i> J.B. Williams subsp. <i>Viridicarpa</i> ms.	EPBC	V	Species or species habitat likely to occur within area
<i>Grevillea guthrieana</i>	TSC/EPBC	E1	recorded
<i>Hakea archaeoides</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Haloragis exalata</i> subsp. <i>Velutina</i>	TSC/EPBC	V	recorded
<i>Hydrocharis dubia</i>	EPBC	V	recorded
<i>Marsdenia longilobata</i>	TSC/EPBC	E1	recorded
<i>Neoastelia spectabilis</i>	TSC/EPBC	V	Species or species habitat likely to occur within area
<i>Peristeranthus hillii</i>	TSC	V	Species or species habitat likely to occur within area
<i>Parsonsia dorrigoensis</i>	TSC/EPBC	V	recorded
<i>Quassia</i> sp. Mooney Creek (J.King s.n. 1949)	EPBC	E1	Species or species habitat likely to occur within area
<i>Sarcophilus fitzgeraldii</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Sarcophilus hartmannii</i>	TSC	V	recorded
<i>Styphelia perileuca</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Tasmania glaucifolia</i>	EPBC	V	Species or species habitat likely to occur within area
<i>Thesium australe</i>	TSC	V	recorded
<i>Tylophora woollsii</i>	EPBC	E1	Species or species habitat likely to occur within area
<i>Zieria lasiocaulis</i>	TSC	E1	recorded

Notes: Species in highlighted in **Bold** have been added since the previous years record.

## 5.4 FAUNA

### 5.4.1 General

The broad variety of habitats located in the Kempsey Shire enables this area to support a large variety of fauna. A search on the NPWS Atlas (2005) shows that 465 fauna species from 174 different families (including marine species) have been recorded in the shire to date, summarised in Table 5.2.

### 5.4.2 Threatened Fauna

The following table provides an updated list of Threatened Fauna Recorded in the Kempsey LGA.

**Table 5.2: Number of Fauna Species Recorded in the Kempsey LGA 2004/2005**

Fauna Group	Number of species	
	2004	2005
Birds	285	286
Amphibians	35	35
Mammals	94	94
Reptiles	50	50
<b>Total</b>	<b>464</b>	<b>465</b>

	Vulnerable	Endangered
<b>Birds</b>	Australasian Bittern Barred Cuckoo-shrike Black Bittern Black-breasted Buzzard Black-tailed Godwit Blue-billed Duck <b>Brolga</b> Brown Treecreeper <b>Brush-tailed Phascogale</b> <b>Bush-hen</b> Comb-crested Jacana Diamond Firetail <b>Flesh Footed Shearwater</b> Glossy Black-Cockatoo <b>Grey Ternlet</b> Grass Owl Grey-crowned Babbler (eastern subsp.) <b>Hooded Robin</b> Magpie Goose Marbled Frogmouth Masked Owl Olive Whistler Osprey Painted Honeyeater Pied Oystercatcher Powerful Owl Rose-crowned Fruit-Dove Rufous Scrub-bird Sooty Owl Sooty Oystercatcher Speckled Warbler Square-tailed Kite <b>Superb Fruit Dove</b> Wompoo Fruit-Dove	Black-necked Stork Bush Stone-curlew Little Tern <b>Painted Snipe</b> Regent Honeyeater <b>Southern Giant Petrol</b> Swift Parrot
<b>Amphibians</b>	Green-thighed Frog Grandula Frog Sphagnum Frog Wallum Froglet	<b>Booroolong Frog</b> Green and Golden Bell Frog Stuttering Frog Giant Barred Frog
<b>Mammals</b>	Australian Fur-seal Brush-tailed Phascogale Common Blossom-bat Common Planigale Eastern Bent-wing Bat Eastern Cave Bat Eastern Chestnut Mouse Eastern False Pipistrelle Eastern Freetail-bat Eastern Long-eared Bat Eastern Pygmy-possum Golden-tipped Bat Greater Broad-nosed Bat Grey-headed Flying-fox Hoary Wattled Bat Humpback Whale Koala Large-footed Myotis Little Bentwing-bat Long-nosed Potoroo Parma Wallaby Red-legged Pademelon Rufous Bettong	<b>Eastern Quoll</b> Hastings River Mouse

**Table 5.3: Threatened Fauna Recorded in the Kempsey LGA**

**Notes:** Species highlighted in Bold have been added since the previous years record.

## INDICATOR - Endangered and Vulnerable Fauna Species

### Why use this indicator?

Loss of species is best measured by the number of endangered or vulnerable fauna species. It displays the impacts on species as a result of environmental changes.

### What this shows?

There are 86 (72 Vulnerable and 14 Endangered species) threatened fauna species (including marine) recorded to date in the shire, excluding fish and invertebrates. Threatened fauna make up 18.5% of all fauna species recorded in the Shire, which is about a 3% increase in the past 12 months.

**CONCLUSION:** **Pressure Increasing**

### 5.4.3 Endangered Ecological Communities and Populations

The NPWS (2005) have identified the following as endangered ecological communities and populations as being present within the Kempsey Shire LGA.

**Table 5.4: Endangered Ecological Communities and Populations**

<b>Endangered Ecological Communities</b>	Coastal Salt Marsh
	Freshwater Wetlands on Coastal Floodplain
	Littoral Rainforest
	Lowland Rainforest on Floodplain
	New England Peppermint Woodland on Sediments
	Subtropical Coastal Floodplain Forest
	Swamp Oak Floodplain Forest
<b>Endangered Populations</b>	Swamp Sclerophyll Forest on Coastal Floodplain
	White Box - Yellow Box - Blakely's Red Gum Woodland
	Emu

### 5.4.4 Migratory Species

A search of the DEH (2005) EPBC website revealed that approximately 26 migratory species or species habitat occur or are likely to occur in the Kempsey Shire. No new species have been listed since the previous year.

## PRESSURES

### Why is it happening?

### 5.5 LAND CLEARING AND DEVELOPMENT

Population growth in the region, particularly on the coast, continues to result in greater demand for development in the region. This causes subsequent pressure on biodiversity due to land clearing for residential and rural residential developments. The associated need for greater services in

region such as gas pipes, power lines, water supply, sewage and new roads causes further pressure on biodiversity.

Land clearing and modification for rural activities in the region that apply direct pressure on biodiversity include agriculture (primarily cattle grazing) and logging. The pressure applied by such economically driven activities does not always occur at an ecologically sustainable rate.

## INDICATOR- Native Vegetation Clearing

### Why use this indicator?

Loss/modification of habitat is one of the most significant key threatening processes. This indicator shows the amount and rate of native vegetation, and subsequent habitat, loss in the Shire.

Data relating to areas approved for vegetation was not made available by the DNR at the time of reporting.

### What this indicator shows?

At present there is insufficient information available to accurately quantify this indicator. Clearing information should be obtained for future reports so the rate of habitat loss in the Shire can be monitored and managed to reduce any potentially significant impacts on biodiversity. However, as not all clearing requires consent it is difficult to determine the actual area of habitat loss, thus there may be a need to implement a reporting system of all vegetation removal greater than a given minimal amount in order to obtain a more accurate figure on native vegetation and habitat loss in the shire.

### 5.5.1 Significant Developments Proposals

The following have been development proposals with significant issues in the last year:

- ♦ **Waldel Park Subdivision, South West Rocks** – A proposal was put forward to subdivide 2 lots currently forming part of Waldel Park, South West Rocks. The applicant proposed to subdivide the study site for low density residential development. Stage 1 involved a 23-lot subdivision with future stages subject to development consent. Numerous environmental issues were raised as a result of the proposal including flora and fauna impacts, bushfire impacts and stormwater management.
- ♦ **Toorooka Composting Facility** - An application was received by Council to erect and operate an organic composting and fertilizer facility. The proposal includes transporting liquid animal waste from Frederickton abattoirs, mixing the animal waste with grass clippings taken from the subject land and sawdust supplied by the applicant to make an organic compost. The compost will be stored on site and used as a fertilizer and spread

over subject land. An environmental management plan was developed for the site addressing the management of groundwater, surface water, leachate (to DEC licence requirements), gas and odour, incoming organics, and pest and vermin control. A soil nutrient balance and land capability assessment was also undertaken. Ongoing monitoring of groundwater, surface water and soils is proposed to be undertaken as part of the management plan to allow for the detection of potential contaminants originating from the proposed facility.

## 5.6 FERAL ANIMALS AND DOMESTIC PETS

### 5.6.1 Feral animals

Feral animals apply a significant amount of pressure on native fauna in the region as well as having an impact on flora. Some have been listed under the TSC and EPBC Acts as Key Threatening Processes (KTPs). KTPs occurring (or likely to be occurring) in the region in relation to introduced animals include:

- ♦ Competition and land degradation by feral goats.
- ♦ Competition and land degradation by feral rabbits.
- ♦ Predation by feral cats.
- ♦ Predation by the European Red Fox (*Vulpes vulpes*).
- ♦ Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs.
- ♦ Competition from feral honey bees.
- ♦ Predation by *Gambusia holbrooki* (Plague Minnow or Mosquito Fish).

#### INDICATOR – Feral Animals Listing

##### Why use this indicator?

Feral animals apply a significant amount of pressure on native fauna and flora and therefore the overall biodiversity in the region. By monitoring the extent and number of feral animals inhabiting the Shire we are able to see how effectively feral animals are being managed, and therefore the associated effects on biodiversity.

In the 2004/2005 reporting period growing numbers of feral pigs and deer have been reported in the upper tablelands and in the Maria River Region of the Kempsey Shire. Reports of feral dogs also represented a significant proportion of the feral animals reported to the Kempsey Rural Lands Protection Board in 2004/2005.

Feral animals of particular significance known to exist in the Shire, reported in past SoE Reports include; hares, rabbits, foxes, black rat, brown rat, common mouse, feral cats, starlings, indian mynahs, house sparrows, mosquito

fish, goldfish/carp, trout, european honey bees and feral dogs and dingoes.

##### What this indicator shows:

It is evident that some species of feral animal have been reported to be increasing in number and, hence, placing increase pressure on biodiversity in the Shire.

