

# STATE OF THE ENVIRONMENT REPORT



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**A Report on the State of the Environment within the  
Nambucca Shire Local Government Area**

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**NAMBUCCA SHIRE COUNCIL  
2006/2007**



# **STATE OF THE ENVIRONMENT REPORT**

## **A Report on the State of the Environment within the Nambucca Shire Local Government Area**

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**NAMBUCCA SHIRE COUNCIL  
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# 1.0 INTRODUCTION

## 1.1 STATE OF THE ENVIRONMENT REPORTING

State of the Environment (SoE) reports contain information about the condition of environmental aspects in an area. They are prepared in order to give an assessment of the human pressures exerted upon an area, and are used to outline actions taken to address adverse impacts and improve environmental conditions. SoE reports are public documents that provide an opportunity to further community awareness and understanding of local environmental issues. In the long-term, SoE reporting will allow trends in environmental conditions to be analysed, thereby providing a sound basis for determining which policies and programs are successfully achieving environmental goals. SoE reports are produced by international organisations and most industrialised countries. Most Australian states and many Local Governments produce regular SoE reports (Hawkesbury-Nepean Catchment Management Trust, 1999).

The *Local Government Act 1993* requires Local Councils in New South Wales to produce an annual SoE report. In late 1997, the Act and the *Local Government (General) Regulation 1993* were amended to address problems identified in previous requirements and to strengthen links between SoE reporting and Councils' strategic planning processes. The amended Act requires Councils to consider the principles of ecologically sustainable development (ESD) in a number of areas, including all activities in the SoE reporting process, and to cover the eight environmental sectors of land, water, biodiversity, air, waste, noise, Aboriginal heritage and non-Aboriginal heritage.

The amendment to the Regulation requires that a comprehensive SoE report be prepared by 30 November for the first year after each Council election, and that a comprehensive or supplementary report be prepared for intervening years. In relation to the preparation of all SoE reports, Councils are required to:

- consider any guidelines and directions that relate to the preparation and content of SoE reports issued by the Director-General of the Department of Local Government;
- consult with community;
- involve the community in monitoring changes to the environment and
- produce a report that can be readily understood by the general community.

Nambucca Shire Council's first SoE report was produced in April 1994 and dealt primarily with the community's concerns relating to the local environment. Subsequent SoE reports have been prepared by Council in accordance with environmental guidelines for SoE reporting by Local Government.

## 1.2 AIMS AND OBJECTIVES

The 2006/2007 SoE Report is a *supplementary* report for the period from 1 July 2006 to the 30 June 2007. The purpose of this supplementary report is to identify any new environmental impacts since the Councils last SoE report and to update the trends in environmental indicators that are important to each environmental sector. The information in this report will include:

- a summary of the environmental attributes of the Local Government Area;
- The human impacts on the environment;
- a public record of Government, industry and community activities in relation to the protection and restoration of the environment and
- a basis to monitor the environmental resources of the area and make future environmental management decisions.

## 1.3 STRUCTURE OF THE SoE REPORT

This SoE report has been produced to address the eight environmental sectors of land, water, biodiversity, air, waste, noise, Aboriginal and non-Aboriginal heritage. The pressure-state-response model (PSR) was adopted to address these sectors. The pressure component identifies and describes the pressures that human activities exert on the environment, the state component identifies and describes the current and projected state of the environment and the response component of the model identifies and describes the response from Council, Government Departments, industry and the community to pressures on, and state of, the environment (Hawkesbury-Nepean Catchment Management Trust, 1999).

Environmental indicators have been used within the PSR framework to provide information on the changes to a range of environmental variables. An environmental indicator is defined as “an aspect of the natural world or built environment that can be monitored to provide information on environmental conditions and trends. Environmental indicators include physical, chemical, biological and socio-economic measures of the environment (such as measurements of contaminants in soil, measurements of the health of plant species and the number of motor vehicles per household) that can be used to assess natural resources and environmental quality” (Department of Local Government, 1998). Updating environmental indicators in subsequent SoE reports will provide decision makers with the information required to formulate management actions, to monitor the effectiveness of current policies and programs and to revise them where appropriate.

Environmental indicators were chosen following consideration of Regional, State and National recommended indicators and the ability of Council to obtain comparative and reliable long-term results.

In 2000, representatives of Local Government Areas and State Agencies involved in natural resource management on the North Coast of NSW agreed on a common set of indicators for Local Government SoE reporting. The adoption of agreed indicators by all 16 North Coast Local Government Areas (including Nambucca Shire) will provide the opportunity for State Agencies and the Local Governments to identify and analyse environmental trends which will inform future planning and management decisions in the region. A desktop review of the 1999/2000 North Coast Local Government Area SoE reports identified that they reflected the use of most agreed indicators and were much more rigorous in comparison to the 1997/1998 versions (NSW Premier's Department, 2000).

The ***NSW NORTH COAST REGIONAL INDICATORS*** referred to above are outlined throughout this report and listed in Appendix C. Due to a paucity of information and some information sources not being available in accessible formats, some agreed regional indicators are not immediately measurable. An example of this is the regional indicator Extent and Degree of Change of Native Vegetation. While areas of native vegetation cleared on State Forest land and private land (under *Native Vegetation Conservation Act 1995* approvals) are available, areas of unauthorised clearing and clearing under legislative exemptions are not.

## 1.4 ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

Recent legislative amendments and related regulations have clarified the links between SoE reporting and the strategic process of Council Management Planning. The main aims of these amendments are to enhance the strategic value of SoE reporting to the Council and community and to ensure that the Council is accountable for its application of ecologically sustainable development (ESD) principles through the Management Plan. ESD may be defined as:

*“Development which aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations”* (Department of Local Government, 1998).

ESD can be achieved through the implementation of the following:

- The precautionary principle – If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Inter-generational equity – The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- Conservation of biological diversity and ecological integrity – Conservation of biological diversity and ecological integrity should be a fundamental consideration.
- Improved valuation, pricing and incentive mechanisms – Environmental factors should be included in the valuation of assets and services.

The legislation requires a Local Council to be well informed of the environmental circumstances of their area and to apply the principles of ESD in a fully integrated way through their strategic management cycles of direction, action and accountability (Department of Local Government, 1998).

## 1.5 COMMUNITY CONSULTATION

Community involvement is an extremely important component of the Local Government SoE reporting process. In addition to being a legislative requirement, community consultation during the preparation of the annual SoE report enables environmental concerns held by the community to be raised and addressed. Consultation and subsequent identification of environmental issues can be achieved through a range of processes.

## **1.6 THE NAMBUCCA**

### **1.6.1 Location**

The Nambucca Shire Council Local Government Area is located on the Mid North Coast of New South Wales, approximately midway between Sydney and Brisbane (Figure 1.1). Situated geographically between 30°30'S and 30°56'S and 152°18'E and 153°01'E, the Shire covers an area of approximately 1,490km<sup>2</sup>. A large proportion of this area is steep terrain intersected by small streams. Nestled between the foothills of the Great Dividing Range and the coastline, the Nambucca River drains a valley approximately 47 km long. The eastern boundary of Nambucca Shire is defined by the Pacific Ocean, the southern and western boundaries of the Shire are defined by the Nambucca River catchment, while the northern boundary begins approximately 10 km north of Valla Beach and runs almost directly west. The Nambucca Shire has an estimated width of 23 km at its widest extent, the eastern boundary adjacent to the coastline.

### **1.6.2 Climate**

The local climate is considered to be semi-tropical with summer dominant rainfall. The average daily maximum temperature is around 23.3°C, while the average daily minimum temperature is around 14°C (Bureau of Meteorology, 2001). Long-term average annual rainfall over the estuary area is between 1,300mm and 1,400 mm. Annual rainfall typically ranges from 1,300mm to 1,600mm in the northern and eastern section of the high ridge country and between 1,200mm and 1,600mm to the south and west along Taylors Arm. Annual pan evaporation is estimated to range from 1,650mm at Bowraville to 1,200mm in the upper Nambucca catchment (Lyll & Macoun Consulting Engineers, 1999).

### **1.6.3 Population**

The human population is a key contributing factor to the pressures exerted upon an environment. An increase in population results in greater pressure on an area's environment through increased use of natural resources and waste production.

The Australian Bureau of Statistics 2006 Census determined a population of 17, 897 persons residing within the Nambucca Shire Local Government Area. With an increase of 179 residents during the 2001 to 2006 intercensal period, the population of the Nambucca Shire grew at a rate of approximately 1.3%. In comparison the population of the North Coast Region and NSW increased by 6% and 3.7% respectively in the same period (Australian Bureau of Statistics 2006 Census). Council records indicate that since 1981, the Nambucca Valley has encountered a 53% increase in population. This equates to a 2.1% average annual growth rate across this 25 year period.

## **NSW NORTH COAST REGIONAL INDICATORS**

<b>Population of the Nambucca Shire (2006)</b>	<b>17, 897</b>
<b>Population growth rate of the Nambucca Shire (2001 to 2006)</b>	<b>1.3%</b>

### **1.6.4 History**

The word "Nambucca" originates from the Aboriginal word *ngambugka*, the use of which dates to at least 1835. It has been variously translated as "winding or crooked river" and as "entrance to the waters" (Townsend, 1993). The Nambucca Valley was originally part of the territory of the Ngaku and Gumbangerri Aboriginal tribal groups. The Nambucca River was the border between these two tribal groups (Townsend, 1993). It is generally accepted that cedar getters were the first Europeans to work the Nambucca area. Arriving in this area as early as the 1830's, the cedar getters were closely followed by pastoralists. From around 1867, when the Nambucca area population was around 50, dairying and some cropping were established. Around the same time ship building emerged as a fledgling industry. A history of the Nambucca area has been compiled and is documented in "Valley of the Crooked River, European Settlement on the Nambucca" Townsend (1993).

### **1.6.5 Social Characteristics**

The linkage between ESD principles and the social factors of the Nambucca Shire is important in relation to the environment of an area. The social and economic attributes of the Nambucca Shire population are linked to the impacts that the population has on the environment and their understanding of, and participation in, environmental issues.

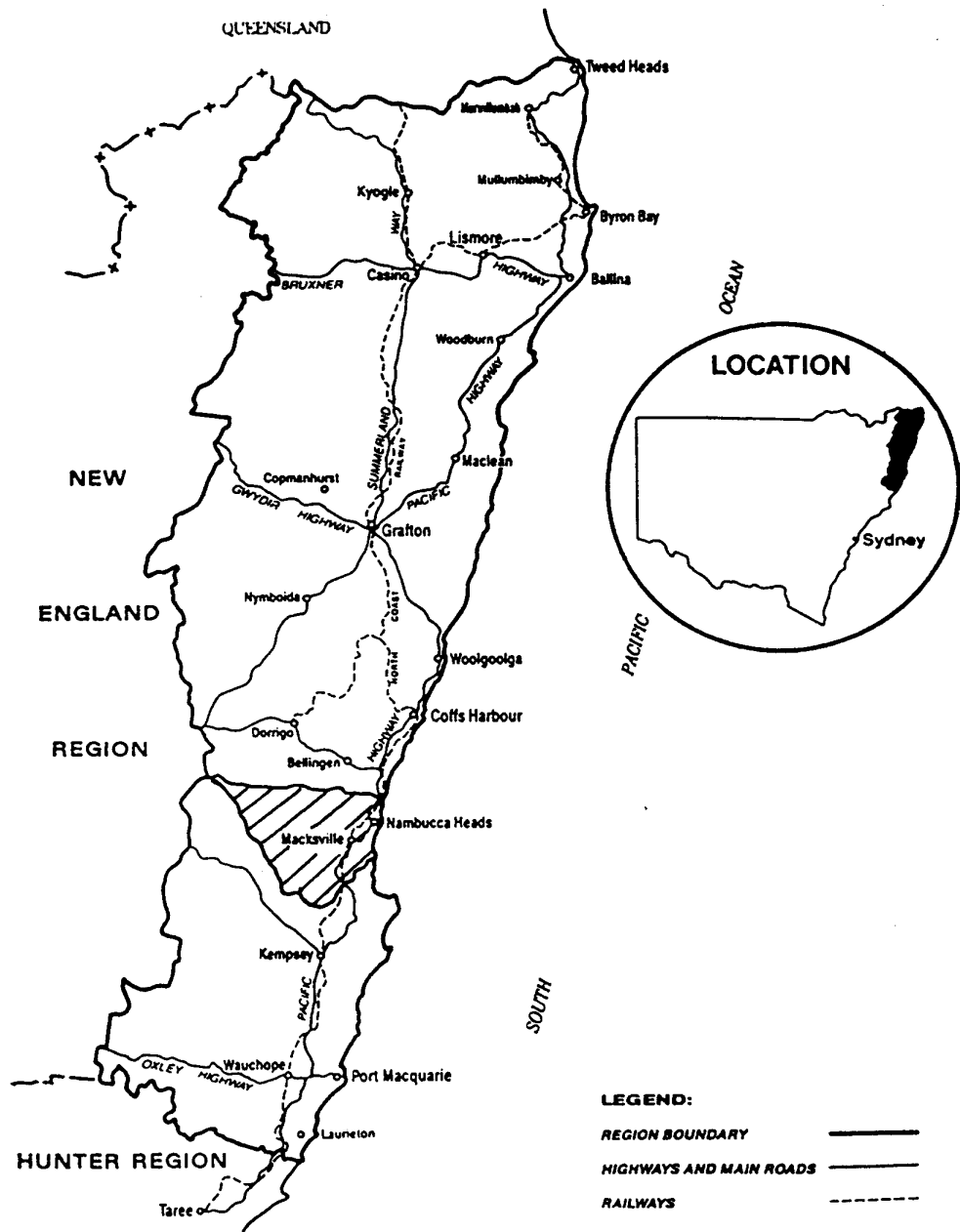
Outlined below is a brief description of some of the major social factors of the Nambucca Shire Local Government Area.



# STATE OF ENVIRONMENT REPORT

DEPARTMENT OF PLANNING

## NORTH COAST REGION



Source: Department of Planning  
 Note: This plan is not to scale  
 Schematic presentation only  
 Date: November 1996

Figure 1.1

Figure 1.1: Location of Nambucca Shire

### 1.6.6 Age Structure

The median age of the Nambucca Shire in comparison with other Mid-north Coast Local Government Areas, the Mid-north Coast and NSW as a whole is displayed in Table 1.1. Figures indicate that the Nambucca Shire has a high median age (46) compared to the regional (43) and state medians (37) and the highest of the selected Shires. Following regional and state-wide trends, the median age of residents within the Nambucca Shire increased during the 2001 to 2006 intercensal period. The increase within the Nambucca LGA is likely to be due to the area being a popular retirement destination and the immigration to developments such as Osprey Villas and Faringdon Village. Figure 1.2 displays age distribution of the Nambucca Shire, the selected Mid-north Coast Shires and NSW.

**Table 1.1: Social Indicators for Mid-north Coast Local Government Areas and the Mid-north Coast and NSW**

Local Government Area	Median Age		Median Individual Weekly Income (\$)		Unemployment Rate		ATSI (%)		NESB (%)	
	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006
<b>Nambucca</b>	<b>43</b>	<b>46</b>	<b>253</b>	<b>296</b>	<b>18.3</b>	<b>11.6</b>	<b>5.4</b>	<b>5.7</b>	<b>2.2</b>	<b>1.7</b>
Kempsey	40	42	261	319	16.5	11.7	8.5	9.3	2.3	2.4
Bellingen	41	44	254	336	14.6	10.5	2.6	2.6	2.3	2.4
Coffs Harbour	38	41	267	364	12.4	8.8	3.1	3.6	3.3	4.3
Hastings	41	45	261	361	13.2	8.5	2.7	2.6	1.6	2.0
Mid-North Coast	41	43	278	344	13.3	Not available	3.7	4.3	2.2	2.4
NSW	35	37	387	461	7.2	5.9	1.9	2.1	18.8	20.1

**Source:** Australian Bureau of Statistics 2001 Census; Australian Bureau of Statistics 2006 Census

**Note:** ATSI (Aboriginal and Torres Strait Islander peoples) and NESB (non-English speaking background people) as a percentage of total population

### 1.6.7 Cultural Background

The percentage of people of indigenous origin in the Nambucca Shire increased slightly between 2001 and 2006 and is high compared to the State average. The percentage of people from non-English speaking backgrounds is low compared to the State proportion and has dropped during the 2001-06 intercensal period to become lower than the Mid-north Coast proportion, which rose slightly during the same period (Table 1.1).

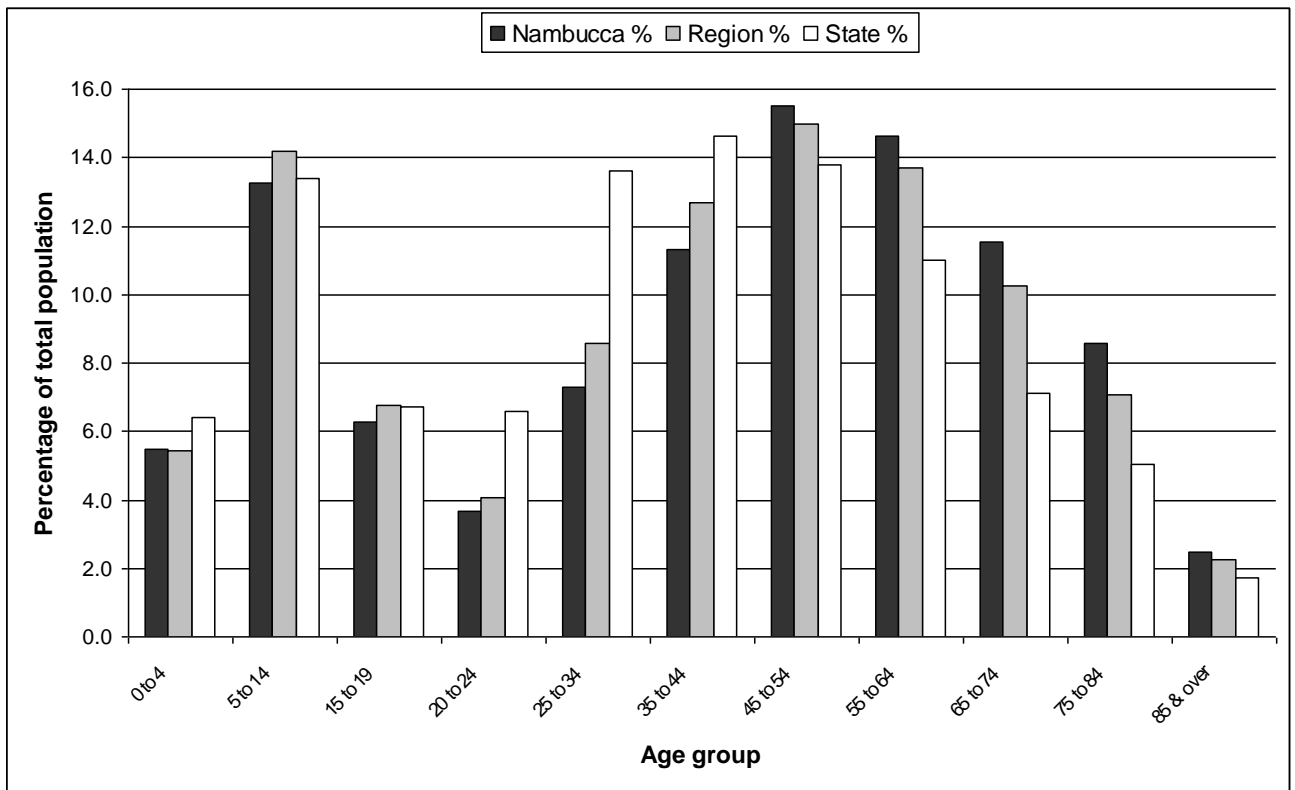


Figure 1.2: Age Distribution of the Nambucca Shire, Mid-north Coast Region and NSW

### 1.6.8 Employment and Income

The 2006 Census data indicates that the main sources of employment for males in the Shire are Construction (14%), Manufacturing (12%), Retail (11.8%), Agriculture, Fishing & Forestry (9.3%) and or females, the data indicates that the main sources of employment are Health & Community Services (23.4%), Retail (16.4%) and Education (12.9%) (Source: ABS 2006 census statistics)

In 2007 the Nambucca Shire had an unemployment rate of 11.6%, which is over double the NSW unemployment rate (5%) and the highest of the Mid North Coast Local Government Areas (Table 1.1 – Source: W. Lowe, NSC Economic Development Officer).

The median weekly family income in the Shire is \$642, 46% lower than the NSW median of \$1,181 (Australian Bureau of Statistics, 2006 Census data) Table 1.1 illustrates that median weekly individual incomes in Mid North Coast Shires are lower than North Coast and NSW medians.

## 2.0 LAND

The land surface is the interface between earth's crust and the atmosphere. The physical state of the land surface, also referred to as 'land cover', includes rock, soil, vegetation, water and man-made structures. Changes in land cover can affect a range of processes including the movement of nutrients through plants, soil, water and the atmosphere (Hawkesbury-Nepean Catchment Management Trust, 1999). Alterations to the state of land resources are often brought about by human activities and competing priorities for land use.

When investigating the state of land resources in the Nambucca Shire it is useful to consider the main types of land within the Shire (rural, urban, coastal and environmental protection) and the activities carried out within them. In setting the context for this discussion it is useful to gain a preliminary understanding of the nature of land resources within the Shire. This will be discussed in Section 2.1.

### 2.1 DESCRIPTION

The Nambucca Shire Local Government Area is located in the eastern zone of the New England fold belt geological province and covers an area of approximately 1,450 km<sup>2</sup>. The geology of the area is dominated by slate, phyllite, schistose sandstone, schistose conglomerate and basic volcanics. Isolated outcrops of tertiary basalts, minor trachyte and dolerite occur at the headwaters of the Nambucca River. The remaining areas are generally alluvial, paludal and estuarine deposits consisting of sands, silts and gravels (Baker *et. al.*, 1983).

Soils within the Shire consist mainly of lithosols and podzolics derived from the slates, phyllites, sandstones and conglomerates. Alluvial and estuarine soils are present in the valleys and floodplains (Baker *et. al.*, 1983). A soil landscape map for the Macksville and Nambucca 1:100,000 map sheets, which includes the majority of the Nambucca Shire, was produced in 2000 by the Department of Land and Water Conservation. A report that includes detailed descriptions of the soil landscapes, limitations to development and rural and urban land capability was also published to complement the map.