Cane Toads have also been recorded in the area, though the level of establishment is largely unknown.

#### CONCLUSION:

**Pressure Increasing**

## 5.7 EXOTIC PLANTS

Exotic plants threaten nearly all biological communities in Australia. Although weeds appear to degrade many natural ecosystems, quantitative measures of their impact on those systems are relatively rare. Introduced plants that result in weed infestations including noxious weeds and garden escapees are a major threat to biodiversity in the Kempsey Shire.

Recognised key biodiversity threatening processes that are common in the region are:

- ♦ Invasion of native plant communities by Bitou Bush and Boneseed (*Chrysanthemoides monilifera*); which dominates much of the local coastline, displacing native flora, and posing a recognised threat to ecological communities and threatened flora species.
- ♦ Invasion of native plant communities by exotic perennial grasses.

#### INDICATOR – Introduced Species/Weed Control (NPWS)

##### Why use this Indicator?

Exotic species of particular concern especially in riparian zones include Camphor Laurel, Willow, Large-Leaved Privet, Small-Leaved Privet, Wandering Jew, Blackberry, and particularly Lantana that was prevalent at all sites surveyed within the Shire. Lantana grows in large thickets adjacent to riparian forests, often forming an impenetrable barrier and blocking access to sections of streams (DWR, 1994). It provides good habitat for small wildlife, especially birds, but can also harbor pests (eg. rats, cats and foxes).

Exotic species applying the most significant pressure in biodiversity in high conservation areas of National Parks estate in the region are Bitou Bush and Lantana primarily in the coastal region.

## What this Indicator Shows?

The Department of Primary Industries provides a lists of all the noxious weeds identified in Kempsey Shire. No new noxious weed species have been identified to be present in the Shire in the last 12 months, however existing species continue to cause considerable problems. Refer to the 2004 Comprehensive SoE Report for a full list of the identified noxious weeds present in the Kempsey Shire.

The Weeds Strategy for the Macleay River Catchment identifies the following weeds as a major economic or environmental threat in the Macleay River Catchment:

- ♦ Bitou Bush
- ♦ Blackberry
- ♦ Giant Parramatta Grass
- ♦ Lantana
- ♦ Nodding Thistle (*Carduus nutans*)
- ♦ Small and Large-leaved Privet (*Ligustrum sinense* and *L. lucidum*)
- ♦ Salvinia and Water Hyacinth
- ♦ St Johns Wort (*Hypericum perforatum*)

### CONCLUSION:

Pressure Increasing

## 5.8 BUSHFIRE

Fire is a natural process to which native animals and plants have adapted to. Groups of animals and plants that constitute an ecosystem respond similarly to fire according to the characteristics of their life-history. Many small mammals and most birds breed in Spring and Summer (commonly the fire period). As burned areas regenerate, different species find suitable habitat at the various levels of regeneration. Changing fire regimes have been associated with the decline of many biological communities. The correct management of fire is thus essential to avoid disruption of ecosystems and extinction of species.

The Kempsey Rural Fire Service supplied preliminary data on an estimated area burnt by bushfires within the Kempsey Shire during the reporting period. However, it should be noted that this data is not fully complete and is subject to further validation which may alter this figure in the future. The total area burnt during the 2004/2005 reporting period was approximately 523.54 ha, encompassing three main bushfires/wildfires occurring from October to December 2004.

The Kempsey Rural Fire Service continued to supply a service to the community and Kempsey Shire Council in

line with the service level agreement. This was achieved by participating in fire suppression and mitigation, community education and public advice in relation to hazard reduction and development applications.

The community education team completed the Fireguard for Kids program in a number of schools in the Shire's rural village areas, as well as visiting pre-schools and day care facilities. Public displays were carried out at local markets within Kempsey, Crescent Head and Bellbrook. Public meetings for fire awareness and hazard reduction were conducted at Hat Head and Stuarts Point.

Staffing levels increased with the employment of a Fire Mitigation Officer and a Development Control Officer. The Fire Mitigation Officer is based in Nambucca and shares the duties over the zone area while the Development Control Officer is based in Kempsey with duties shared over Nambucca, Kempsey and Hastings. In 2004/2005 the Rural Fire Service gave advice to Council on nine 79BA referrals as well as participating in the development of Councils' Bushfire Prone Land maps.

Volunteer Rural Fire Service brigades assisted with a total of 8 hazard reduction burns across the Kempsey Shire totalling 221 hectares of burning. Staff received and acted on 14 hazard complaints across the shire and volunteers issued 619 permits during last year's bushfire danger period.

## 5.9 DISEASE

Diseases can have a significant impact on biodiversity in the region. The NSW NPWS (2005) has compiled the following Key Threatening Processes listed under the TSC Act and EPBC Act related to disease:

1. Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis.
2. Infection and dieback of native plants by root-fungus, *Phytophthora cinnamomi*
3. *Psittacine Circoviral* (beak and feather) Disease affecting endangered psittacine species.

Local Koala populations may also be affected by loss of foraging habitat and introduction of threats such as dogs and automobiles, leading to behavioural and nutritional stress on affected members of the local Koala population. Most Koalas are naturally affected with Chlamydia pathogens (Sharp and Phillips 1999, Phillips 1997). This and other diseases may develop when Koalas are under stress, of which one major cause is habitat loss and disturbance.

The local Koala Preservation Society (KPS) received few reports (<10) of Chlamydia in the local koala population during the reporting period with only one documented case

at the Koloa Hospital. Three other individuals were brought to the Hospital, two from motor vehicle hits and one from a dog attack.

## RESPONSE

**What are the responses and how effective are they?**

### 5.10 VEGETATION AND HABITAT MANAGEMENT

#### 5.10.1 General Existing Management Measures

In general, habitat and vegetation is managed by varying authorities depending on the location of the habitat or vegetation, under provisions of the following main legal instruments:

- ♦ Environment Planning and Assessment Act 1978 (EP&A Act)
- ♦ Threatened Species Conservation Act 1995 (TSC Act)
- ♦ Native Vegetation Act 1997 (NCV Act)
- ♦ Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- ♦ SEPP 44 – Koala Habitat Protection.
- ♦ SEPP 26 – Littoral Rainforest
- ♦ SEPP 14 – Coastal Wetlands
- ♦ SEPP 71 – Coastal Zone
- ♦ National Parks and Wildlife Service Act 1974. (NPWS Act)
- ♦ Kempsey Shire Tree Preservation Order (2002)

Depending on the area of land, ownership and/or relevant development or other proposal (if applicable), local (i.e. Council) or State Government Agencies (eg DIPNR, DEC and NPWS) may have jurisdiction for administration of provisions under these instruments to ensure effective management of vegetation. Specific applications of these instruments are detailed in subsequent sections.

**Table 5.5: Area of Macleay under formal conservation areas**

Reserve Types	Area (ha)	Proportion of (%)
Crown Reserves <sup>1</sup>	1211	1.21
National Park <sup>1</sup>	75,930.50	76.04
NPWS Historic Site <sup>1</sup>	467.1	0.47
NPWS Nature Reserve <sup>1</sup>	13,960.90	13.98
NPWS State Conservation Area <sup>1</sup>	1,267.40	1.27
Zoned Environmental Protection (Draft 2004 LEP) <sup>2</sup>	6,706	6.72
Voluntary Conservation Agreement <sup>2</sup>	0	0.00
Wildlife Refuge <sup>2</sup>	313	0.31
Land for Wildlife <sup>2</sup>	0	0.00
<b>Total:</b>	<b>99855.9</b>	<b>29.53*</b>

Notes: 1. As at 2000

2. As at 2005

\*. Percentage of total land area in Shire

### 5.11 NATIONAL PARKS, NATURE RESERVES, STATE RECREATION AREAS AND OTHER RESERVES

The NPWS reserve systems in the Macleay includes several nature reserves, historic sites, national parks, and state conservation areas. These areas include:

- ♦ Hat Head National Park;
- ♦ Limeburners Creek Nature Reserve;
- ♦ Willi Willi National Park;
- ♦ Yessabah Nature Reserve;
- ♦ Goolawah Nature Reserve; and
- ♦ The Arakoon State Recreation Area.

The Macleay is also bordered by Werrikimbee, New England and Oxley Wild Rivers (over 91 231 ha) National Parks. Wilderness areas are located adjacent to (and including parts of) the latter National Parks. A significant area of the rugged upper Macleay Valley is now wilderness including the Macleay Gorges wilderness area.

Council reserves also occupy a small area of the region. These reserves are primarily for recreational purposes.

**INDICATOR - Effectiveness of Formal Reserve System (in accordance with its comprehensiveness, adequacy and representativeness within the region).**

#### Why use this indicator?

This indicator aims to show both the type and area of habitat conserved within the reserve system. In Australia this is identified as the main areas implementing biodiversity conservation. In order to effectively conserve biodiversity the reserve system must display characteristics of comprehensiveness, adequacy and representativeness.

No major areas of land have been adopted by NPWS since 2000 and as such the following data remains the same as previously reported. However, this report has attempted to collate information and include land zoned under the Kempsey LEP as Environmental Protection, as well as under Voluntary Conservation Agreements, Wildlife Refuges and Land for Wildlife.

## What this shows:

Currently approximately 99,856 ha of land, representing 29.5% of the total land area in the Shire, is under formal reserve. This represents a slight increase from last years figure, reflecting 313 ha of land designated as a wildlife refuge during the 2004/2005 reporting period.

Specific information regarding the type of vegetation managed in reserves is not available, as little detailed survey of conservation areas has been undertaken. Such information should be made available in future State of Environment Reports.

The following NPWS managed reserves in the Shire have implemented Plans of Management:

- ♦ Cooperbung Creek Nature Reserve
- ♦ Gads Sugarloaf Nature Reserve
- ♦ Pee Dee Nature Reserve
- ♦ Fifes Knob Nature Reserve
- ♦ Yarravel Nature Reserve and Skillion Nature Reserve
- ♦ Boonanghi Nature Reserve
- ♦ Maria National Park
- ♦ The Castles Nature Reserve
- ♦ Willi Willi Caves Nature Reserve
- ♦ Arakoon State Conservation Area
- ♦ Hat Head National Park
- ♦ Limeburners Creek Nature Reserve

## CONCLUSION:

**Situation Improving**

## 5.12 ASSESSMENTS AND RESTORATION ORDERS

### 5.12.1 Threatened Species Assessments

For any development proposal that falls under the provisions of the EP&A Act, Council routinely requests flora and fauna impact assessments for threatened species listed under the TSC Act and EPBC Act, and for consideration of Matters of National Environmental Significance (which predominantly relates to migratory species listed under international agreements).