The western part of the Shire consists of the rugged topography of the eastern edge of the New England Plateau, dominated by steep hill slopes and valleys (significant areas having slopes in excess of 33%). The eastern portion of the Shire is characterised by the gentle slopes of the Nambucca River and Taylors Arm floodplains and the adjacent undulating lands. Isolated steeper ridges from the New England Plateau cut into the eastern section of the Shire and define the middle reaches of the Nambucca River and Taylors Arm valleys (GHD, 1990).

A number of substantial headlands exist in the floodplain and are separated by the beaches and dunal systems. Elevations range from 0.0m at the confluence of the Nambucca River with the Pacific Ocean to over 1,500m Australian Height Datum (AHD) in the western part of the Local Government Area.

## **2.2 STATE - RURAL AREAS**

Approximately 55% of land within the Shire is zoned as Rural under the Nambucca Local Environmental Plan 1995. The number of Rural zones that exist reflects the varied nature of many rural areas within the Shire and their varying suitability for different forms of development.

Since the first period of European settlement in the Nambucca Valley, there has been a long history of modifying rural land resources for agriculture, forestry, mining and other purposes. Modification has involved practices such as the clearing of native vegetation, the introduction of exotic species of flora and fauna (eg crops and cattle) and the removal of extractive material from floodplains and river beds. Recent history has seen an increased demand for rural-residential development and a consequent increase in the area of land allocated for this purpose.

The state of rural areas within the Shire can be determined by a variety of indicators including the areas of land devoted to certain types of production and development, the number of approvals issued by Council and the relative contributions of particular activities to the economy. These indicators reveal little information as to the actual physical state of rural lands or their relative nutrient levels, however they assist in gaining a general understanding of the state of rural areas and rural industry within the Shire. The adoption of regional indicators for SoE reporting (NSW Premiers Department, 2000) may see information relating to rural areas being readily available from the relevant State Government Authorities in the future. The main rural activities that will be considered include agriculture, extractive industries, forestry, rural subdivision and development.

### **2.2.1 Agriculture**

Agricultural use of rural lands throughout the Shire is varied in terms of the value of products generated, number of producers and areas of land used for different types of production. Most agricultural land within the Shire is utilised for livestock and dairy production. Therefore the state of rural lands is likely to be strongly influenced by the acceptability of farming practices associated with these forms of agriculture. Australian Bureau of Statistics data for the Nambucca Shire indicates that the proportion of people employed in the agriculture, forestry and fishing

industry decreased from 11.5% to 10.3% between 1996 and 2001. Figures for the following intercensal period (2001-06) were not available at the time of preparation of this report, however, it is anticipated that these will be available upon posting of second release statistics by the ABS in November 2007.

While some agricultural industries in the Shire may be in decline, the macadamia industry is becoming an increasingly important agricultural pursuit. As at 2001 there were around 80 macadamia growers in the Nambucca Shire with plantations ranging in size from a few hundred trees to extensive operations of up to 45,000 trees. In 2001 it was estimated that the industry employed 25 people on a full time basis and 100 on a casual basis (Nambucca Area Macadamia Growers Association, 2001). The majority of macadamia trees planted in 2001 have now reached maturity, and most are producing commercial quantities of nuts.

By 2006 the Nambucca Shire supported around 100 farms, with an estimated 65, 000 trees planted. The planting of trees is ongoing with another 10,000 planned for planting on existing farms during 2007. Following this considerable growth in cultivation activity, the number of full-time employees has increased by 50% to around 50 persons, with another 150 employed on a casual basis (pers. comm. - Nambucca Area Macadamia Growers Association, 2007).

Most agricultural pursuits in the Shire rely on the presence and continued health of rivers and floodplains. Rivers provide water for irrigation and stock watering whilst floodplains provide areas for crops or pastures to grow. For water allocations for irrigation, stock watering and other uses, refer to Table 3.3. The Department of Land and Water Conservation commissioned a study, "River Styles on the North Coast", whose aim was to investigate the different styles of river evident in the North Coast area and make an assessment of their current status. The preliminary findings of the study indicated that the majority of the rivers within the Nambucca Shire were classified as degraded, and that many had a low likelihood of success for rehabilitation. This report suggests that the state of degradation is strongly linked to the presence of native vegetation on the river banks and within channels, as well as the actual style of the river concerned. The clearing of riparian vegetation in association with agricultural operations is implicated as the process most likely to have contributed to the degraded state of the rivers and the loss of areas of floodplain due to bank erosion.

### **2.2.2 Extractive Industry**

The Nambucca Valley River and Catchment Management Study (Lyall & Macoun Consulting Engineers, 1999) investigated, amongst other things, the affect of gravel extraction on the health of the Nambucca River and its tributaries. The study noted that:

*“Observations in the Nambucca Valley confirm the technical literature from other rivers in Australia and overseas which indicate that, in general, inappropriate gravel extraction causes stream bed lowering and loss of bed armour which are the initiating processes in destabilisation of the river channel and bank collapse. Because of the detrimental consequences of gravel extraction, as a matter of principle, there should be no further extraction from river beds in the Nambucca system, and gravel relocation should only be permitted in a number of special circumstances that are set out in Section 6.5.2”.*

There is potential for unsuitable gravel extraction operations to adversely impact upon the environment. The abovementioned study suggests that the inappropriate extraction of river bed gravel has contributed to the relatively degraded state of the Nambucca River system. It also notes that most of the gravel within river beds has been scoured from erosion of the adjacent floodplain. This emphasizes the importance of viewing the river and floodplain as components of an overall functional system. Hence careful consideration of any future proposals for floodplain extraction is required.

There are no longer any river bed gravel extraction operations in the Local Government Area. State environmental controls are such that it is unlikely that new river bed gravel extraction operations will eventuate.

### **2.2.3 Forestry**

Forestry activities undertaken within the Nambucca Valley may include forestry operations undertaken on private land or forestry operations undertaken on State Forest land. Private forestry operations are generally required to gain consent from the Northern Rivers Catchment Management Authority (NRCMA), under the provisions of the *Native Vegetation Conservation Act 2003*, while Forests NSW oversee operations undertaken on State Forest land. Clearing for the purposes of agriculture or forestry is generally permitted without consent in most Rural zones within the Shire, however consent for clearing is required by Council in those rural zones where significant vegetation, wildlife habitat and steep slopes have been identified. Consent for clearing is otherwise required from Northern Rivers Catchment Management Authority under the *Native Vegetation Conservation Act 2003*. As at September 2007, Forests NSW indicated that approximately 28,088 ha of land within the Shire is State Forest. Of the 28,088 ha (or 18.9% of the Shire), 554 ha is plantation, 4,084 ha is rainforest and 23,450 ha is native forest (eucalypt) (Forests NSW, 2007).

## **NSW NORTH COAST REGIONAL INDICATORS**

<b>Area of Local Government Area occupied for State Forest</b>	<b>28,088 ha</b>
<b>Percentage of Local Government Area occupied for State Forest</b>	<b>18.9%</b>

### **2.2.4 Rural Subdivision**

Council has approximately 7,000 ha of land zoned for rural-residential subdivision (LEP 1995 maps). Land zoned for rural-residential development varies substantially with regard to its natural state and suitability for certain types or densities of development. The "Urban and Rural-Residential Capability Survey of The Nambucca Shire – May 1992" provided information relating to the existing state of rural-residential land (in terms of physical suitability for subdivision). However, data is not currently available on the state of rural-residential areas that have undergone subdivision.

## **2.3 PRESSURE – RURAL AREAS**

### **2.3.1 Agriculture**

There are a number of impacts that may potentially arise from agricultural activities including the loss of native vegetation, erosion, land contamination (eg from banana spraying) and pollution. The amount of pressure exerted upon the natural environment by agriculture is dependent upon the duration, intensity, nature and scale of the operations. These will ultimately depend upon environmental factors, economic factors (eg demand for produce and production costs) and accessibility of markets.

In some respects it may be considered that the pressure exerted upon rural lands in the Shire by agriculture has reduced over time. Table 2.1 illustrates that the number of establishments with agricultural activity and the total area of establishments with agricultural activity have both declined substantially since 1976. It is obvious that these figures have fluctuated over time and these fluctuations may be in response to market factors. An increase in the level of education regarding environmentally responsible farming techniques and restrictions imposed by various levels of Government may have also assisted in reducing the pressure from agricultural operations on the environment. Whilst these factors may ultimately reduce the pressure from agriculture, the continuation of certain farming techniques is likely to contribute to the activity still exerting a relatively high degree of pressure on the rural environment.



**Table 2.1: Change in Area and Number of Agricultural Establishments in Nambucca Shire**

	1976	1981	1986	1991	1996	2001	2006
Total Area of Establishments with Agricultural Activity (ha)	76,669	57,225	52,401	24,924	36,172	34,541	
Number of Establishments with Agricultural Activity	654	521	484	205	350	332	

**Source:** ABS Regional Statistics, Lawrence & Associates Consulting Services, 2003.

**Note:** Statistics for 2006 were unavailable at time of preparation; these will be available from the ABS in November 2007

### **2.3.2 Extractive Industries**

Extractive industries provide construction materials and various rock products to specification for activities including roadworks, foreshore protection, concrete production and construction. Extractive industries usually incorporate extraction, storage, some form of on-site processing and transportation of materials from the extraction site. Due to the nature of these activities there is potential for adverse environmental impact in terms of vegetation removal, production of wastes, release of contaminants into the air and water, disruption caused by noise, increased traffic and visual pollution. Table 2.2 displays the current approved extractive industries within the Shire, as at June 2007.

The degree of pressure exerted upon local extractive resources will depend largely on the demand for materials and the availability of deposits. Assuming that the local construction industry will source local materials, an indication of the likely pressure that will be placed upon extractive resources may lie in figures for building approvals and road construction. It is expected that an increased degree of pressure will be placed upon extraction of floodplain gravel deposits to replace river based deposits. The (former) Department of Land and Water Conservation released strict guidelines relating to the extraction from floodplain localities. It is expected that floodplain extraction will become increasingly difficult in the future due to community opposition and Government Policy.

**Table 2.2: Approved Extractive Industries in the Nambucca Shire at June 2007**

<b>Quarry Name</b>	<b>Type</b>	<b>Council File</b>	<b>Address</b>
<b>Barber</b> (Brown Sugar)	Sand	T1-4-120	Lot 3 DP 1032047, Scotts Head Rd, Way Way
<b>Monro's</b> (F Munro)	Sand	T1-7-226	Lot 1422 DP 806688 and Lot 33 DP 733080, Gumma Road, Gumma
<b>Marriott's</b> (A Monro)	Granite	DA 1995/056	Lots 1 and 2, DP 1008612, Valla Road, Valla
<b>Scotts Head Grazing*</b>	Sand & gravel	T1-7-88	Lot 141 & 157, DP 755539, 747 Gumma Road, Gumma
<b>Nambucca Valley Quarry</b>	Hard rock	DA 1998/055	Lot 121 DP 1046434, Scotts Head Road, Way Way
<b>Eagle Sands Quarry</b>	Sand and marine pebble	2003/904	Lots 141 & 157 DP 755539, Gumma Road, Gumma
<b>Austone</b>	Marine Pebble	T1-7-3	Lot 3 DP 876141, Barnett's Road, Gumma
<b>Public Works Quarry</b>	Break wall rock		Lot 203 DP 581870, Valla Road, Valla

\* Scotts Head Grazing quarry ceased operation @ 2004.

### **2.3.3 Forestry**

Removal of vegetation for forestry purposes has the potential to create various adverse environmental impacts. The degree of pressure exerted upon State Forests is primarily a function of harvesting plans formulated by Forests NSW. There is often conflict between relevant parties regarding the conservation status of areas designated for logging and protection. The reported figures for the amount of native forest on State Forest land logged in the Nambucca Shire Local Government Area during the 2006/2007 reporting year was zero hectares (0 ha) (Forests NSW, 2007). This figure is a reflection of the new reporting system adopted by Forests NSW, whereby only the compartments logged or contracts fulfilled during the reporting year are recorded. In other words, figures relating to logging are only supplied to Council by Forests NSW at the completion of logging works.

#### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Native forest logged on State Forest land during the reporting year*</b>	<b>0 ha</b>
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\* **Note:** As logging figures are only reported upon completion of contract, this figure reflects the amount of contracts completed 06/07

As mentioned, recent years have seen the dedication of several areas of State Forest as National Parks. In 1998, New England National Park was extended by 1,828 ha and Dunggir National Park (area of 2,445 ha) was declared. Further areas of State Forest were reserved in 1999 as a result of the Comprehensive Regional Assessment of forests in the area. These

included a further extension to New England National Park, the declaration of Ngambaa Nature Reserve, Juugawaarri Nature Reserve, Ganay Nature Reserve and Bollanolla Nature Reserve. Gumbayngirr Nature Reserve has been identified on previous maps as an extension of New England National Park.

The dedication of large areas of previous State Forest as National Park will obviously reduce the pressure on large areas of vegetated land within the Shire. A reduction in productive agricultural ventures within the Shire however, may increase pressure on private landowners to log their properties in order to supplement declining incomes from agriculture. Approximately 800 ha of land were determined by the Department of Environment & Climate Change to be cleared for logging purposes in the Shire during the reporting year. Determinations were made under State Environmental Planning Policy 46 and the *Native Vegetation Conservation Act 1997*.

### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Land determined by DNR to be cleared for logging purposes during the reporting year*</b>	<b>800 ha</b>
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\* Land clearing figures not available at time of reporting

#### **2.3.4 Rural Subdivision**

Council is required to maintain a register of rural-residential lots approved over set periods of time to demonstrate compliance with quotas imposed upon this form of subdivision. The number of lots approved by Council is considered to be an appropriate indicator of the pressure being placed upon rural-residential land within the Shire.

Council was granted a quota of 250 lots to be released over a five-year period commencing from 23/3/1998. Table 2.3 illustrates the number of lots approved and released over the five years (23/3/1998 to 23/3/2003). It is important to note that generally a time lapse between development approval and release onto market occurs.

**Table 2.3: Rural Residential Allotments and Dwellings Approved by Council between 1998 and 2003**

<b>Year*</b>	<b>Rural-Residential Lots Approved (DA)</b>	<b>Rural-Residential Lots Released (Subdivision Certificate)</b>	<b>Rural-Residential Dwellings Approved (DA)</b>
1998/1999	33	24	13
1999/2000	27	31	28
2000/2001	37	25	23
2001/2002	10	33	29
2002/2003	11	59	35
<b>5 Year Total</b>	<b>118</b>	<b>172</b>	<b>128</b>

\* The year for subdivisions is the subdivision quota year ie 23 March - 22 March

\* The year for dwelling approvals is the financial year ie 1 July - 30 June

The total number of rural-residential lots approved between 23/3/1998 and 23/3/2003 (118) was well within the 250 lot quota.

In the reporting years from 2003/2004 and 2004/2005, rural-residential approvals dramatically increased to 99 and 81, respectively. In response to this dramatic increase in demand for rural-residential lots, Council requested the (former) Department of Infrastructure, Planning and Natural Resources to grant an increase in the five year quota. Approval was granted by the Department for an additional 50 lots. In the previous reporting year (2005/2006), 56 new lots were approved. It should be noted that the quota for the five year period up to 2008 has now been exhausted. In response to this situation, Council has engaged the services of a consulting firm to provide guidance in the preparation of a rural residential land release strategy, which is expected to be finalised by 2008.

The number of lots approved per annum is a readily accessible indicator of pressure, however subdivision design and suitability of the land to be subdivided will ultimately determine the pressure exerted upon the rural environment.

## **2.4 RESPONSE – RURAL AREAS**

### **2.4.1 Agriculture**

Agriculture is an activity that does not generally require Council consent, therefore Council has not formulated specific policies to control agriculture through the development consent process. One exception to this however, is Council's formulation of a Local Environmental Plan to provide controls in the management of acid sulphate soils. Supported by a Development Control Plan, the aims of this plan are to:

- 1 Provide environmental planning controls that will result in the management of any disturbance to acid sulphate soils in the Nambucca Local Government Area so as to minimise impacts on natural waterbodies and on agricultural, fishing, aquaculture, urban and infra-structure activities;
- 2 Obtain development consent for the works, including some agriculture related works, that would disturb soils or groundwater levels in localities identified as having acid sulphate soils; and,
- 3 Provide special assessment of certain development on land identified as being subject to risks associated with the disturbance of acid sulphate soils.

Land affected by acid sulphate soils and risk categories are presented in Figure 2.2.

Another activity intended to reduce adverse impacts of agriculture on rural lands is the fencing off of vulnerable or sensitive areas. The issues of riparian corridor management, fencing off and revegetation of stream banks were raised during a recent community consultation program. While Council supports and encourages fencing off and revegetation of stream banks, much responsibility must fall upon individual landholders to undertake such activities.

### **2.4.2 Extractive Industries**

Mining and extractive industry within the Nambucca Shire is a contentious issue, with community groups often having differing opinions. Assessment and management of extractive industries is an intricate process generally involving many conflicting issues. As a resource manager, Council has to carefully balance development and environmental protection. This balance is determined at the environmental assessment stage by Council and a number of other Government Agencies, under a number of legislative controls including the *Environmental Planning and Assessment Act 1979*, the *Protection of the Environment Operations Act 1997* and the *Threatened Species Conservation Act 1995*.

In addition to these controls, guidelines for the preparation and review of environmental impact statements (EIS) for floodplain gravel extractive industries were formulated by the (former) Department of Land and Water Conservation. The guidelines state that the EIS must contain a complete hydrological study, a fluvial geomorphology study, an erosion & sediment control plan, a rehabilitation plan and monitoring proposals. Council will continue to assess each application on its individual merit, having regard to the findings of the Nambucca Valley River and Catchment Study (Lyll & Macoun Consulting Engineers, 1999), specialist reports prepared in support of the application, comments received from relevant Government Departments and submissions made by members of the public.

Monitoring and reporting in relation to the performance of the majority of operations is based on an approved management plan that requires continued environmental impact assessment addressing site specific requirements. Certain operations commenced extraction prior to current environmental assessment procedures being imposed. All operators however, are subject to regular inspections by Council, the Department of Environment and Conservation and the Department of Infrastructure, Planning and Natural Resources to ensure compliance with operating procedures, development approvals and environmental legislation.

It is worthy of note that in the last 6 years, only one new quarry has been approved in Nambucca Shire, this being Eagle Sands quarry at Gumma.

### **2.4.3 Forestry**

In 2003 the Nambucca Catchment Vegetation Survey was completed for the Nambucca Vegetation Sub-Committee and Council (Kendall & Kendall Ecological Services, 2003). The primary outcomes of the survey were to:

- map the native vegetation communities within the catchment;
- identify vegetation communities with high conservation values;
- identify possibly occurring rare, threatened and significant plant species and
- contribute to the data set collected within the catchment.

As at 30<sup>th</sup> June 2006 there were **260 ha of** non-dedicated State Forest plantation in the Nambucca Shire Local Government Area. Non-dedicated State Forest plantation includes land purchased, but not dedicated, by Forests NSW and plantation partnerships between Forests NSW and private landowners on private land.

## NSW NORTH COAST REGIONAL INDICATORS

Non-dedicated State Forest land	260 ha
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### 2.4.4 Rural Subdivision

Since November 1987 (gazettal of LEP 1986) and December 1995 (gazettal of LEP 1995), Council has stipulated strict criteria for the assessment of rural-residential development applications. The criteria ensure that each rural-residential subdivision meets strict environmental guidelines to make sure that there is an acceptable impact on the environment. These criteria include consideration of issues such as flora and fauna, on-site effluent disposal, drainage, aquatic environment, vegetation conservation, bushfires and impact on the scenic qualities of the landscape. Additionally, all developments are required to contribute towards upgrading Council's public road system and pay Section 94 contributions towards public reserves, community facilities and surf lifesaving equipment. Council has adopted a user pay system whereby the developer, and not the community, pays towards providing and upgrading facilities and services for new rural-residential development.

The State Government now requires Council to approve and regularly inspect all on-site effluent disposal systems throughout the Shire. The primary purpose of this requirement is to ensure that systems are functioning correctly so as to minimise pollution runoff into waterways. The number of new systems approved (including inspection) during the 2001/2002, 2002/2003, 2003/2004, 2004/2005, 2005/2006 and 2006/2007 reporting years are outlined in Table 2.4. At best estimate, 449 existing systems were inspected during the current reporting year. These inspections will be ongoing to ensure that all on-site effluent disposal systems are functioning properly so as to reduce environmental impacts on waterways and risks to public health.

**Table 2.4: Number of On-Site Effluent Disposal Systems Approved during Reporting Years**

Reporting Year	Number of Systems Approved (Including Inspection)
2002/2003	18
2003/2004	12
2004/2005	1576
2005/2006	576
2006/2007	486

## **NSW NORTH COAST REGIONAL INDICATORS**

<b>Number of on-site effluent disposal systems approved during the reporting year</b>	<b>37</b>
<b>Number of existing on-site effluent disposal system inspections during the reporting year</b>	<b>449</b>

Council specifies that all new applications for dwellings in areas not connected to Council's sewerage system must include a report from a geotechnical consultant that attests to the suitability of the system to receive effluent generated by the proposal. Applications for relevant rural-residential subdivisions are also required to include a geotechnical report that demonstrates the ability of the proposed lots to dispose of effluent in accordance with Council's adopted On-Site Sewage Management Plan. Conditions of development consent require any future effluent disposal to be in accordance with the recommendations in this report.

The large increase in the number of approvals and inspections in the last two years is due to Council's activity to implement licensing and inspections as per Council's Onsite Sewage Management Plan. The final number of systems is expected to be in the vicinity of 3,200.

### **2.5 STATE – URBAN AREAS**

The Nambucca LEP 1995 permits residential growth to increase population by an estimated further 3,250 people in residential zoned areas. Rural-residential zones allow further growth of 6,380 people resulting in a total potential Shire population of 29,000 people.

New residential subdivisions have been commenced at Bent Street, Nambucca Heads; Ocean View Drive, Valla Beach; McLeod Drive, Scotts Head and Preston Drive, Macksville. Development Control Plan (DCP) No. 17 - South Macksville Urban Release Area, came into effect in February 2005. The DCP sets guidelines for the future development of residential zoned land south of Preston Drive. This area has the potential for 600 new residential lots.