Some significant results detected in studies over the past 12 months included, the detection of threatened species such as the Wallum Froglet, Common Blossom Bat and Grey Headed Flying Fox, in relatively isolated fragments of open forest and woodlands at South West Rocks.

## 5.13 EXOTIC ANIMAL CONTROL

### 5.13.1 Vertebrate Pests

Over the past 12 months vertebrate pest control has again concentrated in the western portion of the district on wild dogs and dingos. The Rural Lands Protection Board (RLPB) continues running a strategic three point baiting program, which collaborates:

- ♦ RLPB aerial baiting on private lands;
- ♦ Private land owners independent baiting; and
- ♦ Crown land (eg NPWS, State Forest, etc).

Rabbit, fox and feral cat management throughout the area is ongoing, with small scale pig trapping also occurring, primarily in the south eastern portion of the region.

### 5.13.2 Companion Animals Act 1998

#### General Provisions and Implementation

The Companions Animals Act came into effect from July 1, 1999. Relevant provisions under the Act aim to reduce deleterious impacts that domestic cats and dogs have on native species via providing regulations that allow penalisation of irresponsible owners.

Under relevant provisions of the Act, Council continues to implement regulations of its Companion Animals Management Plan. The Plan outlines Council's objectives and direction in relation to Companion Animals.

Over the past year, approximately 275 dogs and 45 cats were impounded, which is considerably less than the previous year that recorded 327 dog and 329 cat impoundments.

The local Koala Preservation Society (KPS) received several reports of dog attacks on koalas during the reporting period, with the Koala Hospital receiving 1 individual as a result of a dog attack.

## 5.14 WEED MANAGEMENT

### Operational Works and Control Programs

A summary of the weed control programs implemented by Council is as follows:

- ♦ Eradication of Bitou Bush, Gloriosa, Lantana and Senna continues along the coast as part of the Coastal Weeds Eradication Program.
- ♦ Extensive control programs are underway for spraying of Giant Parramatta Grass with Taskforce on Roadsides.
- ♦ Several new infestations of Groundsel Bush were identified during the reporting period and have been added to control programs and letters sent to private property owners.

- ♦ A significant Water Hyacinth infestation in a large dam affecting three properties was identified. Control measures were discussed with land owners and the need to continually suppress and destroy the weed.
- ♦ Council was contacted by one of Kempsey's large Nurseries to inform of their large infestation of Salvinia Weed in their dam (approximately 2 hectares). The dam was treated by a contractor with reasonably successful results.
- ♦ Aerial inspections were carried out in April 05 for Groundsel Bush infestations in the Grassy Head, Stuarts Point, Clybucca, Collombatti and Kinchela areas. Infestations were mapped with the GPS. Inspection letters have been sent to property owners to notify them that they have infestations on their land.
- ♦ Groundsel Bush treatment control program was then implemented and is close to completion. Infestations have been treated on roadsides and reserves. Control is also being carried out on crown lands in the vicinity of Stuarts Point. Further infestations were treated in the South West Rocks area, parts of the Pacific Highway, and other isolated areas of infestation.
- ♦ A Noogoora Burr infestation in Sid Sutherlands Lane was sprayed to prevent spreading into other roads, reserves and properties.
- ♦ Red Lantana infestations were treated on roads and reserves to prevent spreading into adjoining lands. Areas concentrated on were at Carrai/Warbro Brook Roads, Pipers Creek Road, Nulla Nulla Rd, Mungay Creek Road, Stuarts Point and Grassy Head Roads, South West Rocks Road and other isolated areas of infestation.

### **Private Property Inspection Programme**

The Private Property Inspection Program has incorporated the following works over the last year:

- ♦ Inspection letters have been sent out to landowners for new infestations of Giant Parramatta Grass and Groundsel Bush on their properties
- ♦ Inspections are continually being carried out on private property for Salvinia, Giant Parramatta Grass, Groundsel Bush, Water Hyacinth, Red Lantana, Blackberry, Riparian Vine Weeds and Mother Of Millions as well as other Noxious Weeds.

### **Legal Notices**

No legal procedures regarding Section 18 Notices, Section 20 Notices, Prosecutions or Penalty Notices have been issued by Council during the reporting period.

## **5.14.1 Other Agency Weed Management**

### **NPWS**

NPWS weed management programs continue to be implemented in areas of high conservation (around SEPP 14 and 26) in Arakoon, Limeburners Nature Reserve, Hat Head National Park and at the Clybucca historical sites. These works primarily target Lantana and Bitou Bush infestation through aerial and ground spraying, and hand removal.

### **5.14.2 Community Weed Management**

Weed control and native plant regeneration activities continue to be undertaken by South West Rocks Dune Care, Hat Head Dune Care, Grassy Head Dune Care and Goolawah Dune Care groups.

These groups have provided follow up weed control in areas on the coastal strip of the Macleay Valley, since the initial removal of Bitou Bush and other weeds. The Macleay Valley Working Group is a loose association of 4 dune care groups who have been working in conjunction with a bush regenerator to target priority areas including littoral rainforest and headland communities along a stretch of the mid north coast.

## **5.15 BUSHFIRE MANAGEMENT**

Council finalised its Bushfire Prone Land maps in 2003/2004 to assist in strategic planning and development assessment. Following this, Council introduced bushfire planning guidelines, which will determine the way buildings are sited, designed and constructed for bushfire prone areas.

Council routinely requires Bushfire Risk Assessments to be submitted with DAs in areas considered fire prone.

## **FUTURE DIRECTIONS**

### **What more could be done?**

### **5.16 COMPREHENSIVE VEGETATION MAPPING**

Council has allocated funding for the 2005/2006 financial year to undertake comprehensive vegetation mapping of the eastern portion of the Kempsey Shire. Gaining a greater understanding of the what types of vegetation communities exist and where, will enable improved decision making with regard to protecting ecologically significant areas and aid in achieving ecologically sustainable development.

### **5.17 NORTHERN RIVERS CATCHMENT MANAGEMENT AUTHORITY**

Catchment Management Authorities (CMA) are statutory bodies that are responsible and accountable for engaging

their respective regional communities in the major natural resource management issues.

The Shire falls under the jurisdiction of the Northern Rivers Catchment Management Authority (NRCMA) that extends from the Great Lakes to the Queensland border.

#### **5.17.1 Catchment Action Plan**

The NRCMA is developing a Catchment Action Plan (CAP) for the Northern Rivers Region. The 10 year CAP will guide natural resource management across the Northern Rivers Region. The CAP will build on the Northern Rivers, Upper North Coast and Mid North Coast Catchment Blueprints that currently operate across the Northern Rivers region. The NRCMA is currently conducting consultation on the Draft CAP to gain the northern rivers communities input.

#### **5.18 KEMPSEY SHIRE COMPREHENSIVE KOALA MANAGEMENT PLAN**

The Kempsey Shire has been identified in the draft Koala Recovery Plan (NPWS 2003) as a priority area for a Comprehensive Koala Management Plan (CKMP).

Council is planning to fund the CKMP via contributions under the Environmental Levy and State funding. The CKMP is projected to be prepared in 2006, and will most likely apply to the eastern half of the Shire, with focus on areas of significant Koala populations eg Yarrahappini, Kundabung and Crescent Head.

# At a **GLANCE**

## HUMAN SETTLEMENTS

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<p><b>Population and Demographics</b> – Estimated residential population (ERP) for the Kempsey LGA determined by the then Planning NSW Department for 2001 was 27,700</p> <p><b>Population Growth</b> – predicted to grow at a steady rate for the next 25 years reaching just over 29,000 in 2031</p> <p><b>Age Distribution</b> – Kempsey has an aging population associated with the baby boomers, lower birth rates and a higher percentage of younger people moving out of the Shire for work.</p> <p><b>Local Economy</b> – the economy experience 1.5% growth between 1991 and 2001.</p> <p><b>Income</b> – The percentage of households with weekly income levels less than \$500 is higher in the Kempsey Shire than the Mid North Coast and NSW.</p> <p><b>Employment</b> – Wholesale and retail trade and education, health and community services are the biggest employers in the Shire</p>	<p><b>Population Growth and Development</b> – South West Rocks is experiencing significant growth, as are rural subdivisions.</p> <p><b>Aging Population</b></p> <p><b>Settlement patterns</b> – Kempsey is the largest urban centre, followed by South West Rock, while a significant number of people reside in the central rural area of the Shire.</p>	<p><b>Kempsey Shire Council Ecological Sustainable Development Policy</b></p> <p><b>Planning Controls</b></p>	<p><b>Kempsey Shire Council Ecological Sustainable Development Policy</b></p>
<p><b>Transport</b> – No major changes in lengths of roads in the shire, but 4.76 km of cycle ways are present within the shire.</p>	<p><b>Water Accessibility</b> – Macleay Water has identified water efficiency as the key issue.</p>		<p><b>Integrated Water Cycle Management Strategy</b></p>
<p><b>Water &amp; Sewage Treatment</b> – is managed by Macleay Water, an arm of Kempsey Shire Council. Annual potable water consumption during 2004/2005 was 3954 Mega Litres (ML), which was slightly less than the previous years (2003/2004) 4044 ML</p>	<p><b>Drinking Water Quality</b> – Ongoing algae monitoring regime has indicated that for the past year, taste and odour causing algae numbers have been negligible</p>	<p><b>Waste Management Strategy</b></p>	<p><b>South West Rocks Proposed Reclaimed Water Scheme</b></p>
<p><b>Waste</b> – there was a slight increase in solid waste going to landfill during the past 12 months.</p>			
<p><b>Recycling</b> – There is currently no kerbside recycling services in the Shire, while 11 drop-off centres located around the Shire receive glass, aluminium and paper only.</p>		<p><b>Civic Team Maintenance</b></p>	<p><b>Kerbside Recycling</b></p>

## 6.0 HUMAN SETTLEMENTS

### 6.1 INTRODUCTION

Human settlements are where we live. Cities, country towns and remote rural settlements all form our human environment. The impact that human society has on the environment relates to its size, production and consumption, resource use, technology used to supply goods and services and our effectiveness in preventing or repairing environmental degradation.

In moving toward sustainability in the Kempsey Shire it is important to consider the interrelationships with the natural environment in the decision making processes. To assess the impact that human settlements have on the environment, the following topics will be addressed: population and urban form, water and energy consumption, waste and transport use.

## STATE

**What are the issues for sustainability? And how are they changing?**

### 6.2 POPULATION AND DEMOGRAPHICS

The population of Kempsey Shire from the ABS 2001 raw statistics was 26,934, with the estimated resident population for 2001 27,700.

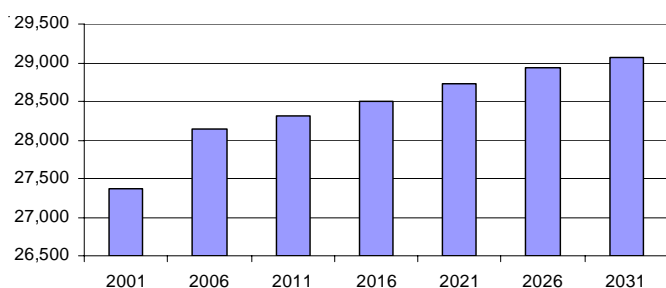
#### 6.2.1 Population Growth

##### INDICATOR – Population Growth

##### Why use this Indicator?

Population growth, including population distribution and migration, combine with high-consumption patterns to put stresses on the environment, through increased demand for land resources and the need to increase infrastructure requirements to support new and growing human settlements.

**Figure 14 – Population Growth with Forecast**



Source: DIPNR, NSW (2004)

### What does this show?

The population of the Kempsey LGA is likely to have grown close to 28,000 in 2005 and is predicted to grow at a steady rate for the next 25 years reaching just over 29,000 in 2031. Population growth is expected to rise over the coming decades as the area attracts retirees and others seeking lifestyle changes. The coastal town of South West Rocks for example is expected to experience rapid population growth.

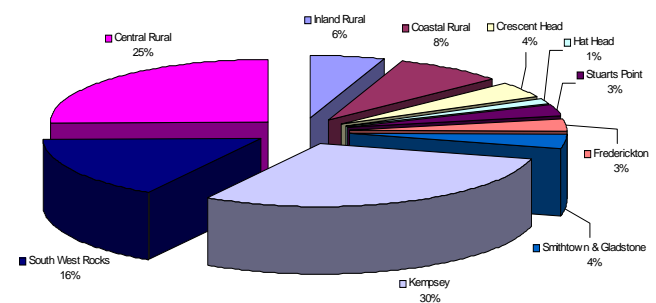
### CONCLUSION:

**Pressure Increasing**

#### 6.2.2 Population Distribution

Changes in population distribution over the Shire have significant implications for the provision of services (eg. transport, water and sewerage). A breakdown of the population distribution is provided in Figure 15 below.

**Figure 15 – Population Distribution within the Kempsey Shire (ABS, 2001)**

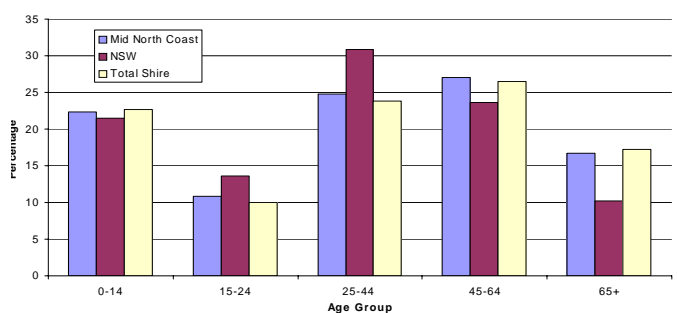


The above Census information indicates that the majority of the population within the Shire reside in the township of Kempsey (7,984 or 30%) and the coastal township of South West Rocks (4,359 or 6%). The central rural region, encompassing the large hinterland areas to the north and south of Kempsey, also represents a large proportion of the population accounting for 25% (6,788).

#### 6.2.3 Age Distribution

The following graph shows the percentage of the Kempsey Shire population within defined age bracket, with regional (Mid North Coast) and State (NSW) comparisons, sourced from (ABS 2001).

**Figure 16 – Age Distribution – Total Shire, Mid North Coast and NSW**



Kempsey Shire has an aging population. The trend is reflected in Figure 16, which shows the Kempsey Shire and Mid North Coast having a much higher percentage of people older than 45 years compared to NSW. The reasons for this trend includes an influx of retirees, an aging population associated with the baby boomers, lower birth rates and a higher percentage of younger people moving out of the Shire to major centres such as Sydney and other large urban areas for education and work.

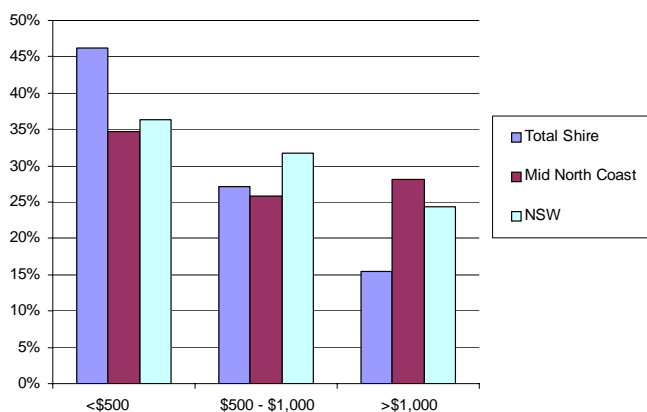
### 6.2.4 Local Economy

The Kempsey Shire annualised growth rate was 1.5% during the period 1991 to 2001 (ABS 2001). The 2001 Census data for Kempsey Shire revealed that although experiencing a slight decline since 1991, the manufacturing industry represented the greatest dollar output in 2001, accounting for \$A 199M dollars. The retail and construction industry were the next highest dollar earners, accounting for \$A 119M and 98M respectively.

### 6.2.5 Income

The following chart represents the weekly household income brackets and the respective percentage of adults within each income bracket for the Kempsey LGA, the Mid North Coast and NSW in 2001.

**Figure 17 – Weekly Household Income - Kempsey Shire, Mid North Coast & NSW**



The percentage of households with weekly income levels less than \$500 is higher in the Kempsey Shire than the Mid North Coast and NSW. Closer analysis of the data revealed that 46% of households in the Shire earned less than \$500 per week in 2001. This compares to 28% for the Mid North Coast and 29% for NSW.

### 6.2.6 Employment

In the week prior to the Census in 2001, 8,396 people in Kempsey were employed. Of these 4,677 were working full time and 3,433 were working part time. The workforce is skilled in community services, construction, agriculture, horticulture and manufacturing. The area has a mix of trade skills and professional skills.

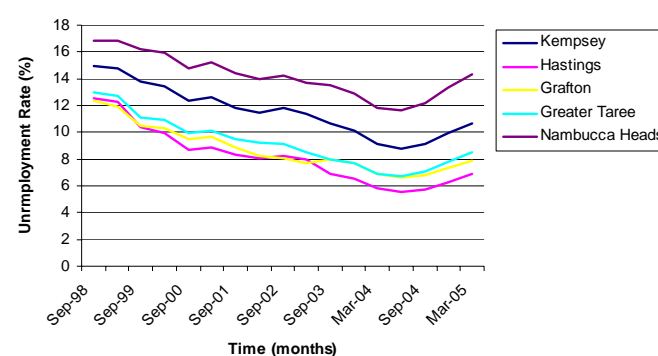
The largest employer in the Kempsey Shire is Wholesale and retail trade, and education, health and community services, employing 43.1 % of the total work force. This figure is similar to those for NSW, where 45 % are employed in the service industry.

These figures may change over the next ten years as tourism continues to grow in the Shire. The provision of infrastructure services is also expected to grow as towns and villages throughout the Macleay Valley Coast continue to expand and grow.

### 6.2.7 Unemployment Rates

The following chart illustrates unemployment rates for Kempsey and neighbouring LGAs and “like type” river towns for comparison. Updated data indicates Kempsey’s unemployment rates continued to decrease from 10.6% in September 2003 reaching a low of 8.8% in June 2004. Unemployment rates have increased during this reporting period to 10.7% in March 2005. Similar trends have been experienced in all neighbouring LGA’s and “like type” river towns during the past 12 months, as shown Figure 18 below.

**Figure 18 – Local and Regional Unemployment Rates**



## 6.3 TRANSPORT

The NSW Roads and Traffic Authority (RTA) is currently in the preliminary stages of designing the proposed Kempsey-Fredericton Pacific Highway bypass, including the selection of the preferred route/s. Federal funding has not yet been directed for the construction of the bypass, which is not expected to be completed for some years. When completed the bypass will remove significant volumes of traffic from the above-mentioned urban areas, though will also encourage an increase in the volume of traffic passing through the Shire.

No updated information regarding estimated lengths of certain road types was available at the time of reporting, however little change is expected from last years figures, presented in the table below, although the estimated length of cycle ways has now been calculated.

**Table 6.1: Road Transport Infrastructure in Kempsey.**

Road Classification	Estimated Length (km)
Regional Roads	142
Urban Roads	161
Non-urban sealed roads	286
Non-urban unsealed roads	574
Bridges and Culverts	7.5
Cycle Ways	4.76

Commercially operated public transport buses operate between Kempsey and some outlying villages and facilitate the transportation of school children. Walking and cycling not only represent environmentally sustainable options, but they also have added potential health benefits.

## 6.4 WATER & SEWAGE TREATMENT

The centralised urban water supply and wastewater systems throughout the Kempsey Shire are the responsibility of Macleay Water. Macleay Water is a separate business unit of Kempsey Shire Council.