The Shire's major commercial areas are located in Nambucca Heads and Macksville. Bowraville, Scotts Head and Valla Beach each have a commercial area to serve the needs of the local community. Industrial land is confined to Nambucca Heads, Macksville and Bowraville, however some industries can be located in rural areas.



## 2.6 PRESSURE – URBAN AREAS

As the population of the Local Government Area increases, the need for development to provide for this increase must be met. This can lead to both short and long term environmental pressure. Problems associated with development growth include erosion of construction sites and subsequent sedimentation, the loss of significant native vegetation, habitat areas and productive rural lands, and increases in land, water and air pollution. The cost of providing additional physical, social and environmental services to new land release areas is another factor that must be considered when releasing urban and non-urban land for future development.

The two most urgent issues in the Shire appear to be the lack of available industrial land in Nambucca Heads and the need for additional residential land in the Nambucca Heads area. While Valla Beach had the capacity to absorb some surplus Nambucca Heads growth to the year 2006, the declaration of a Nature Reserve over an area of land formerly zoned residential at south Valla (approximately 12 ha) has markedly reduced longer term growth potential of the village. A reduction in the availability of residential land in the area will increase the pressure from development on future urban areas, such as the Cow Creek/Boggy Creek Urban Investigation Area between Nambucca Heads and Valla Beach.

Macksville is unlikely to experience any substantial supply problems as land exists for residential expansion. Notwithstanding this, additional long term commercial land will need to be identified to accommodate future large scale retail activities. Council prepared a draft LEP to rezone land located on the fringe of Macksville's commercial area, from 2(d) Residential (Tourist) to 3(a) General Business, to permit a shopping complex comprising a supermarket and shops. However, the Minister for Planning did not make the plan and the Department of Planning advised Council that any rezoning for major retail or commercial development will need to be justified by an adopted retail/commercial strategy.

There is a need for identification of long term industrial land supply for both Nambucca Heads and Macksville. Existing industrial land supply will only meet short to medium term demand. Council has prepared a draft industrial plan that reviews strategies for the supply of industrial land. The Cow/Boggy Creek locality has been identified as a future urban land release area. This area has the potential to meet the longer term demands for additional industrial land.

## 2.6.1 Growth Rates and Land Capacity

Land release needs to be timed to ensure that there is an adequate supply of appropriately zoned land available for development. An under supply is likely to result in elevated prices thereby discouraging potential developers, while an oversupply may result in Council bearing unnecessary early development costs. Predicting future land requirements demands careful monitoring of population growth rates, which have varied dramatically over the past 15 years.

Between 1991 and 1996 the average population growth rate of the Local Government Area was 1.1% per annum. Between 1996 and 2001 the average population growth rate slumped to virtually nil, with some years recording a population loss. A development boom commenced in late 2001, resulting in an estimated population growth rate of 2.1% for 2006. This is a significant increase on the previous ten years.

**Table 2.5: Nambucca Shire Population Capacity**

	<b>Population at 2006</b>	<b>Population Potential Existing Vacant Residential Land</b>	<b>Potential Population Future Urban Expansion Zone</b>	<b>Estimated Potential Area Population (Rounded Figure)</b>
Valla Beach		400	1,007	1,807
Nambucca Heads		2,000	-	2,000
Hyland Park		-	,	-
Cow Creek/Boggy Creek		-	7,488	7,488
Bowraville		500	-	500
Macksville/ Sth. Macks./ Congarinni		1,400	6,267	7,667
Scotts Head		500	1,822	2,322
Rural and Villages		6,500	-	13,100
<b>Total</b>		<b>11,300</b>	<b>16,584</b>	<b>34,884</b>
	Based on Australian Bureau of Statistics 2006 Census	Based on areas of vacant urban and rural-residential areas	Based on NSSP 2007	Based on NSSP 2007

**Note:** Locality-based census data is yet to be released by the ABS. These figures will be available on release of second release statistics from ABS in Nov. 2007

**Source:** Draft Nambucca Shire Structure Plan 2007

It is important to note that since the 2001 Census, the Shire population is estimated to have increased to 19,900 persons based on development approvals from 2001 to August 2006. The population potential for undeveloped areas can only be estimated, as such areas are subject to further assessment. Environmental requirements are likely to reduce the actual population potential of future urban land. There are also added complexities of changing household sizes (resulting in fewer persons per dwelling on average) and the redevelopment of existing urban areas to allow more dwellings per hectare.

The provision of new urban land requires a substantial lead time in providing adequate servicing for new areas by way of roads and stormwater, water supply and sewer infrastructure. Community facilities also need to be provided to ensure that areas are attractive and suitable for growth.

## **2.7 RESPONSE – URBAN AREAS**

### **2.7.1 Plans and Strategies**

Both State and Local Government control urban development within the Local Government Area. Baseline data utilised to plan for future development is contained in the following documents:

- Nambucca Local Environmental Plan 1995;
- Nambucca Development Control Plans, including DCP 13 – Urban Release Areas 1996 and DCP 17 – South Macksville Urban Release Area;
- Australian Bureau of Statistics Census data;
- NSW Agriculture, Land Capability mapping;
- Department of Natural Resources, Land Capability mapping – Urban and Rural Residential Areas;
- North Coast Regional Environmental Plan;
- State Environmental Planning Policies (SEPPs);
- Section 94 Contribution Plans;
- Nambucca Environmental Studies 1983 and 1994;
- Scotts Head Environmental Study 1982;
- Urban Land Release Strategy 1996;
- Commercial and Industrial Strategy 1996;
- Bowraville Heritage Study 1989;
- Floodplain Risk Management Plan 2005;
- Macksville Heritage Main Street Study 1999.
- Nambucca Shire Structure Plan 2007 (Draft)

The Department of Planning is currently in the process of developing the Mid North Coast Regional Strategy (MNCRP). Council is also in the process of preparing a new shire wide structure plan to guide future development in the Shire over the next 20 years. It should be noted that any recommendations of the structure plan and/or strategies developed for the Shire, will need to be consistent with the MNCRP.

Some of the matters that will be considered in the Structure Plan, that may affect future potential population growth, are:

- Identification of potential future rural-residential areas based on land capability, access to services and infrastructure, adjoining land use, and environmental characteristics.
- Further investigation of issues identified in the Urban Land Release Strategy (1996) for the Cow/Boggy Creek, South Valla and South Macksville areas.
- Identify suitable areas in the Cow/Boggy Creek Urban Investigation Area to meet the long term needs for additional industrial land.
- Assessment of the 1(d) Future Urban Zone land at Scotts Head and Valla Beach.
- Investigation of the possibilities for future expansion of smaller communities in the Shire ie Eungai Rail, Eungai Creek, Taylors Arm, Warrell Creek and Donnellyville.
- Management of the growth and redevelopment of the existing towns of Nambucca Heads, Macksville, Valla Beach, Scotts Head and Bowraville.

The Nambucca LEP 1995 provides for future urban zones totalling 1,374 ha. This equates to a potential population of 21,100 people that could be accommodated within these areas (using gross density targets of 11 lots per ha). The demand on these lands is not expected to commence until 2006. Cow Creek/Boggy Creek is likely to be the first of the identified future urban areas to be rezoned for residential, commercial and industrial land uses. Should current growth rates be maintained, demand to supply infrastructure to these areas will become more urgent in the near future.

Council has adopted an Urban Land Release Strategy and a Commercial/Industrial Strategy to ensure that land is released economically and efficiently. The Urban Land Release Strategy was endorsed by the Director-General of the former Department Urban Affairs and Planning. These two planning policies provide strategies for urban and non-urban land release and strategic planning. Both the rate of development and population increase are monitored regularly. The strategies will be reviewed as part of the new Shirewide Structure Plan.

The Urban Land Release Strategy identifies specific urban expansion opportunities within the Shire. Areas suitable for future urban development are identified north west of Nambucca Heads, south west of Macksville, south of Bowraville, south of Scotts Head and at Valla Beach. All urban expansion areas identified in Council's LEP 1995 are consistent with the urban expansion opportunities identified in the State Government's North Coast Urban Planning Strategy.

### **2.7.2 Development Control**

As part of the shire-wide structure plan process, DCP 3 - Residential Development is currently under review. The DCP review process will result in the formulation of a new DCP that will include new controls to guide urban residential development, with regard to the unique characteristics of each individual town within the Shire.

Council has also prepared a draft amendment to Council's LEP to permit independent residential units above ground floor shops in commercial zones. This will apply to all commercial zones, except those portions which are flood prone.

Council has also prepared a new draft Subdivision policy (draft DCP 4) that will replace 3 existing subdivision policies. The new policy will encourage improved road layouts for new subdivisions and reduced lot sizes. These measures will reduce the reliance on private motor vehicles for short distance travel and increase opportunities for walking and cycling and public transport links.

In an attempt to reduce the effects of erosion & sedimentation, Council requires large developments and subdivisions to submit soil and water management plans for approval by Council. With regard to smaller developments, site inspections are carried out by Council staff at the construction stage to make sure that appropriate erosion & sediment control measures are in place. If a potential land degradation problem such as large scale vegetation clearance or inappropriate drainage is identified, conditions are imposed upon the developer to undertake an acceptable form of mitigation to minimise any environmental impacts. In some cases this may involve management and rehabilitation plans, on-site detention and disposal of urban runoff, provision of open space, wildlife corridors, protection of natural drainage systems and other such measures.

Applicants for new developments are required to comply with the provisions of the *Threatened Species Conservation Act 1995*. A Section 5A Flora and Fauna Assessment must be carried out by an appropriately qualified person where clearing of native vegetation is proposed or where the development site adjoins areas of native vegetation. Where there is likely to be a significant effect on threatened species or their populations, Council may require a Species Impact Statement (SIS) to be submitted.

## 2.8 STATE – COASTAL AREAS

The coastline of the Nambucca Shire is approximately 25 km in length and runs roughly north to south. The coastline consists of various environments including exposed beaches and dune systems, headlands and associated rock platforms, river mouths and intermittently closed/open lakes and lagoons (ICOLL's).

A vegetation study conducted by Smith (1994), identifies the following as the major vegetation types found in the immediate coastal region:

- Banksia - Shrubland/Open Woodland;
- Swamp Paperbark - Closed Forest;
- Brushbox - Closed Forest;
- Blackbutt - Open Forest;
- Coastal Wattle/Spinifex - Shrubland/Heathland; and
- Kangaroo Grassland.

The coastal zone is an area of extreme environmental sensitivity and is of major economic importance to the Local Government Area. Many people visit the local area each year to enjoy the beaches and associated environments.

The coast is also of major importance to short and long term residents. The beaches and associated areas are all highly sensitive to human impacts, with many of the popular beaches experiencing high usage during the warmer months. This may result in loss of native vegetation, destabilization of the dune system and invasion of weed species.

The Warrell Creek Coastal Forest received interim listing on the Register of the National Estate. The Australian Heritage Commission provides the following reasons for listing this area.

AHC Official Statement of Significance - 24 June 1996.

*“The Warrell Creek place is one of the largest and least disturbed examples in New South Wales of a contemporary estuary embedded in a beach barrier system and closely paralleling the present day beach. The place is a discrete tract of coastal landscape comprising a sand mass developed by beach progradation since the last major rise in sea level. The most distinctive geomorphological feature of the place is the estuary of Warrell Creek which flows northward just behind the beach for the entire 10 km length of the beach. This phenomena is paralleled a kilometre further inland by the much larger estuary of the Nambucca River.*”

*The place is an outstanding scenic waterway which exhibits a high degree of visual integrity, with more than 10 kilometres of waterway being lined almost entirely by a diversity of undisturbed coastal forest and dunes. In the New South Wales context it compares only with the much larger coastal estuarine waterways of the Myall and Esk Rivers.*

*It supports a diversity of coastal vegetation communities, including several patches of littoral rainforest, which is a rare plant community in New South Wales. Six plant species are at or nearing their natural geographical limits of distribution in the Warrell Creek area, and one species is present which rarely occurs on the coast.”*

Council recognises the environmental significance of the area; however, certain lands identified in the interim listing are highly disturbed from agriculture, forestry, mining and possibly wastewater treatment activities and should possibly be excluded from the listing. A proposal to alter the boundary of the Warrell Creek Coastal Forest to generally include crown land only was agreed to by the Australian Heritage Commission. Private land immediately north of South Pacific Drive and land located on the western edge of Warrell Creek were proposed to be excluded. Council endorsed the proposed alterations (refer Map 1).

## **2.9 PRESSURE – COASTAL AREAS**

The increasing importance of tourism in the Shire and on the North Coast as a whole is exerting pressure on fragile coastal ecosystems. These ecosystems have evolved to endure extreme erosion and degradational events such as storms and floods, however they are unable to contend with constant and uncontrolled use that is typical of popular tourist beaches. The introduction and widespread increase of many weed species exerts additional pressure on the natural ecosystems.

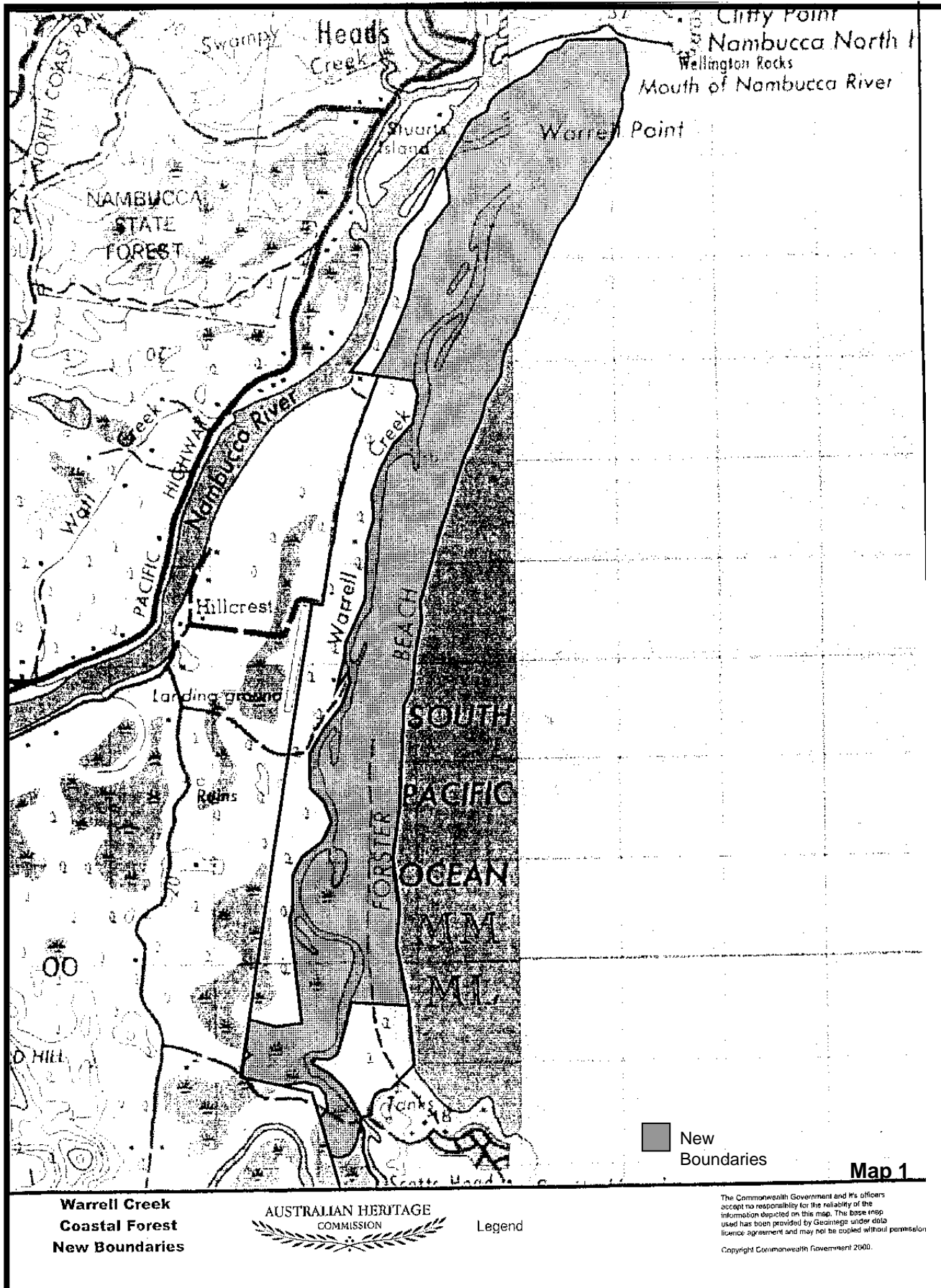
Council currently operates a policy that allows vehicles on certain beach areas within the Shire, subject to the vehicle owners obtaining a Beach Driving Permit. It is difficult to quantify the pressure exerted upon the coastal environment from these permits given the following:

- some drivers use the beach more than others;
- drivers will avoid the prohibited and restricted areas to varying degrees and
- permits issued in the Kempsey and Hastings Shires also allow access to beaches in the Nambucca Shire.

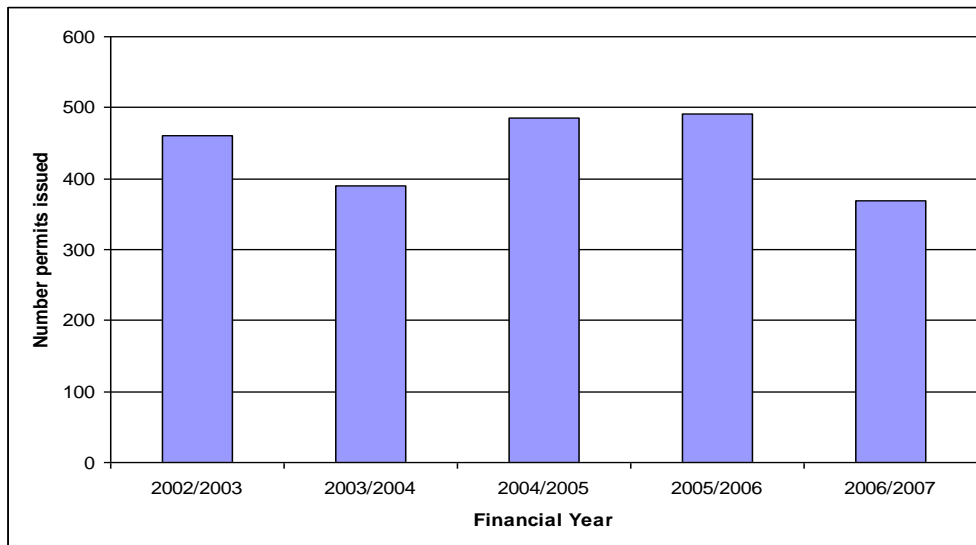
Regardless, a comparison of permits issued annually may provide an indication of the trend in four wheel drive vehicle use and the potential for degradation from this source.

The number of permits issued in the 2006/2007 reporting year was considerably lower than the previous reporting year. Historical information demonstrates that annual figures fluctuate considerably. It is believed that pressure on coastal areas from this source is remaining relatively constant. Figure 2.1 displays the number of permits issued for 2002/2003, 2003/2004, 2004/2005, 2005/2006 and 2006/2007 reporting years.





Map 1: Alterations to boundary of Warrell Creek Coastal Forest



**Figure 2.1: Number of Beach Driving Permits Issued in the Nambucca Shire**

The invasion of Bitou Bush (*Chrysanthemoides Monilifera* spp *rotunda*) is increasing throughout most coastal areas. Prior to 2000 no formal investigations had taken place, however it was obvious that Bitou Bush was increasing in terms of distribution and abundance in many coastal areas in the Local Government Area. In recognition of the potentially harmful effects of Bitou Bush on native flora and fauna, the NSW Scientific Committee determined the Invasion of Native Plant Communities by Bitou Bush and Boneseed (*Chrysanthemoides monilifera*) as a KEY THREATENING PROCESS under the *Threatened Species Conservation Act 1995*.

A potential problem that was previously overlooked during revegetation projects is the use of species that may be native to Australia or even the east coast but originate from a different biogeographical region. This may result in pollution of the local gene pool and the subsequent loss of biodiversity. Below is a list of species that may be used as either seed or plants in the revegetation or beautification of coastal areas, Wrigley (1991):

- Logan Apple - *Acronychia imperforate*;
- Beach Bird's Eye - *Alectryon coriaceus*;
- Rose Tamarind - *Arytera divaricata*;
- Coastal Wattle - *Acacia sophorae*;
- Lilly Pilly - *Acmena smithii*;
- Wallum Banksia - *Banksia aemula*;
- Coast Banksia - *Banksia integrifolia* var. *integrifolia*;
- Coastal Jack Bean - *Carnivalia rosea*;
- Native Pigface - *Carpobrotus glaucescens*;
- Red Olive Berry - *Cassine australis* var. *australis*;
- Common Correa - *Correa reflexa*;

- Tree Veined Laurel - *Cryptocarya triplinervis*;
- Tuckeroo - *Cupaniopsis anacardioides*;
- Golden Everlasting Daisy - *Helichrysum bracteatum*;
- Climbing Guinea Flower - *Hibbertia scandens* var. *scandens*; and
- Running Postman - *Kennedia prostrata*;
- Coastal Tea Tree - *Leptospermum laevigatum*;
- Silverbush - *Sophora tomentosa*;
- Brush Cherry - *Syzygium australe*.

Pressure is also exerted on the coastal environment through natural events such as floods and storms. Consideration must be given to the possible loss of life and property during such events. Dune systems are often the last line of defence between the destructive forces of storm events and fragile ecosystems or property.

## **2.10 RESPONSE – COASTAL AREAS**

WBM Oceanics Australia completed an Estuary Processes Study for the Nambucca River in 2000. The study was funded by Council and the Department of Land and Water Conservation and was overseen by the Estuary and Coastline Management Committee. The Estuary and Coastline Management Committee secured funding from Coastcare in 2000 to prepare a Bitou Bush Management Strategy for the Shire. The primary aims of the strategy were to produce a digitised inventory of Bitou Bush distribution and density along the Nambucca Coast and to develop short and long term eradication strategies for the area. The finalized strategy has been completed and adopted.