Macleay Water’s short and long-term goal is to provide high quality water services to Kempsey Shire’s urban communities in a cost effective and environmentally sustainable manner.

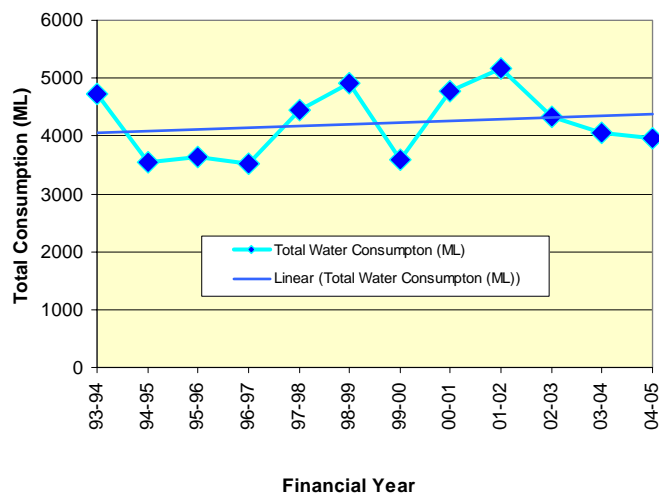
### 6.4.1 Water Consumption

#### INDICATOR – Water Consumption in the Kempsey Shire

##### Why use this indicator?

The extraction of water for human consumption and industry puts pressure on surface and groundwater resources. Population growth and subsequent new development will generally increase the need for clean potable water to be drawn from the environment and as such put an extra strain on surface and groundwater resources.

**Figure 19 – Total Water Consumption**



## What this shows?

Annual potable water consumption during 2004/2005 was 3,954 Mega Litres (ML), which was slightly less than the previous years (2003/2004) 4,044 ML. While consumption rates have trended downwards since 2001/2002 this may reflect less extraction from the Macleay, following the filling of the Stuart Macintyre dam, between 2000-2002. However, the linear trend line in the above chart shows annual potable water consumption rates for the Kempsey Shire are increasing, consistent with current population growth.

**CONCLUSION:** Pressure Increasing

## 6.5 WASTE

### 6.5.1 Solid Waste

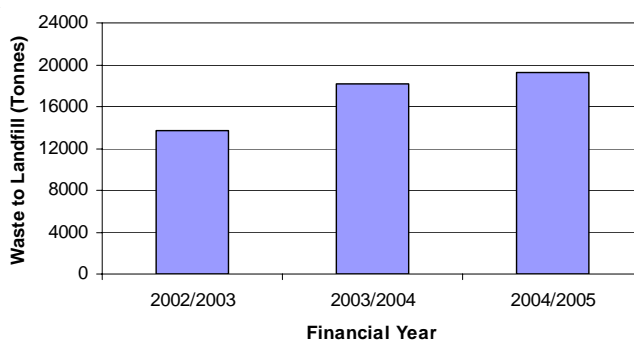
Waste disposal in the Shire has been confined to one facility within the Kempsey Shire; the Kempsey Waste Reveal and Disposal Facility (KWRDF), located along Crescent Head Road. Three former landfill sites located at Stuarts Point, South West Rocks and Bellbrook have been either permanently or temporarily capped and are currently used as waste transfer stations. The centralisation of waste disposal activities rather than having a number of uncontrolled landfills scattered throughout the Macleay provides for a more economical and efficient disposal of waste for the community that minimises environmental impacts.

#### INDICATOR – Waste to Landfill

##### Why use this indicator?

Australia is the second highest producer of waste in the world (second only to the USA) with most landfill sites filling at an unprecedented rate. As a result, more and more space is required to dispose of our waste safely. The volume of waste going to landfill (excluding green waste and recyclables) for the past three financial in the Kempsey Shire is shown in Figure 20 below.

**Figure 20 – Volume of Waste to Landfill**



## What this Shows:

Waste going to landfill increased considerably between 2002/2003 and 2003/2004 with a slight increase during the last 12 months. The increased waste to landfill is most likely indicative of population growth and development that has occurred over the same time period.

### CONCLUSION:

**Pressure Increasing**

## 6.5.2 Recycling

There is currently no provision of kerbside recycling services to households in the Kempsey Shire. Eleven drop-off centres are provided in villages throughout the Shire including provision for recyclable collection at the transfer station sites and the Kempsey Waste Receiving and Disposal Facility (KWR&DF). These centres provide collection receptacles for glass containers, aluminium cans and paper and cardboard.

Green waste, steel, timber and rubber tyres and car batteries are separated where possible at the waste transfer stations for recycling. Resalable items are also separated from the waste stream where possible and on-sold to the public.

## 6.6 STORMWATER

Stormwater collection, pollution and Management Plans are discussed in detail in Chapter 3.0 – Water.

## PRESSURE

### Why is it happening?

## 6.7 POPULATION GROWTH

Population growth places increased pressure on essential services of water supply, wastewater treatment and waste disposal and/or reuse. It also places pressure on land resources as is discussed in Section 2.0 – Land, through the need for new residential subdivisions, industrial land and extractive resources for roads and construction.

## 6.8 DEMOGRAPHICS

Kempsey Shire's aging population will increase pressure on providing services to the aged. Thorough planning is required to ensure that such services can be provided, while still allowing for the needs of the broader community to be met, without compromising environmental health.

## 6.9 SETTLEMENT PATTERNS

As identified in the previous Comprehensive SoE Report, settlement patterns in the Shire appear to have experienced

a significant increase in rural/residential development and development of the coastal fringe, particularly South West Rocks. This increases the pressure on service provision and land resources in these growth areas.

## 6.10 WATER ACCESSIBILITY

Further development in coastal regions is placing pressure on water resources and the need for more efficient use of such resources is vital to ensuring sustainable water usage.

Water efficiency will become increasingly important because of the pressure being applied by the State Government through the implementation of water sharing plans. These plans will spell out how much water (access rights) Macleay Water will be able to extract from a water source. From all current indications, these access rights will be considerably less than current licence allocations.

## 6.11 DRINKING WATER QUALITY

Ongoing algae monitoring regime has indicated that for the past year, taste and odour causing algae numbers have been negligible. However, the dam was taken offline from 27 September 2004 through to 27 December 2004 due to a large string like algae causing blockage in the reticulation network. The dam came back online again from 18 April 2005 to 9 May 2005 to allow for the cleaning of Greenhill Reservoir.

While the dam is offline, it impacts on the environment in that stress on the Macleay River cannot be alleviated during dry times when dam is offline.

## RESPONSE

### What are the responses and how effective are they?

## 6.12 ECOLOGICALLY SUSTAINABLE DEVELOPMENT POLICY

Kempsey Shire Council's Ecologically Sustainable Development Policy as discussed in Chapter 1.0 – Introduction, provides the necessary principles and philosophies to be used in discussion making to future planning and development to move towards sustainability. This will be achieved through the full consideration of the Social, Economic and Environmental elements of proposed planning of human settlements both in the present and for the future.

## 6.13 PLANNING CONTROLS

Planning controls are and will in future be revised and created to ensure the sustainability of Human Settlements within the Kempsey Shire. Table 17 in the previous Comprehensive

SoE Report provides a detailed list of Development Control Plans (DCPs) directly related to sustainability of Human Settlements. No new DCPs have been identified to relate to sustainability of Human Settlements within the past 12 months.

#### **6.14 WASTE MANAGEMENT STRATEGY**

The Kempsey Shire Council Waste Management Strategy continues to plan, develop, provide and manage an environmentally responsible and cost effective waste management system that addresses the needs and expectations of the community. The Waste Management Strategy also aims to act in accordance with the NSW Waste Avoidance and Resource Recovery Strategy 2003 (Resource NSW) targets for reduction in waste to landfill, increasing the recovery and reuse of materials from the waste stream and by aiming to reduce litter and illegal dumping.

A range of site improvement works, identified in the previous Comprehensive SoE Report were completed in mid 2004 at the Kempsey Waste Reveal & Disposal Facility (KWR&DF), located on Crescent Head Road. These improvements have enabled Council to remove materials from the waste stream that can be reused and/or recycled.

Kempsey Shire Council continues to be an active member of MidWaste (Mid North Coast Waste Forum), which is the forum made up of representatives from eight member Councils located on the Mid North Coast of NSW, whose focus is regional co-operation in waste management and waste minimisation.

#### **6.15 URBAN STORMWATER MANAGEMENT PLAN**

The Kempsey Shire Urban Stormwater Management Plan is discussed in detail in Chapter 3 – Water.

#### **6.16 CIVIC MAINTENANCE TEAM**

Kempsey Shire Council's Civic Maintenance Team continues to actively maintain business centres within the Shire to ensure these areas are kept clean and presentable.

### **FUTURE DIRECTIONS**

#### **What more could be done?**

#### **6.17 ESD**

As part of Kempsey Shire Council's ESD Policy, a Local Agenda 21 program will be undertaken. A key element of the program will be the establishment of the ESD Working Group, including Council and public representation, to work toward setting goals for sustainability.

#### **6.18 INTEGRATED WATER CYCLE MANAGEMENT STRATEGY**

Ongoing review of the Integrated Water Cycle Management Strategy (IWCMS) will take place over the coming years, incorporating planning and management of the three main urban water services of water supply, sewerage and stormwater. Planning and managing these services together will help to:

- Meet customer needs;
- Maximise the value of water resources; and
- Minimise the impact of water use on the environment.

#### **6.19 SOUTH WEST ROCKS PROPOSED RECLAIMED WATER SCHEME**

In response to rapid population growth and the sensitive environmental location of

South West Rocks Kempsey Shire Council has proposed a reclaimed water scheme be developed. The aim of this reclaimed water Scheme is to ensure wastewater from the local Sewerage Treatment Plant (STP) is treated to a very high quality and then reused in new residential development and community irrigation initiatives such as South West Rocks golf course and sporting fields. The main benefit of the scheme is that it will reduce the amount of effluent being discharged into the environment via the existing sand dune disposal site and also decrease pressure on water supply demands.

#### **6.20 KERBSIDE RECYCLING**

Kempsey Shire Council, through in Waste Management Strategy, is continuing to work towards the provision of a household kerbside recycling service for plastics, paper and glass. It is hoped that this can be achieved through resource sharing initiatives currently being investigated within the MidWaste group of Councils.