Through its Floodplain Management Committee, Council is in the process of preparing a Floodplain Management Plan in accordance with the NSW Government Flood Policy to identify solutions to existing flood problems and ensure new development is compatible with flood hazard.

There are also two Dunecare groups currently operating on the Nambucca Shire's coastline. These groups are based in Valla Beach and Scotts Head.

In the 2005/2005 financial year Nambucca Shire Council in a joint partnership with the Northern Rivers CMA and the Scotts Head Trust funded a dune rehabilitation project at Scotts Head, with a primary goal being urban habitat and biodiversity enhancement. Information signs showing areas of rehabilitation and restoration, along with maintenance of dune protection fencing have

contributed to the work the Scotts Head Trust undertakes in the rehabilitation of the dunal system. The work undertaken has also contributed to a wider community awareness and understanding of importance of urban habitat.

Another dune rehabilitation project jointly funded by the Northern Rivers CMA was completed at Beilbys Beach in Nambucca Heads. Due to the high amount of public traffic over the area in the past, the dunal system was under high stress and a significant amount of erosion had taken place. Ngurrala Aboriginal Corporation provided the labour with works including dune shaping, planting of endemic species and fencing of the area to prevent access by the public. Signage was erected to inform the public of the significance of the dunal ecosystem.

Council must consider the provisions of the NSW Coastal Policy when preparing plans and assessing Development Applications. State Environmental Planning Policy No. 71 – Coastal Protection also requires consideration by Council when preparing new plans and assessing development applications that relate to the NSW Coastal Zone.

## **2.11 STATE – CONSERVATION AREAS**

As mentioned previously, in 1998 the State Government announced additional National Parks and Nature Reserves within the Shire to those already established. A further series of National Parks and Nature Reserves were gazetted in 1999 (Local Environmental Plan has not yet been amended to provide these areas with an appropriate zoning). The location of all National Parks and Nature Reserves, as well as areas designated for environmental protection in Council's Local Environmental Plan, within the Shire is presented in Figure 2.3.

## **2.12 PRESSURE – CONSERVATION AREAS**

It is reasonable to assume that a greater degree of pressure will generally be exerted on those conservation areas that are readily accessible to the public. Adverse impacts that may result from over use of such areas include the introduction of exotic flora and fauna species, erosion and habitat degradation. Bush Rock Removal has been declared a KEY THREATENING PROCESS under the provisions of the *Threatened Species Conservation Act 1995* in recognition of the widespread removal of such material for landscaping and other purposes, and the consequent impact on habitat for various threatened species.

## 2.13 RESPONSE – CONSERVATION AREAS

Most of the land protected under the Nambucca Local Environmental Plan 1995 reflects State Government requirements only (ie SEPP 14 Wetlands, SEPP 26 Littoral Rainforest, National Parks and Nature Reserves). The exceptions are a few small areas of land zoned 7(b) Environmental Protection (Vegetation Conservation) and 7(f) Environmental Protection (Coastal Lands).

Council has carried out various studies reflected in appropriate zoning and landuse provisions in the Local Environmental Plan that aim to protect areas of conservation significance within the Shire. An example is the study into Remnant Vegetation Conservation Significance (Smith, 1994), undertaken for the eastern seaboard portion of the Shire, which is reflected in the provisions of Clause 18 of Nambucca Local Environmental Plan 1995. Council has also included a provision within its Local Environmental Plan requiring the following issues to be taken into consideration when assessing development applications on land adjoining, or within the drainage catchment of land zoned 7(a) Environmental Protection (Wetlands):

- The likely effect of the development on flora and fauna found in the wetlands;
- The likely effect of the development on the water table; and
- The likely effect on the wetlands of any proposed clearing, draining, excavation or filling.

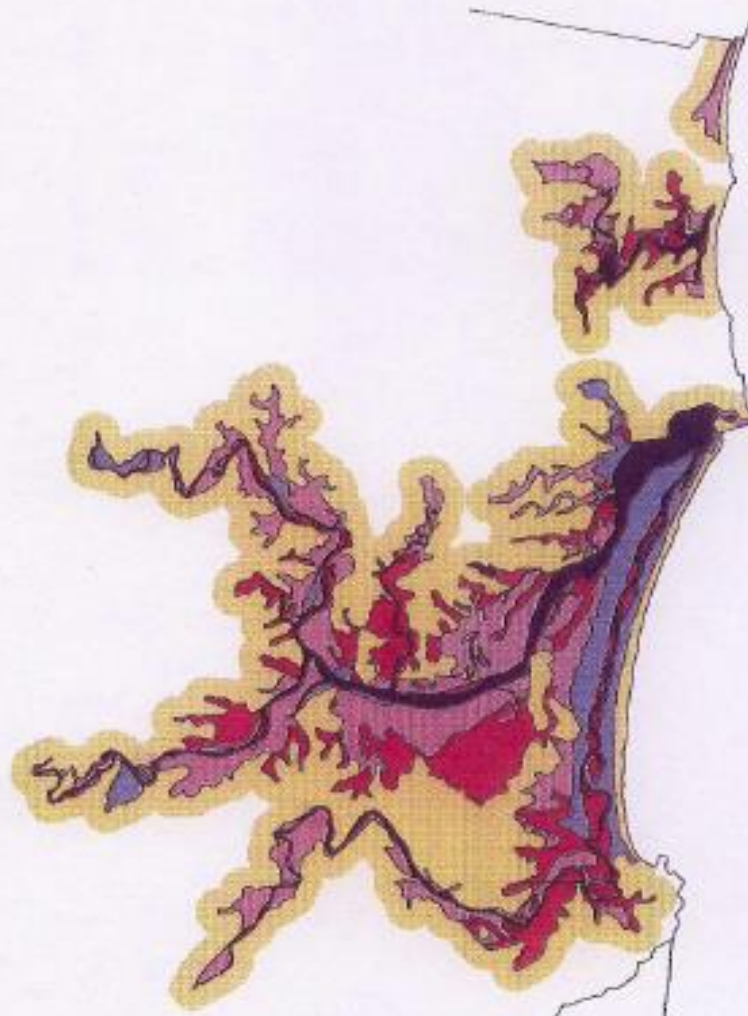
Provisions such as this recognise that activities undertaken outside conservation areas have the potential to affect conservation status.

Council has also designated zones 1(a3) Rural (Upper Water Catchment) and 1(a4) Rural (Lower Water Catchment) in the Nambucca Local Environmental Plan 1995. Special consideration is required to be given to the impact of activities on downstream water quality and quantity (including Council's water supply) in both of these zones. The 100 ha minimum lot size stipulated for zone 1(a3) is particularly important in minimising the degree of pressure exerted upon the upper catchment area through more intensive development.

In the 2005/2006 financial year Nambucca Shire Council in a joint partnership with the Northern Rivers CMA and the Gordon Parks Rainforest Walks Committee, funded an urban habitat and biodiversity enhancement project for Gordon Park Reserve in Nambucca Heads. A noxious weed removal program along with the defining of walkways and paths enhanced protection, condition and extent of the urban wildlife habitat. Signage of endemic tree species, the involvement of local conservation groups and the creation of an easy, safe access though the reserve have all contributed to a wider community awareness and understanding of urban habitat, and of ways urban dwellers can assist in its protection, enhancement and establishment.

# STATE OF THE ENVIRONMENT REPORT

## Acid Sulphate Soil Risk Areas



SOIL SCORE	RISK
0	No Risk
1	Minor to low risk of ground water acidification and associated vegetation damage
2	Minor to moderate risk of ground water acidification and associated vegetation damage
3	Major to high risk of ground water acidification and associated vegetation damage
4	Very high risk of ground water acidification and associated vegetation damage

Figure 2.1



**NAMBUCCA SHIRE COUNCIL**

Source: G.I.S. Nambucca Shire Council

Figure 2.2: Nambucca Shire - Acid sulphate soil risk areas

# STATE OF THE ENVIRONMENT REPORT

## Environmental Protected Areas

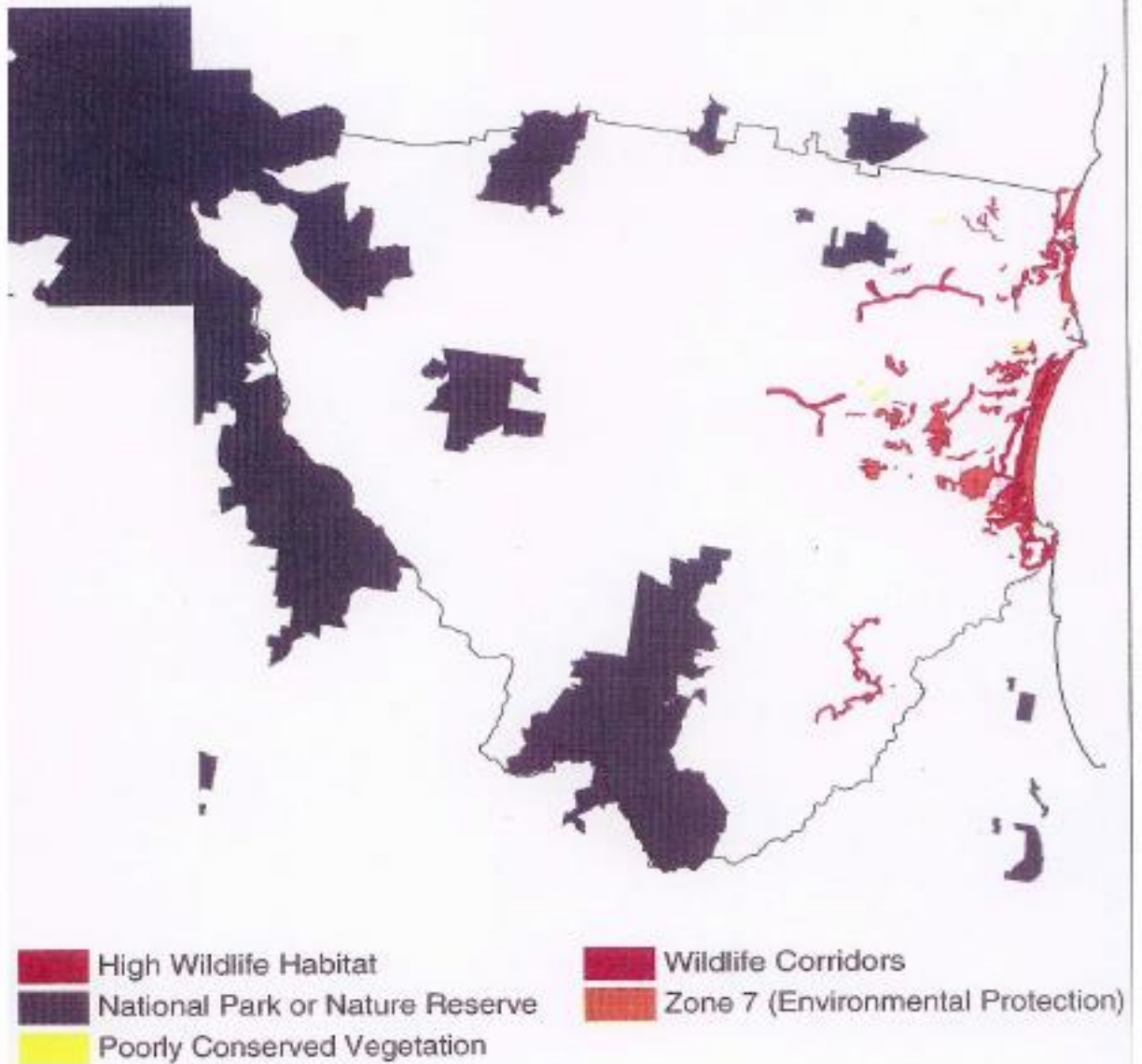


Figure 2.3


 NORTH	<b>NAMBUCCA SHIRE COUNCIL</b>
	Source: G.I.S. Nambucca Shire Council

Figure 2.3 Nambucca Shire - Environmental protected areas

## **3.0 WATER**

Aquatic resources form an integral part of the environment in the Nambucca Shire Local Government Area. Not only do these provide the scenic backdrop which is integral to the character of the Nambucca Shire, these resources also provide habitat for a diverse variety of flora and fauna species, provide water for urban and agricultural supplies and allow important economic and social activities to take place, such as aquaculture, fishing and boating.

Pressures on these environments from increased development and population growth can reduce water quality and quantity, increase nuisance algae growth and modify geomorphology.

### **3.1 STATE – WATER RESOURCES**

A diverse range of water resources occur within the Nambucca Shire. They include the Pacific Ocean and associated coastline and beaches, the Nambucca River and its tributaries, intermittently closed/open lakes and lagoons (ICOLLS) and a number of smaller intermittent creeks (Figure 3.3). Substantial groundwater aquifers are also present in the Nambucca Local Government Area.

#### **3.1.1 Surface Water**

The Nambucca River drains a catchment of approximately 1,330km<sup>2</sup> that is located almost entirely within the Shire. The Nambucca River extends from its headwaters in the north-west of the Shire through to its confluence with the Pacific Ocean adjacent to Nambucca Heads. Two main tributaries of the Nambucca River are Warrell Creek, which drains the south-eastern section of the Shire, and Taylors Arm, which drains the south-western section.

Since the commencement of European settlement, the Nambucca River has been substantially altered. The entrance and main channel of the river have been modified by the construction of the breakwall on the northern bank and increased sedimentation. The bed and course of the river above the tidal limit have also been altered substantially, resulting in erosion of banks along certain sections as well as the shallowing and widening of the waterway.



The ICOLL's of Deep Creek and Oyster Creek drain relatively small catchments in the north-east of the Local Government Area. Deep Creek drains an area to the south-west of Valla Beach while the Oyster Creek catchment drains an area to the north-west of Valla Beach. Deep Creek is almost permanently open to the ocean (Figure 3.1) while Oyster Creek is almost permanently closed. The catchments of the Swimming Creek and Beilby's Creek ICOLL's consist mainly of the north-eastern urban areas of Nambucca Heads. Many of their drainage lines are piped and concreted. Both Swimming Creek (Figure 3.2) and Beilby's Creek are rarely open to the ocean.



**Figure 3.1: Deep Creek Entrance Following Mechanical opening in 2000**



**Figure 3.2: Swimming Creek Entrance, 2004**



### **3.1.2 Groundwater**

In 1998 the (former) Department of Land and Water Conservation carried out an assessment of aquifers in New South Wales. The aquifers were classified according to the risk of over-extraction and/or contamination. The risk assessment used was a multi-criteria analysis developed to define the total risk to an aquifer system (high, medium or low). This rapid desktop analysis involved ranking each aquifer on the following eight criteria:

- Relationship between water licence entitlement and sustainable yield of the aquifer;
- Local interference caused by pumping;
- Small and large flow systems;
- Vulnerability of an aquifer to pollution;
- Land-use threats;
- Proximity to poor water quality that could be drawn in by over pumping;
- Water level rise and salinity needs and
- Dependence on surface ecosystems on groundwater flows.

The results of this report were used to prioritise the development of groundwater plans. These plans were developed for all aquifers assessed as being at high risk.

Other than the alluvium downstream of Macksville being classified as medium risk, mainly due to potential contamination risks, the remainder of the Nambucca Shire Local Government Area was classified as low risk. As such, the Department of Natural Resources has no intentions for the development of any groundwater management plans within the Shire. The department however, is monitoring the issuing of new licences within the unconsolidated sediments associated with the Nambucca River and its tributaries with the intent of providing greater security for the borefield adjacent to Bowraville during drought periods.

It is important to note that the department considers the extraction of groundwater for domestic purposes from aquifers to be minimal compared to extraction for town water supply and irrigation.

## **3.2 PRESSURE – WATER RESOURCES**

Since European settlement, the majority of the waterways in the Nambucca Valley have been affected by the processes of accelerated erosion and deposition, gravel extraction and removal of riparian (stream side) vegetation. These changes are due to a combination of factors, including clearing of land adjacent to watercourses for agriculture and stock grazing, extractive activities and tourism/recreation-based activities, such as boating.

### **3.2.1 Sedimentation**

Sedimentation of the Nambucca River entrance is likely to be perceived as the largest problem in the waterway. Sediment deposited in the river entrance is believed to reduce the navigability and flushing volume of the river.

As with the majority of estuarine entrances on the eastern seaboard of New South Wales, the condition of the Nambucca River estuary entrance changes considerably over time. This change is a manifestation of the influence of naturally variable conditions that affect the accumulation of marine sediments in the entrance, combined with human-based activities which alter the rates of deposition and transport of sediments into and within this water body. Of principal concern in this regard are catchment runoff/flooding and significant storm/high wave events.

Catchment runoff/flooding will tend to assist in the maintenance of “open” entrance conditions by scouring sand out of the entrance and into the nearshore zone. In comparison, high wave events will tend to mobilise coastal sand resources and enable them to be transported into the estuary where they will deposit and tend to “close” the entrance (WBM Oceanics, 2000).

### **3.2.2 Gravel Extraction**

A study by Lyall & Macoun Consulting Engineers (LMCE, 1999 - unpublished) identified that gravel extraction is one of the most contentious issues in the Nambucca Shire catchment. Extraction has been attempted in most of the watercourses in the Nambucca Shire over the past 90 years. Although gravel extraction has now ceased from the bed of the watercourses, its legacy remains, with LMCE (unpublished) identifying that the activity has contributed to bed lowering and the loss of bed armour, which have initiated the destabilisation of the river channel and bank collapse.

### **3.2.3 Bank Erosion**

Bank erosion is evident along all of the waterways in the Nambucca Shire and ranges from relatively minor to severe (ie the loss of hectares). The primary causes of bank erosion include flood flows, tidal flows, waves (wind and boat generated), land clearing and sand and gravel extraction.

### **3.2.4 Stock Access**

Stock access to stream banks has a number of impacts on the stability of river banks and stream ecology. The sharp hooves of farm stock can contribute to the physical breakdown and erosion of the stream banks. Stock can also adversely impact on riparian vegetation by trampling and eating it.

### **3.2.5 Removal of Riparian Vegetation**

Riparian vegetation is essential to the stream ecology and stability. The area in which it grows however, was the first to be cleared when the area was settled, due to its accessibility by boat and the presence of rich, alluvial soil flats which were ideal for agriculture. The removal of this vegetation has modified stream ecology, reduced the amount of woody debris entering the waterways and decreased the stability of the stream bank and bed. There are only thin fringing riparian vegetation zones remaining along much of the Nambucca River, Taylors Arm and Deep Creek. Good riparian zones, however still exist along much of Warrell Creek and Oyster Creek.

## **3.3 RESPONSE – WATER RESOURCES**

### **3.3.1 Nambucca Valley River and Catchment Management Study**

The Nambucca Valley River and Catchment Management Study (Lyall & Macoun Consulting Engineers, 1999) was commissioned by the Nambucca Catchment Management Committee, through funding provided by the National Heritage Trust and Department of Land and Water Conservation. Its aims were to determine the causes of degradation in the freshwater sections of the catchment and how best to manage them. Some of the major findings of the study included:

- The river and floodplains are naturally vulnerable to change
- Initial European settlement “primed” the river system for severe change
- A quick succession of floods (definitely in 1950’s) caused catastrophic change
- The prime reason for channel degradation has been the removal of riparian vegetation
- Expansion in the extent of river oaks is a response to river instability rather than a cause
- Gravel extraction from the river channel will, in most cases, exacerbate erosion problems.
- Effective river and floodplain management should include conservation activities, vegetation management, river stabilisation activities, stream gravel management and administrative actions

These and other important findings provide critical information for ongoing conservation activities in the catchment eg Landcare works, and also provide guidance for departmental policy and direction for future investment in river management projects.

### **3.3.2 Estuary and Coastline Management Committee**

The Estuary and Coastline Management Committee received funding to prepare an Estuary Processes Study for the Nambucca River. The study was completed in late 2000 and is the first step in the preparation of a management plan.

A number of stream bank erosion sites exist on the Nambucca River upstream of Macksville. The abovementioned committee, the NSW Waterways Authority and community groups have become active in restoration projects, increased signage and boater education for the area.

### **3.3.3 Nambucca River Estuary Management Plan**

After a period of community consultation, a draft document was prepared by WBM Oceanics at the request of Council, with the aim of identifying, ranking and addressing the issues involved in managing the resources associated with the Nambucca River Estuary. This document is known as the Nambucca River Estuary Management Plan 2007 (NREMP 2007), and forms the basis for responsible and appropriate management of this invaluable estuary. Some of the issues covered in this plan are the need to improve water quality, protect marine habitats, establish and maintain vegetative buffers adjacent to water courses and effectively monitor the human-based activities identified as contributing to declining estuary health.

### **3.3.4 Landcare Activities**

Nambucca Valley Landcare has a number of Landcare groups, Dunecare groups, schools and community groups as well as 100 individuals as members. Nambucca Valley Landcare is contracted by the Northern Rivers Catchment Management Authority (NRCMA) to “build community capacity” in the four areas of land management, biodiversity, rivers, estuaries and marine resources and Aboriginal cultural heritage. During the reporting year 2006-07, NV Landcare managed 7 contracts under the NRCMA, and 2 with the Federal Government, for environmental projects to the value of \$350, 000.

Nambucca Valley Landcare’s role is to deliver the on-ground outcomes outlined in the Catchment Action Plan and involve the community in natural resource management. In doing this, Landcare forms partnerships with Federal and State Government Departments, Council, industry groups and the community. The organisation helps plan, deliver, review and report on training courses, workshops, farm visits, devolved grants and catchment and sub catchment projects. During 2006-07, NV Landcare held 2 tree fairs and 3 field days as part of its program of community education and natural resource management.

Nambucca Valley Landcare, in conjunction with NRCMA and the Nambucca Valley Conservation Association, recently released a comprehensive field guide to Nambucca's local native plants and weeds. Called the Nambucca Valley Vegetation & Planting Guide, this handbook is an excellent source of information for those wishing to become better acquainted with the plant species meant to be growing in the Nambucca, and those which are not.

Nambucca Valley Landcare's resources and Community Support Officer are available to groups and individuals for any activity relating to natural resource management. The Nambucca Valley Landcare office is located at 64 High St Bowraville.