# At a **GLANCE**

## ABORIGINAL AND NON-ABORIGINAL HERITAGE

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<p><b>Aboriginal Heritage</b> –Two more sites have been identified during the past 12 months categorised as an ‘artefact’ and ‘stone quarry’. There is now a total 677 sites recorded in the Shire.</p>	<p>The main pressures facing heritage areas are:</p> <ul style="list-style-type: none"> <li>• Encroachment by development</li> <li>• Community attitudes</li> <li>• Inadequate policy relating to protection of sites</li> <li>• Development of unregistered sites</li> <li>• Natural weathering and aging process</li> <li>• Lack of economic resources for appropriate maintenance</li> </ul>	<p><b>Conservation and Planning Controls -</b></p> <p>All Aboriginal areas/structures within the Kempsey Shire LGA sites are protected under the National Parks and Wildlife Act (1974), however, only a small number sites have specific protection measures in place.</p>	<p>Council continues to update its list of sites as new sites are identified.</p>
<p><b>Non-Aboriginal Heritage</b> – There are 87 identified Non-Aboriginal heritage sites in the Shire</p>		<p>Major Non-Aboriginal sites include the Trial Bay Gaol and the Smokey Cape Lighthouse, which are protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).</p>	

## 7.0 ABORIGINAL AND NON-ABORIGINAL HERITAGE

### 7.1 INTRODUCTION

Heritage is important because it provides cultural identity to communities and nations. It also provided opportunities for future generations to gain knowledge and understanding of their past. By linking our past and present we gain an appreciation of the way we were, where we've been and where we should be going. Australian history and the history of the Kempsey Shire can be separated into two distinct eras of pre European settlement and post European settlement.

## STATE

**What are the issues for sustainability? And how are they changing?**

### 7.2 ABORIGINAL HERITAGE

The Macleay area is part of the territory of the Thunghutti (Dhunghutti), which extends from Point Plomer to Macksville, inland to Kemps Pinnacle. Prior to European settlement, this area supported a large and densely concentrated aboriginal population.

#### 7.2.1 Identified Aboriginal Sites, Structures and Landscapes

The DEC (2005), through the NSW NPWS' Aboriginal Heritage Information Management System (AHIMS), provides a database that records all known aboriginal sites in NSW, including the Kempsey Shire. However, explicit details cannot be provided due to legal requirements.

Council employs an Aboriginal Liaison Officer to assist with establishing links with the aboriginal community in relation to the identification and protection of sites.

When an aboriginal heritage site is identified or believed to occur, it must be reported to the NSW National Parks and Wildlife Service, so that the appropriate course of action for conservation, in consultation with the Land Council, can be undertaken.

#### INDICATOR – Number and Nature of Aboriginal Sites

##### Why use this indicator?

This indicator provides an assessment of the number and types of identified aboriginal heritage sites. The following recorded sites and structures should be regarded as indicative as all sites are possibly not known.

**Table 7.1: The number and Nature of Aboriginal sites in the Kempsey Shire**

Site Feature	Number Previously Recorded	Number Identified during 2004/2005
Aboriginal Resource and Gathering	1	0
Aboriginal Ceremony and Dreaming	26	0
Art (Pigment or Engraved)	1	0
Artefact	267	1
Burial	28	0
Ceremonial Ring	25	0
Conflict	5	0
Earth Mound	148	0
Fish trap	1	0
Grinding groove	1	0
Habitation Structure	-	0
Hearth	1	0
Non-Human Bone and Organic Material	-	0
Ochre Quarry	-	0
Potential Archaeological Deposit (PAD)	-	0
Shell	150	0
Stone Arrangement	6	0
Stone Quarry	6	1
Modified tree (Carved or Scarred)	9	0
Water Hole	-	0
<b>Total</b>	<b>675</b>	<b>2</b>

##### What this shows:

This shows that there are many significant Aboriginal Heritage sites in the Kempsey Shire. Two more sites have been identified during the past 12 months categorised as an 'artefact' and 'stone quarry'. The total number of sites recorded above (677) has increased from 301 recorded in the 2000 SoE Report.

#### CONCLUSION:

**Situation Improving**

### 7.3 NON ABORIGINAL HERITAGE

Items of non Aboriginal heritage refer to those buildings, works, relics or places of historical, scientific, cultural, social, architectural, or aesthetic significance that have occurred in the Shire post European settlement. It also includes areas of natural significance, such as rainforests that have remained intact after European settlement.

#### 7.3.1 Heritage Listed Sites, Structures and Landscapes

#### INDICATOR – Number of Sites of Heritage Significance

##### Why use this indicator?

This indicator provides an assessment of the number and types of identified of heritage items of non-Aboriginal heritage significance and will aid in the protection of these sites for future generations to enjoy. The following Table lists the number of sites of National, State and Local post European and natural heritage significance occurring in the Shire.

**Table 7.2: Number of Non-Aboriginal Heritage Sites in the Kempsey Shire**

Site	National Significance			State Significance			Local or Regional Significance	
	Register of National Estate	World Heritage List	Commonwealth Heritage List	NSW Heritage Act	NSW Government Gazette	State Government Agency	Regional Environmental Plan (REP)	Local Environmental Plan (LEP)
<b>Natural</b>								
Arakoon State Recreation Area	✓							
Banda Banda Flora Reserve	✓							
Bellbrook Conservation Area	✓							
Central Eastern Rainforest Reserves (Hastings-Macleay Group)		✓						
Central Eastern Rainforest Reserves (New England Group)		✓						
Cybucca Nature Reserve Proposal	✓							
Hat Head National Park	✓							
Limeburners Creek Nature Reserve	✓							
New England National Park (1978 boundary)	✓				✓			
New England National Park (1989 boundary)	✓				✓			
North Eastern Rainforest World Heritage Area				✓				
The Castles Flora Reserve	✓							
Willi Willi Caves Nature Reserve	✓							
Yarravel Nature Reserve	✓							
Yessabah Caves Area	✓							
<b>Post European Settlement</b>								
All Saints Anglican Church and Grounds							✓	✓
All Saints Catholic Church and Hall								✓
Arakoon House							✓	✓
Bride Over Five Day Creek				✓				✓
East Kemspey Public School								✓
Frederickton Post Office							✓	✓
Frederickton Public School	✓				✓			
Frederickton School of Arts							✓	✓
Frederickton Shelter Shed	✓							
Gladstone Courthouse and Police Station	✓						✓	✓
Gladstone Police Register							✓	
Headmasters Residence - Frederickton	✓							
Kempsey Courthouse	✓						✓	✓
Kempsey District Hospital					✓			
Kempsey Post Office	✓			✓				✓
Kempsey Rail Bridge Over Macleay River				✓				

Site	National Significance			State Significance			Local or Regional Significance	
	Register of National Estate	World Heritage List	Commonwealth Heritage List	NSW Heritage Act	NSW Government Gazette	State Government Agency	Regional Environmental Plan (REP)	Local Environmental Plan (LEP)
Kempsey Railway Station				✓	✓			✓
Kempsey Showground Site (including ring and main pavilion)								✓
Kempsey Traffic Bridge					✓			
Kempsey Police Station, including Police Residence								✓
Macleay River Hotel								✓
Oddfellows Hall							✓	✓
Pacific Guest House					✓		✓	✓
Pipers Creek Lime Kilns	✓				✓			✓
Pilots Residence and 3 Boatmen's Cottages							✓	✓
Signal Station and Flagstaff, South West Rocks								✓
Smokey Cape Lighthouse	✓		✓	✓			✓	✓
St Andrew's Presbyterian Church and Hall				✓			✓	✓
The English Scottish and Australian Chartered Bank								✓
Trial Bay Gaol	✓							
Trial Bay Gaol and German Graves					✓		✓	✓
West Kempsey Post Office								✓
West Kempsey Hotel							✓	✓
Yarrahapinni Primary School					✓			

**Note:** There is a considerable degree of overlap between sites, with many being listed on more than 1 register.

## What does this show?

This indicator demonstrates that in total there are 34 sites of post European settlement heritage significance and 16 sites of natural heritage significance occurring in the Shire. These sites require appropriate management to maintain historical 'snapshots' of the Shire.

Closer examination of the National Heritage Registers and Lists revealed that a further 5 sites are listed as an 'indicative place', 3 under the Register of the National Estate and 2 under the Commonwealth Heritage List. An indicative place means that data has been entered into the relevant Register or List and the place is at some stage in the assessment process, with a formal decision on whether the place should be entered in the Register or List, yet to be finalised.

Preliminary results of the comprehensive Community Based Heritage Study has identified numerous other sites throughout the Shire recommended to be listed as items of environmental heritage.

## PRESSURE

### Why is it happening?

The main activities continuing to place pressure on heritage areas are:

- ♦ Encroachment by development
- ♦ Community attitudes
- ♦ Inadequate policy relating to protection of sites
- ♦ Development of unregistered sites
- ♦ Natural weathering and aging process
- ♦ Lack of economic resources for appropriate maintenance

## RESPONSE

### What are the responses and how effective are they?

## 7.4 CONSERVATION AND PLANNING CONTROLS

### 7.4.1 Protection for Aboriginal Heritage Sites

All Aboriginal areas/structures within the Kempsey Shire are protected under the National Parks and Wildlife Act (1974), however, only a small number of sites have specific protection measures in place. Licenses under the National Parks and Wildlife Act (1974) are required under the Act for works, which have the potential to impact on Aboriginal Heritage either positively or negatively. Licences are required not only for activities which may destroy or damage objects or places, but for conservation works or relocation of Aboriginal heritage objects.

## 7.4.2 Protection for Post European Settlement Heritage Sites

A number of post European settlement heritage sites and structures throughout the Kempsey Shire are protected under various Registers and Lists identified in Table 7.2 above. Such examples include, the Smoky Cape Light House, listed on the Commonwealth Heritage List and Trial Bay Gaol on the Register of National Estate. Both these sites are protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), which requires that approval is obtained before any action takes place which has, will have, or is likely to have, a significant impact on the Commonwealth and/or national heritage values of a listed place.