### **3.3.5 Macksville Wharf**

Council and the NSW Waterways Authority jointly funded a public wharf facility on the southern bank of the Nambucca River at Macksville. The facility will provide improved and focussed public access to the river, reducing informal public access points and ultimately foreshore damage and erosion. A marine effluent pump-out station (Figure 3.4) was installed at the wharf in 2002 to eliminate the need for vessels eg houseboats to dispose of effluent in the river. The project was funded by the Department of Land and Water Conservation and Environment Australia.

A similar project, completed by Council in 2007, saw the removal of a public boat ramp in River St., Macksville, and its replacement with a new wharf at the old Government Wharf site at the end of East St. This work formed a part of the riverbank restoration work needed to repair the unstable bank at this location. This project was designed to provide continued public access to the river at this site, as well as to inform residents and visitors alike as to the history and heritage of life in Macksville in earlier times.



**Figure 3.4: Effluent Pump-Out Station, Macksville**

### **3.3.6 Flood Damage Repair**

Major damage to stream banks and roadways commonly occurs during flooding. While Council has previously received funding from the Roads and Traffic Authority to assist with the repair of such flood damage, the financial cost to repair one site alone is extremely high. During the reporting year, NSC undertook bank restoration works to repair flood damage on the eastern bank of Newee Creek on Nursery Rd, Macksville. This work involved the battering of existing banks, armouring with rock and subsequent revegetation. The cost of this operation was in the vicinity of \$60, 000.

### **3.3.7 Surface Water Licensing**

The *Water Act 1912* has been the statute under which all approvals and licenses for water related matters have been granted since enactment. This act has evolved as required over time to provide for the changing requirements of both government and users, and in response to proceeding brought before the courts (Department of Infrastructure, Planning and Natural Resources, 2004).



Licences under the *Water Act* 1912 are regulated by the Department of Infrastructure, Planning and Natural Resources. The locations of surface water licences in the Nambucca Shire Local Government Area are indicated diagrammatically in Figure 3.5.

### **3.3.7 Groundwater Licensing**

The Department of Natural Resources attempts to effectively manage groundwater resources through a system whereby all groundwater bores must be licensed, regardless of purpose or location. Licensing attempts to achieve effective monitoring and management of aquifer levels, potential contamination and other water quality issues. The type and location of licensed groundwater bores in the Local Government Area is displayed in Figure 3.6.

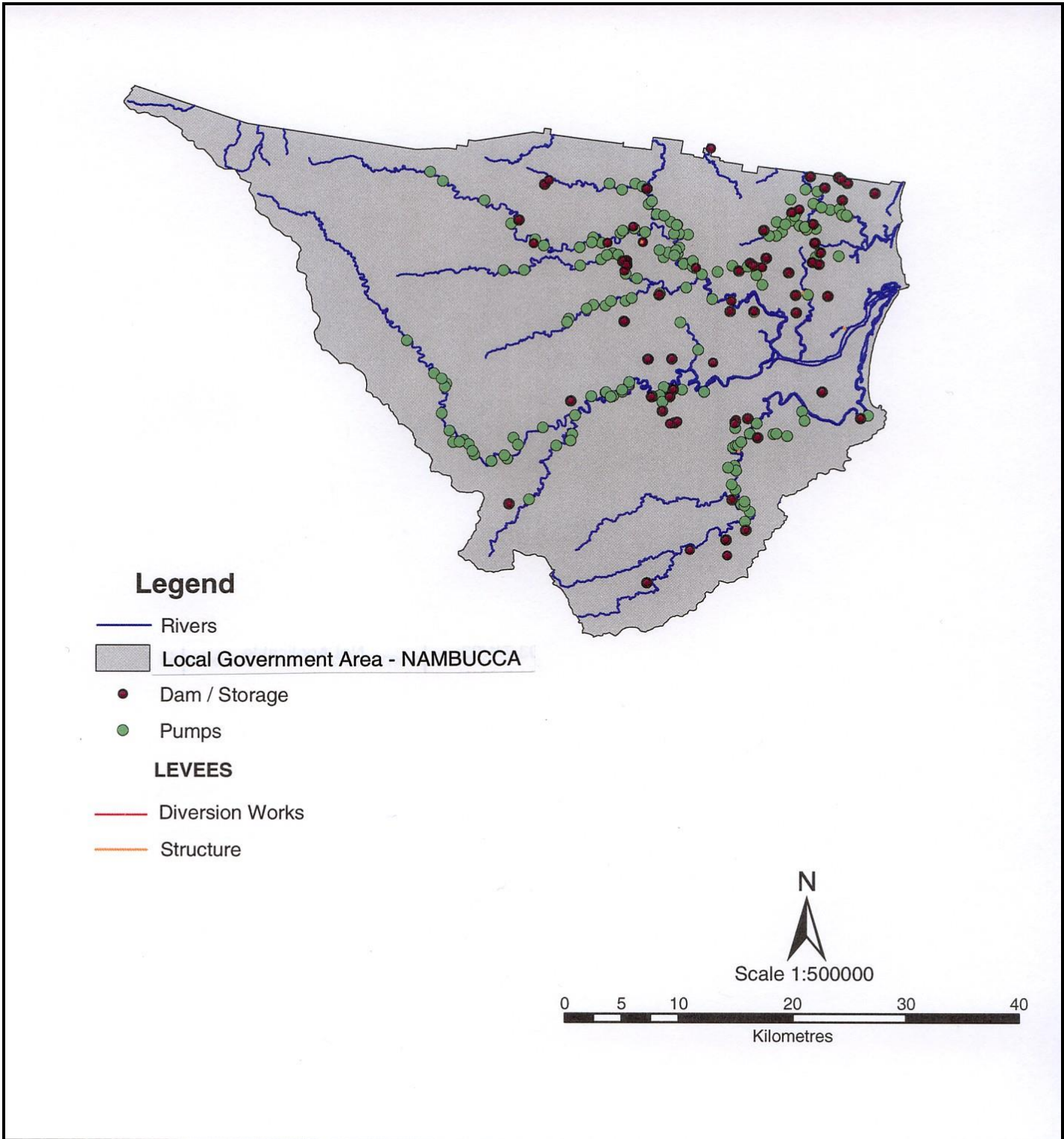
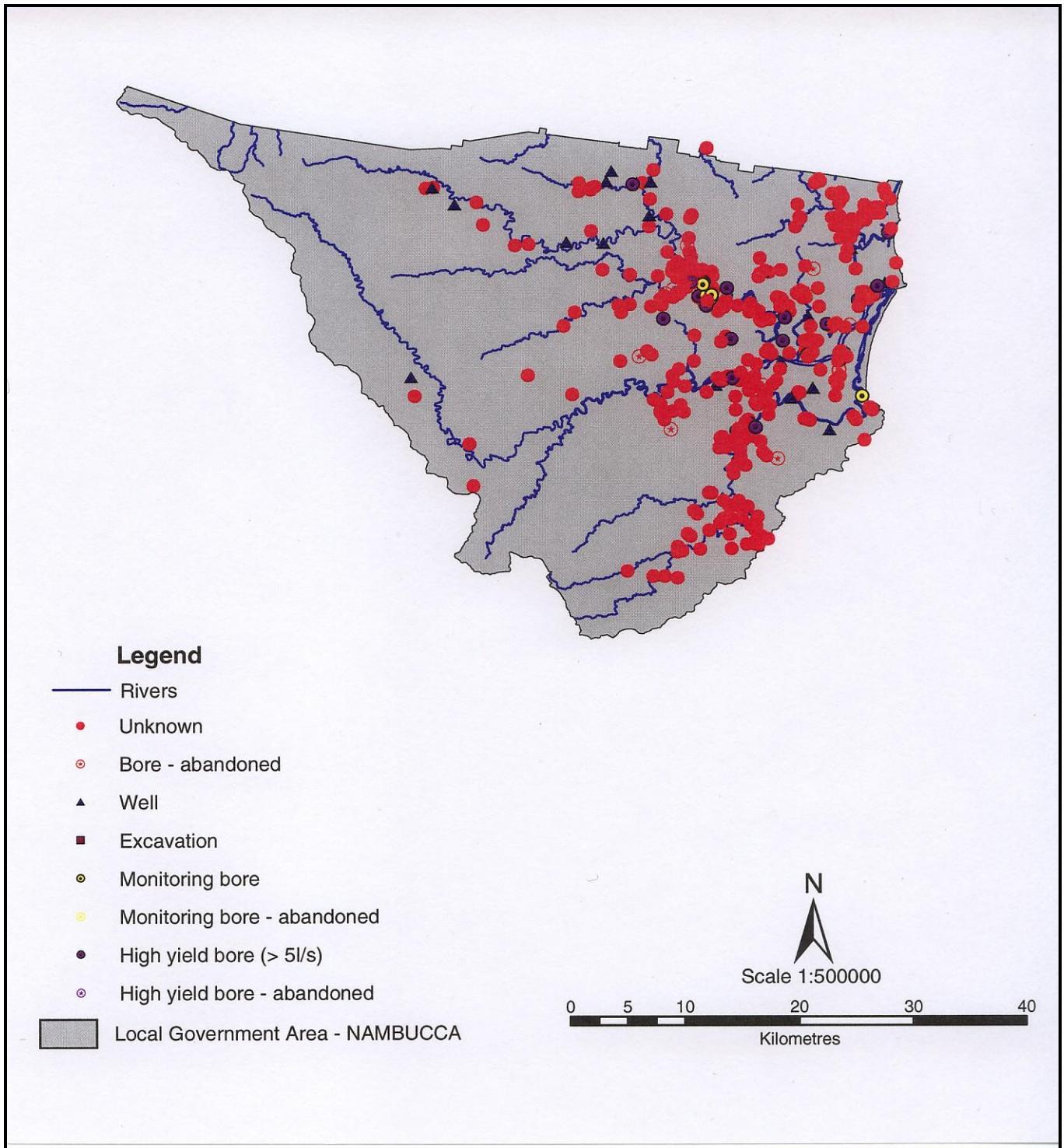


Figure 3.5: Surface Water Licences in the Nambucca Shire Local Government Area



**Figure 3.6: Groundwater Licences in the Nambucca Shire Local Government Area**

## 3.4 STATE – WATER QUALITY

### 3.4.1 Surface Water

Council has monitored the water quality of the waterways in the Nambucca Valley since 1992. The current program monitors eight locations within the Shire on a monthly basis for various water quality parameters including dissolved oxygen, pH, salinity, conductivity, turbidity, temperature, total phosphorus, nitrate, nitrite, faecal coliforms and total suspended solids. Monitoring currently occurs in the Nambucca River (at Bowraville and Macksville), Newee Creek (at Wirrimbi), Warrell Creek (at Scotts Head) and Deep Creek (Valla Beach and Hyland Park).

Total phosphorus and nitrate results from this monitoring program for the 2003/2004, 2004/2005, 2005/2006 and 2006/2007 reporting years have been compared to water quality guidelines for the protection of aquatic ecosystems (ANZECC, 2000). Faecal coliforms results from the program for the abovementioned reporting years have been compared to water quality guidelines for primary and secondary contact recreation (ANZECC, 2000). Only parameters that have defined trigger values have been used; the number of exceedances and percentage of exceedances are presented in Table 3.1.

It is important to note that in August 2002, Council commenced an effluent re-use scheme at the Bowraville Wastewater Treatment Works. Since that time effluent has generally been diverted to a utilisation dam on a nearby property and used for irrigation. Between August 2002 and 30 June 2005 effluent was only discharged to the river for a period of two months in early 2004. The use of treated effluent in this manner provides benefits through the provision of higher water quality in the upper tidal reaches of the Nambucca River. Environmental benefits arise from the discontinuation of effluent release into this waterway through a reduction in the load of biological, chemical and physical factors being discharged, and from the reduction in the volume of surface water being extracted for irrigation.

### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Percentage of exceedances of ANZECC water quality guidelines</b>	<b>Refer Table 3.1</b>
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**Table 3.1: Number and Percentage of Exceedances of Water Quality Guidelines**

Site	Parameter	2003-2004	2004-2005	2005-2006	2006-2007
Site 4: 200mupstream of discharge from Macksville STW	Total phosphorus <sup>1</sup>	3/12 (25%)	1/12 (8.3%)	1/12 (8.3%)	0/11 (0%)
	Nitrate <sup>2</sup>	N/A	N/A	N/A	N/A
	Faecal coliforms <sup>3</sup>	0/12 (0%)	0/12 (0%)	1/11 (9.1%)	0/11 (0%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/11 (0%)
Site 7: 200mdownstrea m of discharge from Macksville STW	Total phosphorus <sup>1</sup>	3/12 (25%)	2/12 (16.7%)	2/12 (16.7%)	0/11 (%)
	Nitrate <sup>2</sup>	N/A	N/A	N/A	N/A
	Faecal coliforms <sup>3</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/11 (0%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/11 (0%)
Site 12: 200mupstream of discharge from Bowraville STW	Total phosphorus <sup>1</sup>	0/12 (0%)	0/13 (0%)	2/13 (15.4%)	0/12 (0%)
	Nitrate <sup>2</sup>	0/12 (0%)	0/13 (0%)	0/13 (0%)	0/12 (0%)
	Faecal coliforms <sup>3</sup>	4/12 (33.3%)	1/13 (7.7%)	6/13 (46%)	5/12 (41.5%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	0/13 (0%)	1/13 (7.7%)	0/12 (0%)
Site 13: 200mdownstrea m of discharge from Bowraville STW	Total phosphorus <sup>1</sup>	0/12 (0%)	0/13 (0%)	5/13 (38.5%)	0/12 (0%)
	Nitrate <sup>2</sup>	0/12 (0%)	0/13 (0%)	0/13 (0%)	0/12 (0%)
	Faecal coliforms <sup>3</sup>	5/12 (41.7%)	3/13 (23%)	7/13 (53.8%)	5/12 (41.5%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	1/13 (7.7%)	1/13 (7.7%)	1/12 (8.3%)
Site 15: Opposite oyster leases, Wrights Corner	Total phosphorus <sup>1</sup>	2/12 (16.7%)	3/12 (25%)	3/12 (25%)	0/11 (0%)
	Nitrate <sup>2</sup>	N/A	N/A	N/A	N/A
	Faecal coliforms <sup>3</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/11 (0%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/11 (0%)
Site 16: 3.5 km up Newee Ck from confluence with Nambucca River.	Total phosphorus <sup>1</sup>	6/12 (50%)	7/12 (58.3%)	6/12 (50%)	1/11 (9%)
	Nitrate <sup>2</sup>	N/A	N/A	N/A	N/A
	Faecal coliforms <sup>3</sup>	2/12 (16.7%)	0/12 (0%)	0/11 (0%)	2/11 (18%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/11 (0%)
Site 25: Valla Park Footbridge, Deep Creek	Total phosphorus <sup>1</sup>	2/12 (16.7%)	3/12 (25%)	0/12 (0%)	0/12 (0%)
	Nitrate <sup>2</sup>	N/A	N/A	N/A	N/A
	Faecal coliforms <sup>3</sup>	1/12 (8.3%)	1/12 (8.3%)	0/11 (0%)	1/12 (8.3%)
	Faecal coliforms <sup>4</sup>	0/12 (0%)	0/12 (0%)	0/11 (0%)	0/12 (0%)

- 1 The ANZECC, 2000 guideline for total phosphorus is 0.05 mg/L (lowland river, freshwater) and 0.03 mg/L (estuarine) and is taken from Table 3.3.2, default trigger values for physical and chemical stressors for South East Australia for slightly disturbed ecosystems.
- 2 The ANZECC, 2000 trigger value is 0.7 mg/L and is taken from Table 3.4.1, protection for 95% of freshwater species.
- 3 Primary contact. Trigger level used is 150 fc/100 mL for a single sample. It should be noted that the guideline for primary contact is 150 fc/100 mL for the median faecal coliform density for five samples taken at regular intervals within one month (ANZECC, 2000 and National Health and Medical Research Council, 1990). Only one sample was taken each month.
- 4 Secondary contact. Trigger level used is 1000 fc/100 mL for a single sample. It should be noted that the guideline for secondary contact is 1000 fc/100 mL for the median faecal coliform density for five samples taken at regular intervals within one month (ANZECC, 2000). Only one sample was taken each month.

Commencing in April 2002, Council began water quality monitoring in Warrell Creek at three locations for a 12 month trial period (results reviewed by Hunter Water Australia). The draft report from Hunter Water Australia found the overall water quality in Warrell Creek to be relatively healthy. However, it appears that water quality at this location suffers stress on

occasion. This study recommended that further water quality monitoring be carried out on a quarterly basis (one test in each weather season). The water quality parameters to be tested include dissolved oxygen, pH, salinity, conductivity, turbidity, temperature, total phosphorus, phosphate, total nitrogen, nitrate, nitrite, ammonia, faecal coliforms and total suspended solids.

### **3.4.2 Groundwater**

Council's reticulated water supply aquifer consistently displays excellent water quality and is reputed to be one of the best quality drinking water supplies in Australia. In April 2002 the Water Unit of the NSW Department of Health offered free water analysis to NSW Councils and County Council water supply authorities for projects relating to drinking water quality. Council submitted a project application, which was successful and involved monthly monitoring of raw drinking water at one groundwater (borefield) and three surface water sites from July 2002 to December 2002. All monitoring results for the groundwater site complied with the corresponding Australian Drinking Water Guidelines, therefore the quality (potable water) of the drinking water supply aquifer is considered to be very good.

From April 2002, Council began groundwater quality monitoring at Scotts Head via four bores located in the vicinity of the Scotts Head Wastewater Treatment Works for a 12 month trial period (results analysed by Hunter Water Australia). A draft report from Hunter Water Australia recommended that ongoing groundwater quality monitoring be carried out on a weather seasonal basis (ie two out of the three months within each seasonal variation). Groundwater quality parameters to be monitored included dissolved oxygen, pH, salinity, conductivity, turbidity, temperature, total phosphorus, phosphate, total nitrogen, nitrate, nitrite, ammonia and faecal coliforms. This monitoring schedule was adopted, and is still in operation to date.

Groundwater bores are also used at the Bowraville re-use farm for the purpose of monitoring water quality. Water from these bores is routinely tested for the presence of certain indicators which would suggest contamination of groundwater through the use of effluent as a water source at this site. Monitoring results to date indicate that no discernable contamination of groundwater has occurred at this site.

As required by NSW Department of Environment and Climate Change Environment Protection Licences, Council monitors groundwater at bores adjacent to the previous and current landfill sites on Old Coast Road, Nambucca Heads. In 2003 Council submitted a review of 24 months of ground and surface water quality monitoring of its previous landfill site. This review did not indicate that groundwater contamination was occurring (as detected by the current groundwater monitoring network). Council is currently undertaking a review of water quality monitoring for its

current landfill site. The preliminary assessment of the data does not indicate that groundwater contamination is occurring.

As mentioned, the Department of Land and Water Conservation carried out an assessment of groundwater aquifers in New South Wales. Apart from the alluvium downstream of Macksville being classified as medium risk, primarily due to potential contamination risks, the remainder of the Local Government Area was classified as low risk.

## **3.5 PRESSURE - WATER QUALITY**

### **3.5.1 *Surface Water***

There are relatively few pressures placed on the quality of the water resources in the Nambucca Shire. The cumulative effect of these pressures however, can be appreciable, particularly during and immediately after rainfall. Pollution of watercourses frequently occurs after rainfall as a result of sediment transport in stormwater. A proportion of this sediment results from erosion of soil from building sites and subdivisions which do not provide erosion and sediment control to the necessary standard. Sedimentation of watercourses causes a decline in estuary health by affecting aquatic organisms, causing siltation, reducing water depth, altering flow regimes and generally reducing the amenity of the waterway.

#### **3.5.1.1 Urban Runoff**

Urban runoff has a notable impact on the quality of the watercourses in the Nambucca Valley. The urban environment modifies the natural environment substantially by increasing impervious surfaces, altering natural drainage patterns and concentrating forms and sources of pollution in a specific area.

The pollutants derived from urban areas include litter, sediment, nutrients, microorganisms, oils & greases, heavy metals, pesticides and oxygen depleting materials such as grass clippings. These pollutants are transported into waterways via stormwater runoff, in the majority of instances without treatment.

Such pollutants can have a considerable impact on the receiving watercourse. Examples of impacts include eutrophication from elevated nutrient levels, heavy metal contamination of aquatic fauna, fish kills and a reduction in the aesthetic value of the watercourse.

#### **3.5.1.2 Industrial Runoff**

The industrial areas in the Nambucca Valley are typically small scale developments, fragmented throughout the major towns in the Valley. The pollutants derived from these areas are typical of small scale industrial areas and include hydro-carbons, heavy metals and oils & greases. Similar to urban pollutants, these substances can be transported by stormwater runoff into nearby watercourses where they can have substantial impacts on water quality and the aquatic ecosystem. Although the small-scale nature of industrial development in the Nambucca Valley suggests that runoff from these areas would contribute a relatively small amount of pollutants to the river system, the cumulative effect of such pollutants over time has the potential to cause considerable, long-lasting effects to the aquatic environment.

### **3.5.1.3 Rural Runoff**

A large proportion of the Nambucca Valley is designated as rural. Agricultural, rural-residential and extractive industry activities all take place in these areas. The primary agricultural pursuits in the Nambucca Valley are beef and dairy cattle grazing, cropping and horticulture. Runoff from agricultural and other rural areas can contribute suspended solids, nutrients, micro-organisms and pesticides to waterways. These pollutants have the potential to impact on water quality.

### **3.5.1.4 Sewage Treatment Works and On-Site Disposal Systems**

Sewage from the urban areas of Nambucca Heads, Macksville, Scotts Head, Bowraville, Valla Beach and Hyland Park is treated at one of the four Wastewater Treatment Works that Council owns and operates. Depending on their level of treatment, these works discharge effluent of varying quality to the adjacent waterbodies (not generally the case at the Bowraville works), which is monitored regularly and subject to strict Department of Environment and Climate Change Environmental Protection Licence conditions.

Nambucca Heads, Macksville and Bowraville Wastewater Treatment Works treat the sewage to a tertiary level, while the Scotts Head Wastewater Treatment Works treats the sewage to a secondary level. The total volume of wastewater treated at treatment plants during the reporting year was 1385.9 ML. Approximately 1308.1 ML (94.4%) of the sewage treated at the Shire's treatment works was treated to tertiary level, while the remaining 77.9 ML (5.6%) was treated to secondary level (based on annual flows). According to the Nambucca Shire Council Growth Profile for Development Servicing Plans (Hunter Water Australia, 2004) and Census data (Australian Bureau of Statistics, 2001), approximately 64% of the Shire's population is serviced by the sewerage system.

A large number of rural residences and rural-residential subdivisions are serviced by on-site effluent disposal systems. A recent concern for local Councils is the cumulative impact of poorly functioning on-site disposal systems on the water quality of waterways. Council is in the process



of undertaking a comprehensive Shire wide audit of all on-site sewage management systems in accordance with amendments to the *Local Government Act 1993*, which requires Council to issue an approval to operate on condition of satisfactory operation of the system. Consequently, any system inspected that is not operating satisfactorily will be required to be brought up to standard. Details of Council's auditing program during the reporting year are outlined in Section 2.4.4. Obviously around 36% of the Shire's population is serviced by on-site effluent disposal systems.

#### **NSW NORTH COAST REGIONAL INDICATORS**

Wastewater treated at treatment plants during the reporting year	<b>1385.8 ML</b>
Wastewater treated at treatment plants to tertiary level during the reporting year	<b>1308.1 ML 94.38%</b>
Wastewater treated at treatment plants to secondary level during the reporting year	<b>77.9 ML 5.6%</b>
Population serviced by the sewerage system	<b>64%</b>
Population serviced by on-site effluent disposal systems	<b>36%</b>

#### **3.5.1.5 Recreational and Commercial Use**

The Nambucca River and Deep Creek estuaries are used for recreational purposes by visitors and local residents, as well as being used by commercial fishermen and oyster growers. They are used in the form of active recreation such as swimming, fishing and boating as well as the passive uses such as nature appreciation. The main pollutants derived from these activities are litter and discharges from boats. Boats can contribute to the decline in estuary health by damaging aquatic habitats through excessive wash, propeller scouring and inappropriate anchoring.

#### **3.5.1.6 Licensed Discharges**

In addition to the aforementioned pressures, there are a number of premises in the Shire that hold a NSW Department of Environment and Climate Change Environment Protection Licence under the *Protection of the Environment Operations Act 1997* (Table 3.2). These premises discharge various substances and are all stringently controlled by the Department of Environment and Climate Change.

#### **3.5.2 Groundwater**

It is difficult to identify and quantify the pressures being placed on the quality of the groundwater of the Nambucca Valley due to the complexity of the hydraulic, chemical and biological forces that influence it.

**Table 3.2: Premises Licensed under the Protection of the Environment Operations Act 1997 in the Nambucca Shire (Includes Notices)**

Doc No	Name	Address	Status/Notice Type
11625	C, J & A Woods Pty Limited	Old Coast Road Nambucca Heads	Issued
11293	Cockburn; Margaret	Pacific Highway Warrell Creek	Issued
3757	M & B Dyer Pty Ltd	Rodeo Drive Bowraville	Issued
11386	Nambucca Shire Council	Corner Wirrimbi Road and Old Coast Road Macksville	Issued
2564	Nambucca Shire Council	South Pacific Drive (Extension) Scotts Head	Issued
579	Nambucca Shire Council	River Street Macksville	Issued
587	Nambucca Shire Council	River Street Bowraville	Issued
6268	Nambucca Shire Council	Old Coast Road Nambucca Heads	Issued
803	Nambucca Shire Council	Mahogany Road, Nambucca Heads	Issued
10002	Nambucca Valley Quarries Pty Ltd	Scotts Head Rd Macksville	Issued
4089	Newee Creek Sawmill Pty Ltd	Wirrimbi Road Newee Creek	Issued
1703	Wingham Abattoirs Pty Ltd	Wirrimbi Road Macksville	Issued
11741	Mac'scon Pty Ltd	44 Missabotti Road Missabotti	Surrendered
010785	J & B Fortescue, Screen Gravel & Sand Pty Ltd	Lot 77, Yarrowonga Street Macksville	S 80 Surrender Licence
008075	Kango Concrete	Lot 141 DP 700891 Old Coast Road Nambucca Heads	S 80 Surrender Licence
008596	Mac'sville Concrete	25-27 Mackay Street Macksville	S 80 Surrender Licence
008595	Nambucca Concrete	Lot 6, Ken Howard Crescent Nambucca Heads	S 80 Surrender Licence

**Source:** Department of Environment and Climate Change, 2007

## **3.6 RESPONSE - WATER QUALITY**

### **3.6.1 Council Water Quality Monitoring**

Council continues with its water quality monitoring program that commenced in 1992. With the inclusion of Warrell Creek this program collects water samples from eight sites once a month which are analysed for dissolved oxygen, pH, salinity, conductivity, turbidity, temperature, total phosphorus, nitrate, nitrite, faecal coliforms and total suspended solids.

As required by NSW Department of Environment and Climate Change Environment Protection Licences, Council currently monitors groundwater at bores adjacent to the previous and current landfill sites on Old Coast Road, Nambucca Heads. Council has been monitoring ground and surface water in and around both landfill facilities since 2000 as a requirement of the licences.

In 2003, Council submitted a review of 24 months of ground and surface water quality monitoring of its decommissioned landfill site. This review did not indicate that groundwater contamination was occurring (as detected by the current groundwater monitoring network). Additionally Council has completed a review of water quality monitoring for its current landfill site. Assessment of the data indicates that contamination of groundwater or surface water is not occurring. Over two years of water quality monitoring in and around the new landfill facility has not detected any influence on the surrounding ground or surface water, suggesting that the integrity of the landfill liner has not been compromised and surface water controls such as the stormwater retention wetland are operating effectively.

During 2003 Council also commenced additional surface water monitoring downstream of Council's decommissioned landfill facility to augment the surface water, groundwater and leachate monitoring programs already in place.

In 2002 the Water Unit of the NSW Department of Health offered free water testing to NSW Councils and County Council water supply authorities for projects relating to drinking water quality. Council submitted an application in June 2002 to carry out monitoring of raw water collected from the Nambucca River and Council's borefield. The application was successful, with the project undertaken between July and December 2002. Council continues to monitor drinking water quality through the NSW Department of Health, and since the inception of monitoring, has achieved and maintained a very high standard of drinking water quality for residents on the reticulated water system throughout the Shire.

Council monitors the discharges from its four wastewater treatment works within the Shire. The Macksville and Nambucca Heads works are monitored on a fortnightly basis, while the Bowraville and Scotts Head works are monitored on a monthly basis. All four works are subject to individual Environment Protection Licences. Council submits annual reports to the Department of Environment and Climate Change relating to these licences. Due to a number of seasonally-related operational and environmental factors governing both the volume and composition of effluent, there are fluctuations in the quality of effluent discharged under these licences. However, these systems generally function well, and typically operate within the conditions stipulated in the individual licences.

### ***3.6.2 Nambucca River Estuary Management Plan***

The major tool available to Council for the improvement of water quality is the newly prepared Nambucca River Estuary Management Plan (NREMP). Prepared after a period of community consultation, this important and comprehensive document identifies the factors and issues behind loss of water quality in the Nambucca River estuary, ranks these in terms of perceived importance, and presents options for the management of and improvement in water quality.

### ***3.6.3 Newee Creek water quality project***

Newee Creek has been identified as a branch of the Nambucca River system contributing to low water quality in the Nambucca R. estuary. As a response to this threat, Council has commissioned a study to identify and address the factors underlying this issue. Commencing during the reporting year, this on-going study is being conducted by researchers from the University of Newcastle. The results of this study will be used to appropriately manage the human-based activities suspected to be contributing to poor water quality. Best-practice management of this system will be performed in conjunction with CMA, Landcare and private landholders.

### ***3.6.4 Stormwater Management Plan***

A Stormwater Management Plan was developed by Council to address stormwater issues in the major towns as well as in rural and rural-residential areas in the Shire. Towards the end of 2000 the EPA requested that Council revise the plan to enhance the quality of the document and to more effectively address certain requirements. The plan was revised in 2001 to the satisfaction of the EPA.

Major Stormwater Management Plan implementation strategy tasks carried out by Council include a stormwater management education program targeted at builders and developers and motor vehicle repairers within the Shire (carried out with the assistance of a \$30,000 Stormwater Trust grant) and a review of Council standards and practices.

A Pollutant Trap has been installed on Beer Creek (adjacent to Creek Street, Nambucca Heads) to reduce the amount of litter being flushed into the Nambucca River during stormwater flows (Figure 3.7). This water quality improvement device is maintained by Council when required. Other such structures are in place throughout the Nambucca Valley, and at the time of preparation of this report, an audit of these was being conducted by Council in order to precisely locate and describe the condition of gross pollutant traps.

In the 2005/2006 financial year, Council in a joint venture with the Northern Rivers Catchment Management Authority, funded a project titled *Less Rubbish and More Fish in the Nambucca River* with the primary goal of clearing up the gully at Bellwood Park in Nambucca Heads which is an urban discharge point into the Nambucca River. Due to an invasion of weeds and rubbish the site had become completely silted up. With labour provided by the Ngurrala Aboriginal Corporation, the area was cleared of invasive weeds and endemic plants and mangroves were planted, providing improved fish habitat as well as an efficient stormwater discharge point.



**Figure 3.7: Pollutant Trap on Beer Creek, Nambucca Heads**

### **3.7 STATE - WATER QUANTITY**

Water quantity and flows have received substantial discussion and research in recent times. It is now generally recognised that waterways require a certain volume of water, commonly referred to as “environmental flows”, to maintain ecological health.

#### **3.7.1 Surface Water**

Groundwater recharge and runoff maintain water flow in the river systems in the Nambucca Valley. A gauging station is located at Bowraville that records the streamflow of the Nambucca River.

#### **3.7.2 Groundwater**

The existing urban water supply is based on the extraction of water from borefields located approximately 1km upstream from Bowraville. In September 2003 Council installed a system whereby borefield water levels are monitored electronically. Works carried out in late 2004 have improved the accuracy of this monitoring.

### **3.8 PRESSURE - WATER QUANTITY**

Excluding rainfall and evaporation, the factors that have the largest influence on the quantity of the water resources of the Nambucca Shire are extraction for the reticulated water supply and rural extraction for domestic and agricultural purposes.

#### **3.8.1 Council Extraction**

As mentioned previously, the urban supply is derived from a borefield adjacent to the Nambucca River near Bowraville. Figure 3.8 displays water consumption for the Nambucca Shire for the period 1993/1994 to 2006/2007. This illustrates that the water consumption for the 2006/2007 reporting year was 1,806 ML, which is substantially less than the annual water extraction entitlement of 3100 ML. The peak day demand of 7928 kL is well below the maximum recorded of 13,600 kL. Based on Hunter Water Australia (2004) and Australian Bureau of Statistics (2006) data, approximately 67% of the Shire’s population is connected to the reticulated water supply.

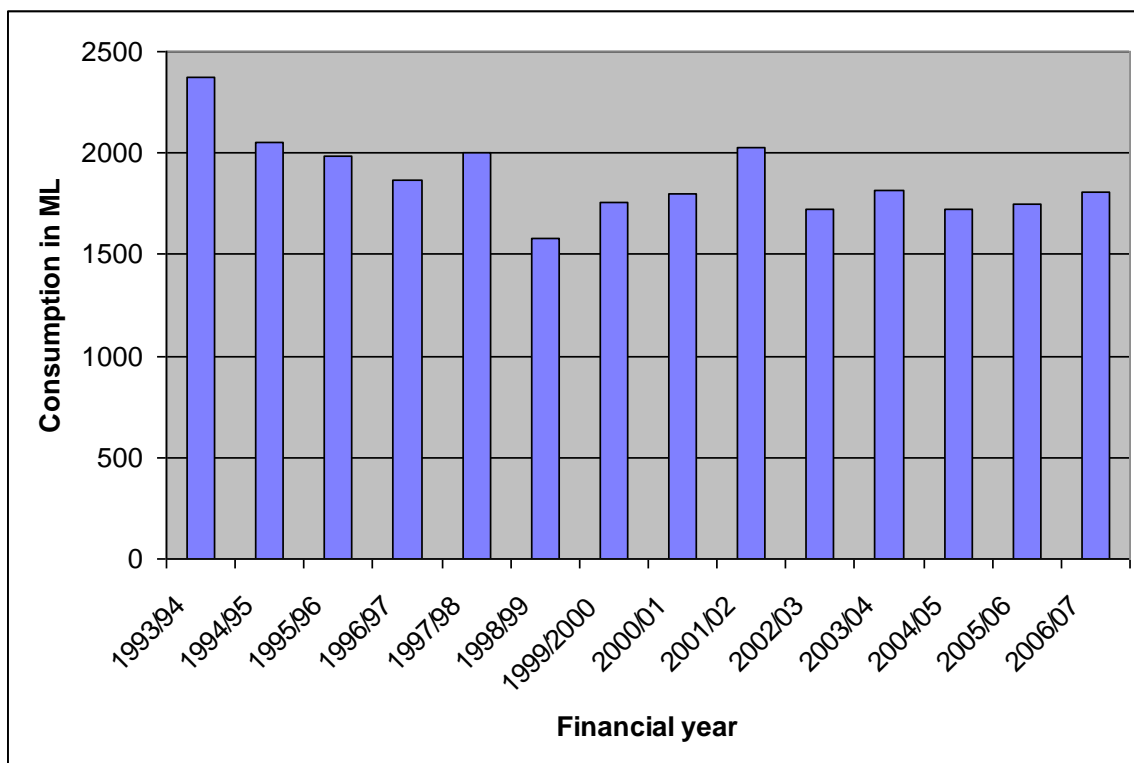


Figure 3.8: Nambucca Shire Water Consumption from 1993/1994 to 2006/2007

#### **NSW NORTH COAST REGIONAL INDICATORS**

Reticulated water consumed during the reporting year	<b>1, 806 ML</b>
Per capita reticulated water consumed during the reporting year	<b>145.1 kL</b>
Daily per capita reticulated water consumed during the reporting year	<b>397.5 L</b>
Reticulated water peak daily demand during the reporting year	<b>7, 928 kL</b>
Population connected to the reticulated water supply	<b>67%</b>

#### **3.8.2 Domestic Extraction**

Many rural properties in the Shire extract water from surface and groundwater resources for domestic purposes. Table 3.3 illustrates that 406 ML of water is allocated to be extracted for domestic use in the Shire per annum (both surface water and groundwater resources). Currently, there are 193 surface water licences and 546 bore licences issued for water extraction in the Nambucca Shire. Of these, 47 are for purposes other than stock/domestic use (DNR 2007). Although it is possible to quantify the number of licences in existence, it is very difficult to estimate the exact quantity of water being extracted.

**Table 3.3 Nambucca Shire Annual Allocations for Surface Water and Groundwater Licences**

<b>Purpose</b>	<b>Surface Water Allocation (ML)</b>	<b>Groundwater Allocation (ML)</b>	<b>Total (ML)</b>
Domestic	26	380	406
Experimental/Research	2		2
Farming	90	64	154
Industrial – Sand & Gravel	200		200
Irrigation	4,557		4,557
Property		3,723	3,723
Stock	42	442	484

**Note:** A Property allocation (groundwater) relates to any purpose other than Stock, Domestic and Farming (Department Natural Resources, 2007).

### **3.8.3 Agricultural Extraction**

Water is extracted from surface and groundwater resources and used for agricultural purposes such as stock watering and irrigation. Table 3.3 illustrates that 484 ML is allocated to be extracted for stock per year and 4,557 ML is allocated to be extracted for irrigation each year. Once again, the volume of water extracted for agriculture from surface or groundwater resources has not been quantified.

## **3.9 RESPONSE - WATER QUANTITY**

### **3.9.1 Off-Stream Storage**

In the late 1990's Council adopted an option to construct an off-stream storage adjacent to the existing borefield and water treatment works at Bowraville. Due to a significant drop in demand which resulted from the closure of the Midco abattoirs, Council deferred the construction of the storage, expecting it would not be required until 2020.

The drought of 2002/2003, however, revealed how vulnerable the groundwater supply was to extended dry periods. As a consequence, in-depth investigations were undertaken, which produced several recommendations for securing supply. After reviewing the various options, Council has reached agreement for an off-stream storage dam, to be constructed in the vicinity of the borefield at Bowraville. Under the auspices of the relevant State government bodies, Council is in the process of establishing this scheme, which will allow Council's resource managers to ensure water supply security for current and future generations in times of drought, and also to accurately regulate environmental flows. Council has arranged the purchase of land for this scheme from all affected property owners, and the required environmental investigations for this type of activity are well under way.



### **3.9.2 Demand Management**

Council's ongoing commitment to demand management practices, which in the past has led to a substantial reduction in consumption, is shown by the introduction of new practices such as:

The reimbursement of monies for the replacement of conventional fittings with water saving devices:

- Low flow shower head (AAA Standard) – \$25.00 each (maximum)
- Dual-flush toilet cisterns \$30.00 each (maximum)

Council has applied for grants to install these devices in all Council owned or operated facilities in an effort to reduce the amount of water being used at these locations.

In addition to these initiatives, Council undertakes annual leakage detection surveys of trunk main and reticulation supply systems. This is performed in order to reduce leakage of potable drinking water, and to identify areas needing maintenance or repairs. Council also participates in community awareness and education programs including public displays and provision of Waterwise information to Shire residents.

Demand management is also achieved through current BASIX provisions requiring the installation of rainwater tanks in all new dwellings. For those living in existing dwellings, which do not fall under the consideration of BASIX, a rainwater tank rebate is available for the purchase of a new tank, and to offset the cost of plumbing needed to attach rainwater tanks to either the toilet, washing machine or both.

The water collected in rainwater tanks can be used to replace drinking water currently being used in the flushing of toilets, washing and watering gardens. This will reduce the demand for water that has been extracted from the borefield, treated at the Bowraville Water Treatment Works, and piped around the Nambucca Shire in the present reticulation system. This would represent a considerable saving in water and money, as the cost to Council and ratepayers of performing these services is not inconsiderable.

Nambucca Shire Council is currently engaged in preparing an Integrated Water Catchment Management (IWCM) Plan. As the name suggests, this is a total systems approach to water management, incorporating all facets of the water cycle in the Nambucca Valley. This is being performed in conjunction with the appropriate State Government departments, who are providing technical expertise and overall guidance. Importantly, many public resource-user groups have been involved in this process, and continue to offer input into the preparation of a comprehensive plan of management for this vital resource.

## **4.0 BIOLOGICAL DIVERSITY**

Biological diversity can be briefly described as the variety of life forms found within an area. The total biological diversity of an area is the combination of all the different animals, plants and micro-organisms, the genes they contain and the ecosystems that they form. The biological diversity of an area is constantly changing and is enhanced by genetic change and evolutionary processes, and is reduced by extinctions and habitat degradation (ANZECC, 1993). The four primary benefits arising from the conservation of biological diversity are: 1) ecosystem services; 2) biological resources; 3) social benefits; and, 4) economic benefits. These benefits include, but are not limited to, protection of watercourses, improvement in crops, identifying new medically active compounds, education, spiritual values and tourism.

Biological diversity plays an important role in everyday human life by maintaining and stabilising the world around us. The climate and geographical layout of the Nambucca Shire results in a diverse range of sub-tropical and temperate faunal and floral communities, and the conservation of this biological diversity is essential to the health and productivity of the Local Government Area.

### **4.1 STATE - FLORA**

#### **4.1.1 *Land-Based Flora***

Clearing for agricultural purposes since the 1800's has greatly altered the Nambucca Shire's vegetation. The location of cleared land is illustrated in the National Parks and Wildlife Service satellite image of vegetation systems in the Shire (Figure 4.1). Large proportions of the central and eastern regions of the Shire have been cleared as well as along the waterways extending into the west of the Local Government Area. It is apparent from Figure 4.1 that the dominant vegetation systems are moist open forest and cleared land.

Very few areas of rainforest exist within the Nambucca Shire. However, there are numerous isolated zones of disturbed remnant vegetation, covering areas of five to fifty hectares, mainly in the east and centre of the Shire. One important vegetation system is the expanse of coastal sclerophyll complex that occurs along the coastline.

The Department of Conservation and Land Management provided an initial evaluation of the conservation significance of remnant vegetation for the eastern section of the Shire (Smith, 1994). The report investigated the significance of this area for vegetation conservation and endangered fauna habitat. The investigation identified that there are a number of vegetation

types and remnant areas that have a high degree of local to regional significance (refer Figure 4.2). The study identified that the following vegetation types are poorly conserved and are considered to be significant on a regional basis:

- Forest red gum forests and woodlands
- Scribbly gum/blackbutt forests and woodlands
- Flooded gum very tall open forests
- River and Grey Mangrove closed forests/woodlands
- Brush box/flooded gum very tall open forests
- *Juncus sp* closed sedgeland/grassland
- Brushbox low closed forest

A number of other vegetation types were considered important primarily due to their wildlife habitat values. These included:

- Flooded gum forests
- Brushbox forests
- Littoral rainforests
- Blackbutt tall wet forests
- Mangroves
- Red gum forests
- Melaleuca forests and woodlands
- Banksia woodlands and shrublands
- Wetland areas
- Riparian areas

With regard to the detailed planning areas, four contained remnant vegetation of high to very high significance and one had a remnant of only moderate value (the area to the south west of Macksville). The areas of high value included:

- The area to the south of Scotts Head
- The area bounded by Warrell Creek the Ocean and Nambucca River
- The areas north and south of Valla Beach
- The floodplain area to the north east of Macksville

Riparian vegetation refers to emergent aquatic, semi-aquatic and over and understorey plants in the zone immediately adjacent to or verging watercourses. Riparian zones are vital to the functioning of stream ecosystems, however the majority of these areas within the Nambucca Shire have been substantially altered since European settlement. Due to their accessibility, the riparian zones of the region were originally cleared for their high quality timber, principally red cedar. The cedar getters were followed by the pioneers who extensively cleared the alluvial floodplains for agriculture.

The lengths and widths of riparian areas along the perennial waterways within the Shire (interpreted from aerial photographs in 1997) are presented in Table 4.1. It can be seen from this information that a relatively good coverage of vegetation still exists along Oyster, Allgomera, Warrell and Eungai Creeks. A lack of riparian vegetation appears to occur adjacent to the Nambucca River, Missabotti Creek, South Creek and Deep Creek.