### Local Heritage Study

Council is close to finalising the Kempsey Shire Community Based Heritage Study. Preliminary results have indicated that numerous sites of post European settlement heritage significance exist throughout the Shire. The study has identified those items which are already listed on various registers and those which are recommended to be placed on the relevant registers.

## FUTURE DIRECTIONS

### What more could be done?

Council continues to update its lists and maps of aboriginal and non-aboriginal heritage sites. New sites become uncovered with new development and redevelopment of sites. The requirement for inspection of new sites by an archaeological consultant in conjunction with the local Aboriginal Lands Council aims to ensure no sites are disturbed.

# At a **GLANCE**

## COUNCILS ENVIRONMENTAL PERFORMANCE

STATE	PRESSURE	RESPONSE	FUTURE DIRECTIONS
<p><b>Energy Consumption</b> – Council's total electricity consumption for the reporting period was approximately 1,094,743.44 kWh</p>	<p><b>Budget</b> – The budget data figures for this year follow a similar trend to previous years with a steady increase in operating expenditure, whilst again a fluctuation in capitol expenditure saw a marked decrease in this figure. The data also indicates there was a budget surplus for the 2004/2005 reporting period.</p> <p><b>Community Concerns</b> – Community surveys indicate that all environmental projects were rated as 'important' to 'very important' with water quality programs rated by respondents to be of the highest importance. Other environmental projects the community would like council to consider for future funding, were 'environmental protection and beautification', 'recycling service', 'control of weeds' and 'river maintenance'</p>	<p><b>Environmental Works Program Levy</b></p>	<p><b>Purchasing of more environmentally friendly vehicles</b> – Clean Car Benchmarks</p> <p><b>Purchasing more efficient and renewable energy supplies</b> – Green Power</p> <p><b>Development of an environmental management plan.</b></p>
<p><b>Water Consumption</b> – Council used 136,825kL of water 2004/2005, accounting for 4.47% of the total water consumed in the Shire.</p>		<p><b>Regulatory and Planning Assessment and Compliance</b> – Council has established a compliance register to measure the number and types of non-compliances.</p>	
<p><b>Waste Generation</b> – Council produces a wide range of liquid and solid wastes many of which may have untapped potential for recycling or reuse.</p>		<p><b>Local Agenda 21 Program</b></p> <p><b>Triple Bottom Line Reporting</b> - Council has developed a Triple Bottom Line reporting template for all business paper reports to ensure that social, economic and environmental considerations are duly addressed to enable informed decision making for sustainable outcomes.</p>	
<p><b>Paper Usage</b> – Council used 3,735 reams of non-recycled copying paper (includes coloured &amp; white paper), 31,000 sheets of letterhead paper and 200 memo pads at a total approximate cost of \$23,813.</p>		<p><b>Environmental Management</b> - A site Water Management System has been developed for the Kempsey Waste Reveal &amp; Disposal Facility (KWR&amp;DF) with regard to the protection of groundwater and surface waters within the vicinity of the site.</p>	
<p><b>Fuel Consumption</b> – Total fuel consumption (including all vehicles fleets) for Kempsey Shire Council for 2004/2005 was approximately 506,000 litres</p>		<p><b>Work Practices</b> – Kempsey Shire Council does not currently have a corporate Environmental Management Plan</p>	
		<p><b>Recycled Content Purchasing Policy</b> – Council signed up to the Buy Recycled Business Alliance (BRBA) in late 2004. BRBA is a non-profit pro-Sustainability alliance of businesses that are united by a commitment to promote the purchase and use of recycled content products (RCPs) and materials.</p>	

## 8.0 COUNCIL'S ENVIRONMENTAL PERFORMANCE

### 8.1 INTRODUCTION

Following on from last years Comprehensive Report, this section of the State of the Environment Report aims to address Kempsey Shire Council's performance in moving toward sustainability. Many of the issues and environmental indicators contained within the State of the Environment Report have been quantified for the first time and comparisons to previous years data may not be possible. However, these indicators will provide a means to measure Council's performance in future reporting years.

## STATE

**What are the issues for sustainability? And how are they changing?**

### 8.2 ENERGY CONSUMPTION

While the Kempsey Shire Council is not regarded as a major producer of greenhouse gasses, Council needs to lead by example with regard to reducing greenhouse gasses.

#### INDICATOR – Council Energy Consumption

##### Why use this indicator?

Energy consumption in the form of electricity from fossil fuel consuming power plants produces greenhouse gases. For every kilowatt-hour of electricity produced, a proportion of CO<sub>2</sub> is emitted to the atmosphere. Whilst electricity production occurs outside of the Kempsey Shire, the impact on the greenhouse effect directly affects the environment of the region.

##### What this shows:

Council's total electricity consumption, sourced from Country Energy 2005, for the reporting period was calculated to be approximately 1,094,743.44 kWh. This figure includes electricity consumed in all Council owned buildings, workshops, and fixtures operated by Council.

The Australian Greenhouse Office annually determines each State's Greenhouse coefficient, based on their respective sources of electricity generation. The NSW Pool Coefficient is an indicator of the average emissions intensity of electricity sourced from the electricity grid in NSW. It represents the emissions of greenhouse gases (in tonnes of carbon dioxide equivalent) per MWh of electricity supplied from the 'pool' of major power stations (Australian Greenhouse Office 2005). Therefore using the NSW 2005 Pool Coefficient of 0.913 tonnes/MWh, it can be calculated that Council's

consumption of 1097.74 MWh of electricity produced 1,002.78 tonnes of CO<sub>2</sub> in 2004/2005.

Historical energy consumption data was not available for comparison but annual electricity consumption totals will continue to be collected for future reports, with a view to identifying areas for improvement in energy efficiency. One such improvement may include purchasing more efficient and renewable energy supplies (eg. promote the purchasing of Green Power).

### 8.3 WATER CONSUMPTION

Extraction of water from the environment for Human Settlements put pressure on the natural environment and water resources as has been discussed in detail in Chapter 3 – Water.

#### INDICATOR – Council's Water Consumption

##### Why use this indicator?

Council needs to take a leading role in driving water efficiency within the Kempsey Shire LGA.

**Table 8.1: Council Water Consumption**

Water Meters	Total Consumption (kL)
Parks, Ovals and Ancillaries	23,799
Water Installations	2
Sewer Installations	71,511
Council Buildings/Public Uses	41,513
<b>Total metered consumption - council operations</b>	<b>136,825</b>
<b>Total shire metered consumption</b>	<b>3,057,902</b>

Where:

**WATER INSTALLATIONS** - All meters connected to water treatment plants

**SEWER INSTALLATIONS** - All meters connected to sewer treatment processes, works, pump stations.

**COUNCILS BUILDINGS / PUBLIC USES / PARKS, OVALS AND ANCILLARIES** - All meters connected to council buildings, civic centre, baby health centres, halls, libraries, community service buildings, public toilets, swimming pools, parks, sporting fields, cemeteries, fish cleaning tables, BBQ facilities, tennis courts, beach showers.

##### What this shows:

This indicator demonstrates that during the 2004/2005 financial year Council water consumption accounted for approximately 136,825 kL or 4.47% of the total water consumed in Kempsey Shire. This figure has increased from 119,845 kL in 2003/2004 financial year.

### 8.4 WASTE GENERATION

Kempsey Shires Council operations produce a wide range of liquid and solid wastes. Councils revised Waste Management Strategy aims to quantify generation rates and composition of wastes generated in all aspects of Council's endeavours.

Council is currently looking at individual areas of waste generation and determining the best options for reducing, reusing and recycling materials and resources from all council operations in conjunction with the Resource Recovery Coordinator.

## 8.5 PAPER USAGE

### INDICATOR – Office Paper Usage

#### Why use this indicator?

The use of non-recycled or recycled content office paper impacts upon the greenhouse effect due to a reliance on forestry resources. Council does not currently have a recycled content purchasing policy with regard to paper.

#### What this shows:

In the 2004/2005 reporting period, Council used approximately 3,735 reams of non-recycled copying paper (includes coloured & white paper), 31,000 sheets of letterhead paper and 200 memo pads at a total approximate cost of \$23,813.

A trial run (approximately 50 reams) of recycled paper was purchased during the reporting period for general copying and use in Council minute taking.

## 8.6 FUEL CONSUMPTION

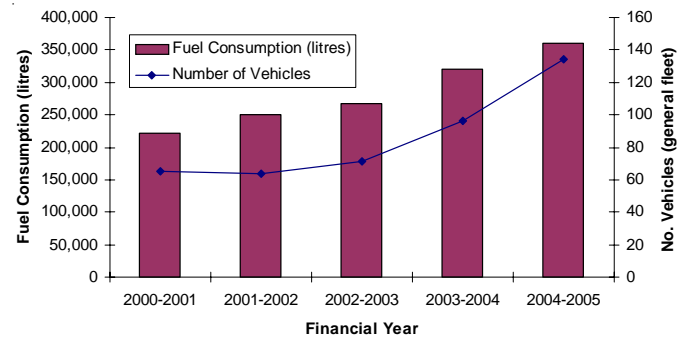
The large area encompassed by Kempsey Shire Council often requires relatively long travel distances between work sites. Despite the fact that air pollution is not regarded as a major problem in the Shire, there is potential to reduce greenhouse emissions through effective management of Council's fleet of vehicles. This could range from continuing to ensure vehicles are running efficiently and cleanly (i.e. appropriate servicing), minimising kilometres travelled (i.e. via car pooling, work schedules) or by investigating alternative technologies.

Kempsey Shire Council's vehicle fleet serves a wide range of purposes and therefore includes a variety of vehicles, from heavy machinery through to light commercial 4WD, and council sedans and wagons. Table 8.2 shows the generalised categories the vehicle fleet is divided into.

Total fuel consumption (including all vehicle fleets) for Kempsey Shire Council for 2004/2005 was approximately 506,000 litres. However this figure is considered to be relatively conservative due to human error (ie. incorrect litre readings during re-fills and missing data regarding fills that occurred outside council's fuel card system). Fuel consumption data for all fleet categories except "General" was not recorded prior to 2004/2005 and so total fuel consumption could not be accurately quantified and compared to previous financial years.