**Table 4.1: Extent of Riparian Vegetation Adjacent to Waterways within the Nambucca Shire**

Catchment	Continuous			Discontinuous			Absent
	>30 m	30 - 5 m	< 5 m	>30 m	30 - 5 m	< 5 m	
Nambucca Estuary	8.4 km 10.8%	12.5 km 16.1%	26.9 km 34.8%	-	-	23.2 km 30%	6.4 km 8.3%
Newee Creek	6.6 km 28.9%	2.7 km 11.8%	7.4 km 32.5%	0.7 km 3%	1 km 4.4%	4.4 km 19.3%	-
Nambucca River	37.7 km 20.7%	16.9 km 9.3%	6.4 km 3.5%	9 km 5%	12.7 km 7%	38.3 km 21.1%	60.8 km 33.4%
Missabotti Creek	10.7 km 14.6%	9.7 km 13.2%	7.5 km 10.2%	3.4 km 4.6%	3.2 km 4.4%	15.4 km 21%	23.6 km 32.1%
Buckrabendinni Creek	22 km 30.2%	0.5 km 0.7%	8.4 km 11.5%	2 km 2.7%	-	23.4 km 32.1%	16.5 km 22.7%
South Creek	1.1 km 1.5%	10.4 km 14%	11.9 km 16%	-	-	38.5 km 51.7%	12.5 km 16.8%
Taylors Arm Creek	145.7 km 31.5%	21.5 km 4.6%	87.1 km 18.8%	8.2 km 1.8%	3.9 km 0.8%	112.6 km 24.3%	83.5 km 18.1%
Warrell Creek	57.2 km 44%	14.6 km 11.2%	27.6 km 21.2%	-	6.7 km 5.1%	14 km 10.8%	10 km 7.7%
Eungai Creek	12.6 km 17.4%	39.5 km 54.4%	5.5 km 7.6%	-	-	5.4 km 7.4%	9.6 km 13.2%
Allgoamera Creek	36.9 km 54.7%	14.1 km 20.9%	8.3 km 12.3%	-	1 km 1.5%	3.8 km 5.6%	3.4 km 5%
Deep Creek	24.8 km 21.2%	13.1 km 11.2%	21.4 km 18.3%	1.2 km 1%	-	45.7 km 39%	10.9 km 9.3%
Oyster Creek	20.3 km 66.8%	5.7 km 18.8%	1.6 km 5.3%	-	-	-	2.8 km 9.2%

Source: Nambucca Catchment Management Committee (2000)

#### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Threatened flora species under the <i>Threatened Species Conservation Act 1995</i> occurring in the Nambucca Shire</b>	<b>Appendix A</b>
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#### **4.1.2 Aquatic Flora**

Aquatic vegetation is another important habitat type within the Local Government Area. This type of vegetation oxygenates the water, accumulates and recycles nutrients, stabilises sediments and provides food and habitat for fish (particularly juveniles), water birds and other aquatic organisms

West *et al* (1985) found that there was 0.779km<sup>2</sup> of mangroves, 0.224km<sup>2</sup> of seagrasses and 1.034km<sup>2</sup> of saltmarsh communities in the Nambucca River catchment. The study also identified that there was 0.008km<sup>2</sup> of mangroves, 0.007km<sup>2</sup> of seagrass and 0.604km<sup>2</sup> of saltmarsh in the Deep Creek catchment. No mangroves, seagrasses or saltmarsh were located in Oyster Creek.

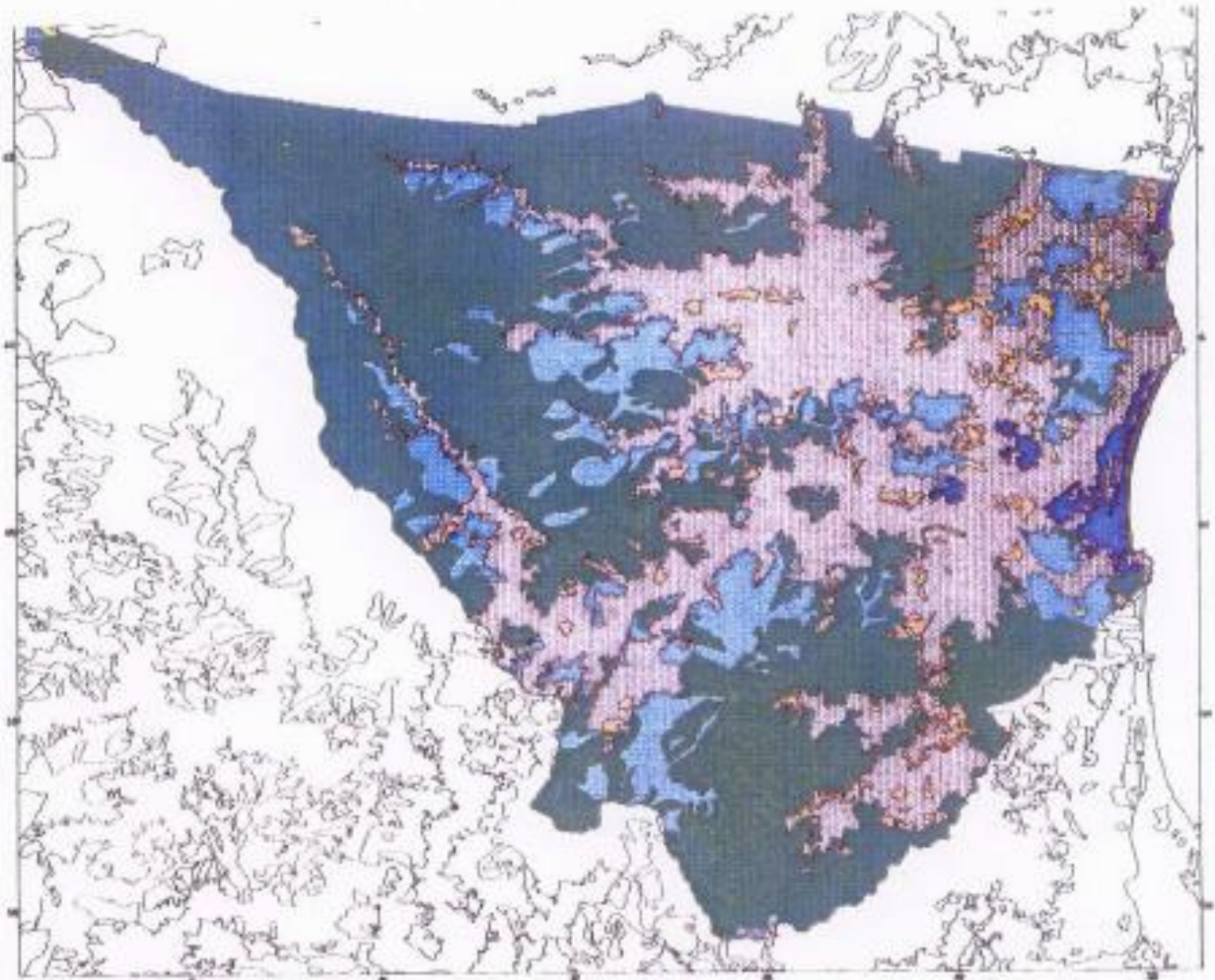
The Nambucca River Estuary Inventory states that the Grey Mangrove, *Avicennia marina*, the River Mangrove, *Aegiceras corniculatum*, and the Blind-your-eye Mangrove, *Excoecaria agallocha*, occur within the Nambucca River catchment. The inventory also indicates that seven seagrass or related plant species are found in the Nambucca River.

The Grey Mangrove was the only species recorded in Deep Creek by West *et al* (1985), however a number of River Mangroves were identified in the creek during a local aquatic survey carried out by Coastcare and Council in 2000. Seagrass was also identified in Oyster Creek during the survey.

There is a paucity of information available on the aquatic flora in the freshwater sections of the catchments in the Shire. However, it has been reported that the Nambucca River is the only river on the Mid North Coast to be affected by major infestations of *Salvinia*, Water Lettuce and Water Hyacinth.

# STATE OF THE ENVIRONMENT REPORT

## Vegetation Systems



Rainforest		Coastal Sclerophyll Complex	
Moist Open Forest		Disturbed Remnant Vegetation	
Dry Open Forest		Cleared	
Woodland			

Figure 4.1



NAMBUCCA SHIRE COUNCIL

Figure 4.1: Nambucca Shire - Vegetation Systems

# STATE OF THE ENVIRONMENT REPORT

## Significant Vegetation

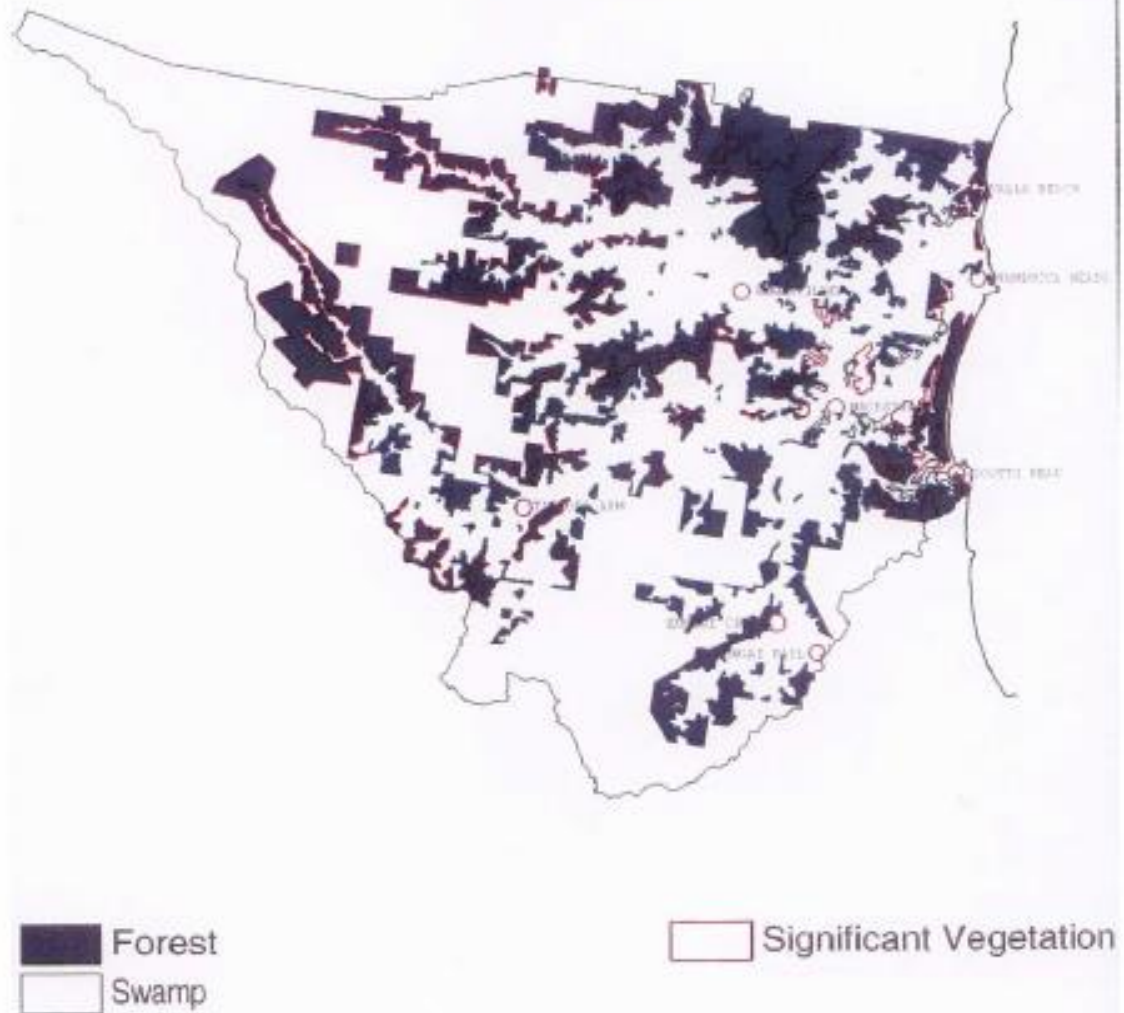


Figure 4.2


 NORTH	<b>NAMBUCCA SHIRE COUNCIL</b>
	Source: G.I.S. Nambucca Shire Council

Figure 4.2: Nambucca Shire - Areas of Significant Vegetation

## **4.2 PRESSURE - FLORA**

### **4.2.1 *Terrestrial (Land-Based) Flora***

#### **4.2.1.1 Clearing**

A substantial amount of cleared land and altered habitat exists within the Local Government Area, which is primarily due to past clearing for agriculture. There is a direct relationship between native vegetation clearance, habitat loss, habitat fragmentation and biodiversity decline. The destruction of vegetation associated with clearing destroys fauna habitat and reduces the genetic plant variation in the area. This genetic variation is necessary for the continuation of endemic native flora species in the area.

#### **4.2.1.2 Fire Regime**

Bush fires are a common occurrence in Australia, and as a result, many Australian native plant species are adapted to, and even rely on, these events. However controlled burning as well as accidental and naturally occurring fires can have major impacts on the number and distribution of species. High frequency and high intensity fires can cause a total change in ecosystem type. This can result in a substantial loss of habitat and associated species. The Nambucca Shire is generally considered to be an area of moderate to high fire risk, especially during the period from September to December (refer Figure 4.3 for fire hazard areas).

#### **4.2.1.3 Weed Invasion**

Weed invasion into the remnant vegetation communities in the Nambucca Shire is an increasing concern. Weeds that are intentionally brought into an area for use in gardens often spread and out-compete native plants. Weeds are commonly very vigorous and fast growing and can take over native plant communities by competing with them for moisture, light and nutrients. The invasion of weeds can substantially alter the composition of an ecosystem by taking over native flora species and creating undesirable conditions for the native fauna species that rely on them. Weeds declared noxious in the Nambucca Local Government Area are listed in Appendix B.

### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Declared noxious weeds under the <i>Noxious Weeds Act 1993</i> in the Nambucca Shire</b>	<b>Appendix B</b>
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### **4.2.2 Aquatic Flora**

The vast majority of aquatic vegetation types are adversely affected by unnatural flow regimes, erosion & sedimentation, herbicide use, elevated nutrient concentrations and introduced species.

Anecdotal evidence indicates that areas of seagrass have been lost and are continuing to decline in the Nambucca River and Deep Creek. If this is occurring, the most likely causes are excessive growth of epiphytic algae associated with elevated nutrient concentrations, increased turbidity and smothering by sediment.

# STATE OF THE ENVIRONMENT REPORT

## Bush Fire Hazard Areas

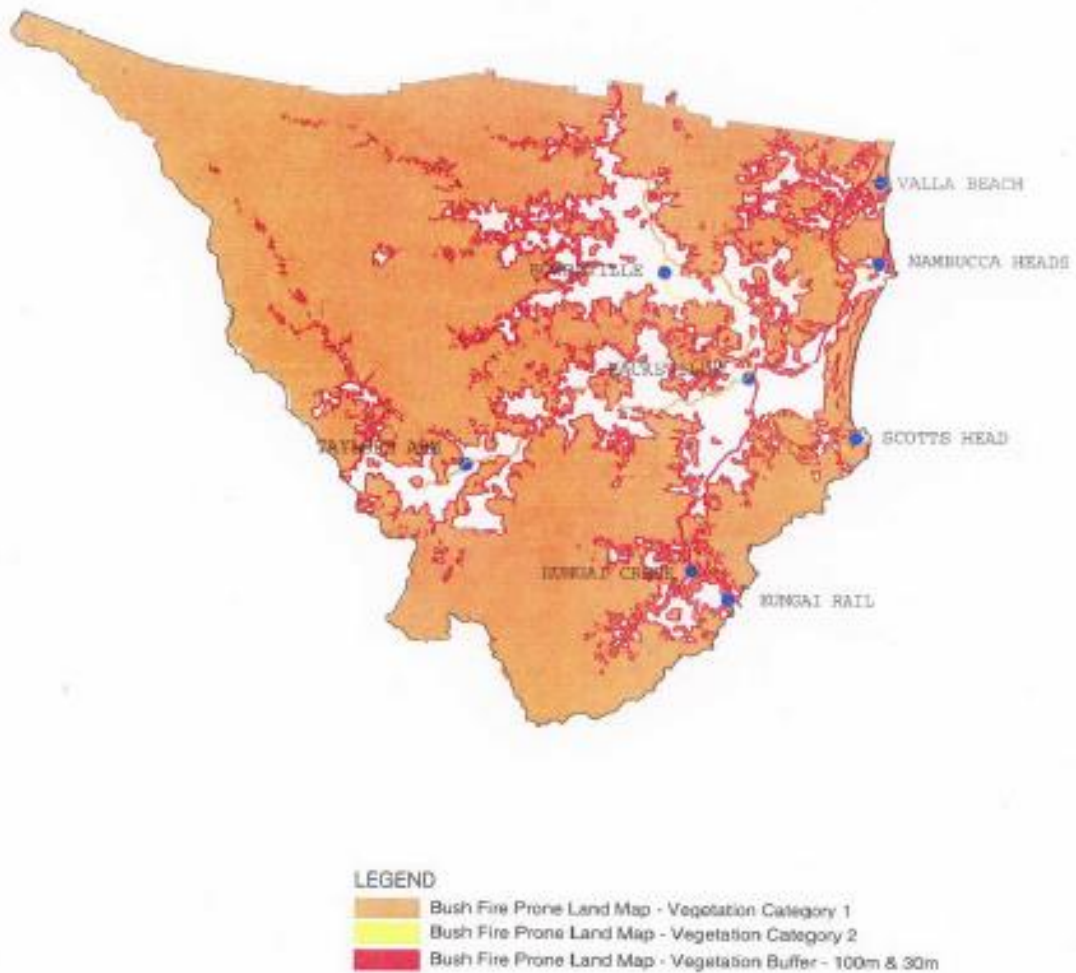


Figure 4.3



NAMBUCCA SHIRE COUNCIL

Source: G.I.S. Nambucca Shire Council

Figure 4.3 – Nambucca Shire - Bushfire Risk Area

## **4.3 RESPONSE - FLORA**

### **4.3.1 Land-Based Flora**

#### **4.3.1.1 Northern Rivers Catchment Management Authority**

In 2005/2006, Council in a joint funding exercise with the Northern Rivers Catchment Management Authority, undertook Urban Habitat and Biodiversity Enhancement projects in Nambucca Heads and Scotts Head. Revegetation, signage, access improvement and weed eradication works were carried out. Both proposed projects had a strong community involvement.

#### **4.3.1.2 Valla Nature Reserve**

The Regional Forest Agreement process resulted in a substantial area of the north-east and south-east forest being identified as containing important flora and fauna habitat. Some of these areas were subsequently declared National Parks and Nature Reserves, including the Valla Nature Reserve. The Valla Nature Reserve is located to the south of the main residential area in Valla Beach and covers an area of 30.29 ha. The National Parks and Wildlife Service described the reserve as a small remnant of mature age class moist Blackbutt and Tallowood forest which is known Koala habitat.

#### **4.3.1.3 Nambucca Catchment Vegetation Survey**

As outlined in Section 2.4.3, Kendall & Kendall Ecological Services recently completed the Nambucca Catchment Vegetation Survey for the Nambucca Vegetation Sub-Committee. The main outcomes of the survey were to map native vegetation communities within the catchment, identify vegetation communities with high conservation values, identify possibly occurring rare, threatened and significant plant species and contribute to the data set collected within the catchment.

#### **4.3.1.4 Bushfire Management**

Council was actively involved in a project between NSW State Forests, the National Parks and Wildlife Service, the Rural Fire Service and the Nature Conservation Council that attempted to develop a series of Bushfire Threat Hazard Maps for the Nambucca area. The hazard maps factored in various sources of information, such as Council's environmental protection zones, and a level of bushfire hazard was consequently decided upon. A Risk Management Plan that aims to control the likely spread of bushfires and address response has been completed and ratified by a coordination committee comprising State Agency officers and other stakeholders. It

is anticipated that the plan will afford an adequate level of protection to areas possessing significant biodiversity. There is however, likely to be differences in opinion regarding prevention techniques, such as the burning off of native vegetation.

### **4.3.2 Aquatic Flora**

#### **4.3.2.1 Deep Creek Mangrove Project**

Approximately two months after the Deep Creek entrance closed in 1997, a number of mangroves in the waterway began to die (M. Greenaway pers. comm., 2000). Mangroves are adapted to tidal inundation and exposure, however while the creek entrance is closed they are constantly inundated. Coastcare and Council undertook an extensive mangrove survey immediately after the closure of the creek in 2000. Around 300 mangroves were tagged and measured (total height and height above water) in Deep Creek, with an additional 200 mangroves tagged and measured in nearby permanently open estuaries to act as controls.

Council is unaware of recent investigations into the extent of aquatic habitats (including mangroves, seagrass and saltmarsh) within the Shire.

## **4.4 STATE - FAUNA**

### **4.4.1 Land-Based Fauna**

The state of the Nambucca Shire's faunal diversity can not only be related to the vegetation cover, but also to the vegetation types or communities that are present. It is apparent from Figure 4.1 that a large portion of the Shire has been cleared. This has substantially altered the vegetation and associated animal species that originally existed in the area. Environmental characteristics have a major influence on the distribution of animal species, and any changes in the structure or composition of the vegetation will eventually be followed by changes in the animal population (Luke, 1986). At present there is a lack of information relating to the actual numbers of certain species within the Shire. Studies undertaken by the Department of Conservation and Land Management, the National Parks and Wildlife Service, the Nambucca Valley Conservation Association and Kendall & Kendall are a good indication of the types of species that may be found and their habitat types (Smith, 1994; Fitzgerald, 1996; Kendall & Kendall, 2003).

The highest diversity of both flora and fauna species occur in the coastal sclerophyll complex which is adjacent to the coast, between Nambucca Heads and Scotts Head. Smith (1994) identified this area as the largest wildlife corridor in the Nambucca Shire. Some of the most

significant species identified in this area include the Beach Stone-curlew, Little Tern and Osprey, which are all listed as threatened under the *Threatened Species Conservation Act 1995*.