The number of vehicles operated along with recent and historical fuel consumption data for Kempsey Shire Council's "General" vehicle fleet only is displayed in Figure 21 below.

**Figure 21 – Council Fuel Consumption and Number of Vehicles**



#### What this shows:

Over the past 5 years the number of vehicles in Council's "General" fleet has increased along with fuel consumption. The reason for this increase can be attributed to an increase in staff numbers and thus vehicles required to resource the needs of the broader community associated with an increase in population and development pressures as identified throughout this report.

**Table 8.2: Councils Vehicle Fleet**

Fleet	Vehicles
General	Earth moving equipment, heavy and light commercial vehicles, minibus, 4WD, sedans and wagons, ride on mowers, tractors, trailers and street sweeper
Garbage	Garbage Collecting Trucks and Landfill Compactors
SES	4WD and Utilities
Community Services	Minibuses
Water	Backhoes, heavy and light commercial vehicles, 4WD and utilities, sedans and wagons, trailers and motorcycle.

## PRESSURE

### Why is it happening?

#### 8.7 BUDGET

The following table presents an update of Kempsey Shire Councils total operational and capital expenditure for the last financial year in comparison to the 4 previous financial years:

**Table 8.3: Kempsey Shire Council Budget Summary**

Financial Year	Expenditure (\$)			Revenue (\$)		
	Operating	Capital	Total	Operating	Capital	Total
2000/01	32,498,885	18,012,817	50,511,702	35,644,864	14,898,225	50,543,089
2001/02	34,796,472	24,590,618	59,387,090	39,356,273	20,036,157	59,392,430
2002/03	36,116,649	15,435,504	51,460,153	36,871,355	14,675,938	51,547,293
2003/04	39,163,254	28,116,757	67,280,011	43,165,780	24,054,170	67,219,950
<b>2004/05</b>	<b>41,350,968</b>	<b>19,384,582</b>	<b>60,735,550</b>	<b>42,651,870</b>	<b>18,104,087</b>	<b>60,755,957</b>

The budget data figures for this year follow a similar trend to previous years with a steady increase in operating expenditure, whilst a fluctuation in capital expenditure saw a marked decrease in this figure. The data also indicates there was a budget surplus for the 2004/2005 reporting period.

#### 8.8 COMMUNITY CONCERNS

A community survey completed in March 2004 by Micromex Marketing Services Pty. Ltd., identified the following top ten issue of community concern:

1. Provision of recycling facilities
2. Maintaining road surface
3. Generating local employment opportunities
4. Improving the overall condition of roads
5. Noxious Weed control
6. Youth services and facilities
7. Planning for an ageing community
8. Provision of services and facilities for an ageing community
9. Council's response time to requests
10. Managing development in the Shire

The above list indicated there was significant concern within the Kempsey Shire community for issues that affected sustainability and the environment in 2004.

Micromex Marketing Services Pty Ltd conducted a similar survey in March 2005. This survey included community opinion relating to more specific environmental matters. Table 8.4 shows the results of community survey where respondents were asked to rate the importance (on a scale of 1 to 5, where 5 = very important and 1 = not important at all) of a predetermined list of environmental projects that could be funded by the environmental levy.

**Table 8.4: Community Opinion on Importance of Environmental Projects to Gain Funding From Environmental Levy**

Environmental Projects	Importance rating %			Mean Rating (Out of 5)
	High (4-5)	Medium (3)	Low (1-2)	
Water quality monitoring programs	92.3	6.3	1.4	4.7
Flood mitigation	89.3	6.7	4	4.5
Riverbank Stabilisation and stream bank erosion	87.6	10.4	2	4.5
Environmental sustainability programs	87	10.3	2.7	4.4
Stormwater quality improvements	84.9	11.7	3.3	4.4
Acid sulphate soil remediation	78.2	17.1	4.8	4.2
Wetland restoration	77.3	17.4	5.4	4.2

**Source:** Micromex Research 2005

#### What this shows:

On a whole, all environmental projects were rated as 'important' to 'very important' with water quality programs rated by respondents to be of the highest importance.

Furthermore, 30% of the respondents stated that there were other environmental projects they would like council to consider for future funding, with the most common response being 'environmental protection and beautification', 'recycling service', 'control of weeds' and 'river maintenance' (Micromex Research 2005).

## RESPONSE

### What are the responses and how effective are they?

#### 8.9 ENVIRONMENTAL LEVY WORKS PROGRAM

Kempsey Shire Council conducted a number of significant environmental projects during the 2004/2005 financial year.

The following table provides a breakdown of specific environmental program works undertaken in 2004/05 and related budgetary information including the Environmental Levy.

**Table 8.5: Environmental Projects and Environmental Levy**

Item	2004/2005
<b><u>Income</u></b>	
Levy 2004/2005	\$401,302.00
<b><u>Expenditure</u></b>	
<b><u>Revenue Expenditure</u></b>	
Pola Creek Rehab	\$ 4,835.68
Killick/Saltwater Creek	\$ 11,600.00
Macleay River Floodplain	\$ 8,482.39
Boyers Lane Wetland Management Plan	\$ 26,048.35
Acid Sulfate Soils Hot Spot Programme	\$ 40,825.69
Beachwatch	\$ 22,000.00
Loan Repayments	\$202,753.49 <b>\$ 316,545.60</b>
<b><u>Loan Expenditure</u></b>	
SWR Drainage (South of Landborough Street)	\$132,020.41
Flood Mitigation programme 2004/05	\$ 22,165.04
Flood Mitigation programme 2003/04 (\$694,500)	\$ 92,157.90
Crescent Head Waste Depot Upgrade	\$ 73,178.28
Council Depot - EPA Programme	\$114,870.62
Drainage – Spencerville	\$ 96,102.36
Saleyards - EPA Programme	\$394,158.42
Swimming Pools - EPA Programme	\$179,235.66 <b>\$1,103,888.69</b>
<b><u>Total Expenditure</u></b>	
	<b>\$1,420,434.29</b>

## 8.10 CIVIC MAINTENANCE

As previously discussed in Chapter 6 – Human Settlements, Kempsey Shire Council established Civic Maintenance Teams to actively maintain the cleanliness and appearance of business and public areas.

### INDICATOR – Compliance Register

#### Why us this indicator?

Council has now implemented a compliance register to provide a measurement of the number and types of non-compliances and development conducted without consent. The total number of non-compliances during the reporting period was 16. Table 8.6 lists the number of each non-compliance category.

**Table 8.6: Compliance Register**

Non-Compliance Category	Number Reported 2004-2005
Unauthorised Development	8
Compliance of Development Consent	5
Unauthorised Land Clearing	2
Quarries	1
<b>Total</b>	<b>16</b>

#### What this shows:

As this system is in its initial stages, insufficient data has been collected to draw any clear conclusion is respect to trends, however it does indicate that there were a number of non-compliance issues throughout 2004-2005.

This indicator will be reviewed annually and reported in future State of the Environment Reports, to determine any apparent trends.

Council's work in the area of policing compliance remains predominantly reactive in nature (i.e. to community concerns). However, Council is planning to conduct more proactive compliance auditing of industrial and commercial operation within the Shire along with large developments.

### **8.11 LOCAL AGENDA 21 PROGRAM**

Kempsey Shire Council has committed to undertaking a Local Agenda 21 program.

Local Agenda 21 provides an operating framework for all of Council's operations and decision-making. It is about visioning, integrating policy, promoting innovation and establishing an Action Plan with targets and goals for achieving sustainable outcomes. Sustainability can be closely linked to resource efficiency, cost management and performance indicators. It involves Council looking toward the future while considering the principles of ESD.

During this reporting period, a Local Agenda 21 Team was established and in May 2005, Kempsey Shire Council finalised the appointment of community representatives forming part of the committee. The first meeting of this Committee is scheduled for the end of September 2005, with the objective of providing an introductory session for all members of the committee, involving a brief training workshop on ESD Principles and examples of other Local Agenda 21 Programs. It is envisaged that this committee will help guide the process for preparing an overall ESD Strategy.

### **8.12 ESD – TRIPLE BOTTOM LINE REPORTING**

Kempsey Shire Council has developed a Triple Bottom Line (i.e. Environmental, Social and Economic) reporting template for all business paper reports. The aim of the template is to ensure that social, economic and environmental considerations are duly addressed to enable informed decision making for sustainable outcomes.

### **8.13 ENVIRONMENTAL MANAGEMENT – KWR&DF**

A Site Water Management System has been developed for the Kempsey Waste Receiving & Disposal Facility (KWR&DF) with regard to the protection of groundwater and surface waters within the vicinity of the site. On-site surface water is channelled via a perimeter spoon drain into a sedimentation dam prior to being re-irrigated on-site. Leachate is captured on-site separately and is channelled into a separate holding dam and also used for on-site irrigation.

As part of this System the Kempsey Shire Council undertakes quarterly sampling of groundwater, surface water and leachate water both within (onsite) and surrounding (offsite) the KWR&DF with an annual report submitted to the NSW EPA evaluating the overall performance of the System. Preliminary results suggest overall water quality being captured within stormwater and leachate systems is of reasonable quality, with no impacts identified offsite.

### **8.14 RECYCLED CONTENT PURCHASING POLICY**

Council committed up to the Buy Recycled Business Alliance (BRBA) in late 2004. BRBA is a non-profit pro-Sustainability alliance of businesses that are united by a commitment to promote the purchase and use of recycled content products (RCPs) and materials. Council is currently trying to form a team of staff to develop an aim, mission and set of policies in order to implement a Recycled Material Content Purchasing Policy that requires specifications for purchased products to include a specified recycled material content where they can contain recycled materials (i.e. say minimum 10% recycled materials).

## **FUTURE DIRECTIONS**

### **What more could be done?**

Kempsey Shire Council will continue to look to ways to improve its operations as it moves toward ecological sustainability. Particular areas for focus in the next 12 months may include:

- ♦ Purchasing of more environmentally friendly vehicles for the council vehicle fleet based on the NSW Clean Car Benchmarks;
- ♦ Audit and implementation of an energy savings action plan; and
- ♦ Development of an environmental management plan.

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