An inland study of State Forests has been carried out by the Nambucca Valley Conservation Association. The study revealed that the Nambucca Shire provides habitat for a variety of significant fauna species. The most significant species identified include the vulnerable Pouched Frog, Stephens Banded Snake, Red-Legged Pademelon, Glossy Black-Cockatoo and the Wompoo Fruit-Dove. The Powerful Owl, which is noted as being dependent on old growth forest, was also recorded. Other important species identified during the study were the Masked Owl, Rufous Scrub-Bird and Koala. The outcomes of this study indicate that a rich biological diversity may exist in the area.

### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Threatened fauna species under the <i>Threatened Species Conservation Act 1995</i> occurring in the Nambucca Shire</b>	<b>Appendix A</b>
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#### **4.4.2 Aquatic Fauna**

An anecdotal list of estuarine fish species found in the Nambucca River (Nambucca River Estuary Inventory) indicates that the waterway supports a diverse range of species. This diverse variety of species may be largely attributed to the location of the estuary between the biogeographical zones of the Eastern Tropical Zone and the Eastern Warm Temperate Zone. This is supported by the fact that many of the fish species listed are at their southern (eg Mangrove Jack) or northern (eg Australian Salmon) distribution limits. Many of the fish, crustacean and mollusc species found in the local waterways are commercially and recreationally important. Such species include bream, whiting, flathead, mullet, Australian Bass (Figure 4.4).

Aquatic macroinvertebrates are an essential component of aquatic ecosystems as they provide a valuable food source for larger fauna species. A benthic macroinvertebrate survey of the Nambucca River found a high diversity and abundance of organisms within intertidal mudflats. Detailed results of the survey are outlined in the Nambucca River Estuary Inventory.



## **4.5 PRESSURE - FAUNA**

### *4.5.1 Land-Based Fauna*

There have been a number of pressures being exerted on the land-based fauna of the Nambucca Shire Local Government Area. Depending on the nature of the fauna, and the pressures exerted upon their habitats, these pressures may still be present. It is likely that terrestrial fauna within the Nambucca Shire faces new threats with the expansion in the area of cleared land, and the increase in population predicted over the next decade.

#### **4.5.1.1 Habitat Alteration**

The size and diversity of habitat will directly influence the fauna in an area. There has been a considerable proportion of land cleared in the Nambucca Shire. While the majority of this land was cleared for agricultural pursuits, clearing has also taken place to permit urban and semi-urban development, forestry and road construction. This has resulted in the loss of areas of habitat and associated fauna species including those of mammals, birds, reptiles and amphibians.

#### **4.5.1.2 Feral Animals**

Feral animals are those animals that have been introduced for the control of pests (eg Cane Toad), domestic animals that have been discarded or escaped and gone wild (eg cats, dogs) and animals that have been released for recreational hunting (eg rabbits, foxes). Feral animals can degrade the habitats of native flora and fauna species. They compete with and prey on many of our endemic fauna species, transmit disease, cause erosion, damage property and spread weeds.

#### **4.5.1.3 Fire**

Frequent burning of habitat can be beneficial to some animal species and detrimental to others, such as ground dwellers or those that cannot escape fire quickly. Studies indicate that most animals survive low to moderate intensity fires by moving beyond the fire edge or taking shelter. Serious depletion of food supplies rarely follows low intensity fires because the area is generally a mosaic of burnt and unburnt ground. Burning may even be beneficial to some species by promoting succulent regrowth. Intense bushfires however, may have major short term effects due to animal species not being able to avoid the fire and exposure of the survivors to starvation and predators.

### **4.5.2 Aquatic Fauna**

Habitat loss, streamflow modification, water pollution and overfishing/over-exploitation can have adverse impacts on the aquatic life of waterways.

#### **4.5.2.1 Habitat Loss**

An increase in sediment load in the watercourses of the Shire has resulted in substantial sedimentation. Many fish species, such as the Australian Bass, prefer deep holes, therefore this process is believed to have led to and is continuing to lead to the loss of important fish habitat. Increased sediment within waterways has also been found to smother aquatic invertebrates.

Mangrove forests and seagrass beds are extremely important habitats for commercially and recreationally important fish species, as well as other aquatic fauna. This is illustrated by the fact that 70% (by value) of NSW commercial fish species rely on mangroves for habitat at some stage in their lives (Coastcare and Landcare, 2000). Anecdotal evidence suggests that these areas are continuing to decline. If this is the case, increasing pressure is being exerted on aquatic fauna within the Shire.

#### **4.5.2.2 Overfishing**

Commercial fishing has taken place in the Nambucca estuary since the late 1800's. The licensed commercial fishers currently operating mainly target mullet, bream, flathead, blackfish, whiting and crabs. Recreational fishing is a popular activity in the waterways of the Nambucca Shire, however the combination of commercial and recreational fishing activities is exerting increasing pressure on the fishery. Anecdotal evidence suggests that numbers of recreational and commercially important fish, crustacean and mollusc species are declining.

### **4.6 RESPONSE - FAUNA**

#### **4.6.1 Land-Based Fauna**

##### **4.6.1.1 Native Vegetation Act 2003**

A review of the performance of the *Native Vegetation Conservation Act 1997* found that it was overly complicated and couldn't deliver on conservation and agricultural outcomes.

The Native Vegetation Act 2003 regulates the clearing of native vegetation on all land in NSW except for National Parks and other conservations areas, State forests and reserves and urban areas. Under the new rules, landholders may only clear native vegetation provided they have reached an agreement with their local Catchment Management Authority (CMA) on suitable offsets.

Clearing of regrowth younger than 1 January 1990 can take place without approval. In addition, a wide range of routine agricultural management activities (such as weed and feral animal control) can continue without approval. Invasive native scrub (woody weeds) can also be managed to restore agricultural value and prevent land degradation under an agreed code of practice (Department of Natural Resources, 2006).

#### **4.6.2 Aquatic Fauna**

##### **4.6.2.1 Fish Fauna**

In recent years NSW Fisheries has undertaken extensive fish fauna surveys in waterways along the NSW coast. In the Nambucca Shire, surveys have been conducted in the Nambucca River and Deep Creek. Surveys have primarily focused on lower food chain species (non-commercial), with results expected to indicate variations in species diversities and abundances at different



times and under different conditions. This information will add to the limited knowledge of the local area's fisheries resources and will be available from NSW Fisheries.

While the effects are difficult to quantify, the widespread promotion of catch-and-release fishing in recent years may reduce pressure on recreationally targeted species in the local area. An increase in these species would have numerous positive effects on the health and economy of the local area.

## **5.0 AIR**

Air pollution typically results from a range of human activities. The primary sources of pollution are industrial processes, electric power generation and transportation, particularly the motor vehicle. Incineration, solid waste disposal and domestic heating may also be substantial contributors. The effect of air pollution can be far reaching and may impact on climate, human health, visibility, property, flora, fauna and water quality.

### **5.1 STATE**

Very little information is available on the state of air quality in the Nambucca Shire Local Government Area. Either the information is non-existent or it is inaccessible. Results of previous community consultation programs however, indicate that air quality is generally perceived to be good. This is most likely due to the lack of large industries, relatively small number of cars (due to small population base) and lack of other forms of equipment that may generate air pollutants.

The main areas subject to air pollution in the Shire are the urban areas. These urban centres are often subject to pollution associated with backyard burning, bushfire hazard reduction and internal combustion heaters. Urban areas are also more likely to experience air pollution from traffic emissions.

Dust from the disturbance of unsealed rural roads in the Shire is also perceived to be an important problem, particularly during prolonged dry periods. The degree to which this is a problem is partly a function of the amount of unsealed roads in the Shire and the number of people living in close proximity to these roads. Approximately 52% of road (Council and Roads and Traffic Authority funded main roads) within the Local Government Area was unsealed as at June 2004.

Air pollution problems may increase in the Local Government Area in the future due to an increasing population that is heavily dependent on the motor vehicle for transportation.

## **5.2 PRESSURE**

The main pressures being exerted on the air quality of the Nambucca Shire are discussed below.

### **5.2.1 Greenhouse Gases**

The majority of available evidence suggests that the release of greenhouse gases into the atmosphere as a result of human activities is having a discernable influence on the global climate. Solar radiation received at the earth's surface provides the energy that supports life. Around 30% of the solar radiation that reaches the earth is reflected back into space by clouds, dust and reflective surfaces (eg snow or water bodies). The remaining 70% is absorbed at the surface and then re-radiated as longer wavelength infrared energy. While the presence of greenhouse gases including water vapour, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), chlorofluorocarbons (CFCs) and sulfur hexafluoride (SF<sub>6</sub>) allow the incoming short-wave radiation to reach the surface, they also act to absorb some of the outgoing radiation (Environment Protection Authority, 2000).

Over the last two centuries the concentration of these greenhouse gases has increased due to human activities. This has altered the earth's radiation balance, so that more long-wave radiation is being absorbed in the lower atmosphere resulting in increased temperatures. This 'enhanced' greenhouse effect is expected to lead to an increase in the earth's temperature and thus changes in rainfall, soil moisture and sea level. Evidence suggests that the effect on climate is already detectable and it is predicted that significant climate changes will become increasingly evident over the next few decades (Environment Protection Authority, 2000).

### **5.2.2 Solid Fuel Stoves and Heaters**

Solid fuel stoves and heaters are still relatively common in both new and old residential areas. The main causes of complaints in relation to these devices are inappropriate fuels, weather conditions (majority of complaints received during colder months) and poorly placed or maintained flues.

The emissions from solid fuel stoves and heaters contain substantial quantities of fine particles that have been identified by health authorities as contributing to respiratory disorders, illness and death. Due to these potentially grave circumstances, it is deemed necessary by Council that those wishing to install a solid fuel heater must obtain Council's approval under Section 68 of the *Local Government Act 1993* relating to solid fuel heaters.

### **5.2.3 Backyard Burning**

Backyard burning was previously a common practice in the Shire and a common basis of complaints. It can cause smoke haze (resulting in respiratory problems), offensive odours and the fallout of ash and other substances.

Under the *Protection of the Environment Operations (Control of Burning) Regulation 2000*, Council has been listed under Schedule 1 Part 2 which restricts backyard burning in mapped areas of the shire. Please refer to Section 5.3.1 for further details.

### **5.2.4 Dust**

Dust is a common problem for residents living adjacent to unsealed rural roads. Dust from unsealed roads, subdivision and building sites, extractive industries and some agricultural practices can cause problems, particularly during prolonged dry periods.

### **5.2.5 Odours**

Offensive odours can adversely impact on the amenity of an area and can cause irritation and discomfort to Shire residents. Odour is one of the most common sources of air quality complaints in the Shire. The main sources of complaints have historically been backyard burning, home activities, animals, sewage treatment works and on-site effluent systems.

### **5.2.6 Licensed Air Emissions**

The *Protection of the Environment Operations Act 1997* requires certain premises in the Nambucca Shire to be licensed for the discharge of substances into the environment. The Department of Environment and Climate Change issues these licenses and any breaches of conditions must be reported to the Department of Environment and Climate Change.

An example of an activity that Council can not regulate is a licensed sawmill that is burning off waste material. For Scheduled Premises in the Local Government Area, refer to Table 3.2.

### 5.2.7 Air Quality Complaints

During the 200/2006, Council received 39 air quality complaints via its Customer Service Request system.

During the reporting year the Department of Environment and Climate Change received 27 complaints relating to air quality in the Nambucca Shire. This figure includes public calls to the pollution line, public calls to the pollution line requesting information and information calls referred from the pollution line to Council (SoE direct, 2007).

#### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Number of air quality complaints to Council (CSR) during the reporting year</b>	<b>26</b>
<b>Number of air quality complaints to Department of Environment and Climate Change during the reporting year</b>	<b>6</b>

## 5.3 RESPONSE

Council has limited control in relation to air quality in the Shire. When a problem is reported, Council officers inspect the site and make recommendations on a case by case basis. Where complaints are received, every effort is made to encourage compliance with the relevant legislation.

Complaints received about Scheduled Premises cannot be dealt with by Council and must be referred to the Department of Environment and Climate Change.

### **5.3.1 Protection of the Environment Operations (Control of Burning) Regulation 2000**

As stated, the *Protection of the Environment Operations (Control of Burning) Regulation 2000* restricts burning of cleared vegetation in the Shire. Residents wishing to undertake open-air burning of cleared vegetation in urban areas may require Council approval in addition to NSW Fire Brigade or NSW Rural Fire Service approval. When assessing applications to burn, Council is required to consider the following:

- The impact on local air quality and amenity
- The impact on regional air quality and amenity
- The feasibility of re-use, recycling, or other alternative means of disposal
- Any opinions of the sector of the public likely to be affected by the proposed approval
- Any opinions of the Department of Environment and Climate Change in relation to the proposed approval

While there are some exceptions, a person intending to burn vegetation in an urban area in the Shire is generally required to submit a written application to Council. It is likely that the application will not be granted given the abovementioned considerations. In May 2005 Council resolved the motion to extend the area in Scotts Head controlled by Council for the provision of the Control of Burning Regulation. The extension was generally bounded by Grassy Head Road, Scotts Head Road, Warrell Creek, the Shire boundary and the coastline. For further information, please contact Council's Department of Environment and Planning.

### **5.3.2 Development Assessment**

In relation to air quality, Council enforces the following requirements through the development assessment process.

#### **5.3.2.1 Dust Mitigation Policy**

Council implemented a Dust Mitigation Policy in an attempt to reduce the amount of dust complaints arising from dwellings in close proximity to unsealed roads. The policy requires new dwellings to be set back at least 300m from an unsealed road and the sealing of 100m of road in front of the dwelling, or another acceptable measure such as landscape buffers. Whilst the policy may not substantially reduce the amount of dust generated, it has been effective in reducing complaints and requests for sealing by Council.

Council may grant relaxations to the Dust Mitigation Policy when an applicant can demonstrate other effective means of dust mitigation. The most common method is the planting of vegetative buffers between the unsealed road and the dwelling. Council currently requires applicants to pay a landscaping bond to ensure that the buffer is planted, with the bond refunded 12 months later if the buffer has been maintained. Problems may arise if the buffer is not maintained after this period and Council has no current monitoring function available.

#### **5.3.2.2 Installing a Solid Fuel Heating Appliance**

When assessing applications to install solid fuel heating appliances, Council considers safety concerns for dwellings and assesses potential impacts on air quality in the area (however they are difficult to predict). Council does not currently have policies in place that regulate the number of dwellings using solid fuel heating appliances in a particular locality. This approach may lead to future problems if the number of dwellings utilising these devices in a certain area increases. Other Local Government Areas in northern NSW have experienced deteriorating air quality from these devices and have adopted policies restricting the use of solid fuel heating appliances.

### **5.3.2.3 Keeping of Animals**

The Department of Local Government advised Council that its Keeping of Animals Policy is no longer valid due to new interpretations of the *Companion Animals Act 1998*. Currently a policy does not exist for the keeping of animals in the Shire. This may lead to a rise in complaints relating to issues such as odour in residential and rural-residential areas.

There is no restriction regarding the number of animals that a person can own provided that the animals are properly cared for and do not pose a nuisance or health or safety risk to other members of the community.

Council can develop policies however, through either a Local Companion Animal Management Plan or a Local Orders Policy, which could provide guidance as to the number of animals considered acceptable in the Shire. Any new policy would be subject to public consultation and can only be applied where health, safety, amenity or animal welfare problems are identified.

### **5.3.2.4 Rural-Residential Buffers Policy**

Council's Rural-Residential Buffers Policy attempts to reduce conflict between agricultural and rural-residential land uses. The policy requires a 150m buffer to the agricultural zone in order to avoid adverse effects that may arise from activities such as chemical spraying or odours from farm animals. Council may grant relaxations to this policy if the applicant proposes to plant a vegetative buffer. It is important to note however, that the *Pesticide Act 1999* requires a setback of 150m from bananas with no variation being accepted.

## **6.0 WASTE AND TOXIC HAZARDS**

Nambucca Shire Council has various responsibilities regarding the management of a range of waste products throughout the Shire. The form of these wastes is variable and includes the solid waste products generated in households and local industries and the liquid waste treated by the local wastewater treatment plants and on-site effluent disposal systems. In conjunction with other State Departments, Council is also responsible for monitoring and collecting data from a number of sites classified as potentially contaminated or contaminated.

The Department of Environment and Climate Change and other State Government Departments are implementing increasingly stricter guidelines relating to the management of all types of waste. Council is striving to meet, and in some instances improve upon, these guidelines by reducing, reusing and recycling waste products wherever possible.

Nambucca Shire Council currently operates two sites at the waste management facility that are under licence by the Department of Environment and Climate Change (DEC). Both sites are Class One landfills and have Landfill Environmental Management Plans (LEMPs) that outline conditions, regulations and reporting requirements.

### **6.1 STATE - SOLID WASTE MANAGEMENT**

#### **6.1.1 *Domestic Waste Service Contract***

A new domestic waste kerbside collection contract was granted to Handybin Waste Services effective from 28 November 2005 for a ten year period.

The collection of street and parkland litter waste is collected and controlled by Councils day labour force.

The domestic waste service comprises of a weekly collection of greenwaste/foodwaste (240L MGB) fortnightly collection of mixed waste (240L MGB) and an alternate fortnightly collection of recycling materials (240L co-mingled MGB). The contract also provides for two kerbside bulky goods collections per year to the quantity of three cubic metres.

#### **6.1.2 *Solid Waste Disposal***

The new landfill facility was officially opened in December 2001. The previous landfill remains in use as a transfer station only and the current landfill provides the community with a "high tech" landfill, with controls in place to contend with potential pollutants such as leachate and gas.



Surface water and ground water quality control systems are in place including the artificial wetland and the separation of stormwater from the waste disposal area.

The waste is stored in lined cells. Within each landfill stage, cells between 4000 and 8000 m<sup>2</sup> will be constructed in the direction of the landfilling (east for Stage One, north for Stage Two and west for Stage Three). Each cell will be filled and capped in accordance with licence conditions and design levels. Each stage will therefore comprise of around four cells. Each cell will be active for three to four years depending on population growth and the quantity of waste being generated. Details of the current landfill are outlined in Table 6.1.

**Table 6.1: Nambucca Shire Council Landfill Details**

	<b>Area (ha)</b>	<b>Landfill Volume (m<sup>3</sup>)</b>	<b>Life of Stage (years)</b>
Stage One	3.8	440,000	25
Stage Two	2.5	360,000	15
Stage Three	2.6	420,000	20
Total	8.9	1,220,000	60

For the 2006/2007 reporting year, 12459.30 tonnes of waste was landfilled. This is a decrease of 1138.84 tonnes on the 2005/2006 reporting year.

### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Municipal waste disposed to landfill during the reporting year</b>	<b>12459.30 tonnes</b>
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While Council had to invest approximately \$1.2 million on the current site (more in the future as the old landfill is rehabilitated and subsequent cells on the new site are built), it is a project that provides value for money and will perform its function for many years.

#### **6.1.2.1 Recycling**

Kerbside recycling commenced on the 28 November 2005. During the 2006/2007 reporting year, 1525.48 tonnes of co-mingled recyclable materials were collected.

Diversions at the landfill during the reporting year are recorded in the table below.

## **NSW NORTH COAST REGIONAL INDICATORS**

<b>Weight of green organics diverted at the landfill during reporting year</b>	<b>335.35 tonnes</b>
<b>Weight of scrap metal diverted at the landfill during the reporting year</b>	<b>276.78 tonnes</b>
<b>Weight of batteries diverted at the landfill during the reporting year</b>	<b>6.81 tonnes</b>
<b>Volume of motor oil diverted at the landfill during the reporting year</b>	<b>1600 litres</b>

### **6.1.2.2 Buy Back Centre**

The buy back centre was created to allow for the sale and diversion of reusable articles. It is estimated that around 2,000 items were sold during the reporting year, thereby diverting them from becoming landfill.

### **6.1.2.3 Hazardous Chemical Waste**

Midwaste has facilitated the tendering of contracts for the collection, transportation and disposal of chemicals and hazardous materials for the eight member Councils (Coffs Harbour in the North to Foster in the South). Midwaste members believed that by acting collectively it would be more beneficial to each Council.

The successful tenderer will enter into a one year contractual agreement with each Council as Midwaste is not a legal entity. This allows for the two monthly collection and transportation of chemicals received at nominated waste facilities located in each LGA.

## **6.2 PRESSURE - SOLID WASTE MANAGEMENT**

### **6.2.1 *Regulatory Requirements***

During 2001 and 2002 Council completed Landfill Environmental Management Plans for both the previous and current landfills. Council also completed the following plans of management associated with the landfill operations:

- 1 Weed Control Program.
- 2 Management and Maintenance Plan – Wetland and Channel Works (previous landfill).
- 3 Design Concept for Stormwater Wetland (previous and current landfills).
- 4 Water Management Works (current landfill).
- 5 Plan of Management for the New Conservation Area.

### **6.2.2 Current Landfill Capacity**

The current landfilling volume is 1.2 million cubic meters of waste over an area of 8.9 hectares. Assuming a growth rate 1.1% and landfill compaction of 750 kg/m<sup>3</sup>, the site will be in operation for approximately 60 years.

### **6.2.3 Domestic Waste Service**

The continued challenge facing Council is to provide the community with a high level of waste disposal services that meets community expectations, is cost effective, responds to the goal of waste minimisation and reduction and complies with the Department of Environment and Climate Change industry standards in waste management.

## **6.3 RESPONSE - SOLID WASTE MANAGEMENT**

Consistent with the increasing effect of the *Waste Minimisation and Management Act 1995* on waste disposal operations, Council has initiated the following:

- Actioning Landfill Environment Management Plans;
- Continue the six monthly volumetric surveys of the landfill to provide better data on waste disposed;
- Construction of improved stormwater/leachate irrigation systems;
- Increase the quantity of greenwaste diversions;
- Review public education programs to reduce contamination kerbside recycling;
- Undertake a full public tender process for facets of the waste disposal system ie domestic kerbside recycling, mixed waste and organic waste services.
- Analyse the contamination levels of recyclable products to increase yields from 60% to 90%;
- Increased environmental monitoring and reporting and
- Constructed a new landfill with individual cells for waste disposal, coupled with increased diversions at the receiving transfer facility.

### **6.3.1 Future Directions in Solid Waste Management for Nambucca Valley**

#### Major Step Forward for Regional Waste Services

A \$75 million contract to provide a regional waste collection and recycling services for Coffs Harbour, Bellingen and Nambucca residents has been awarded to Handybin Waste Services. The contract is central to the operation of the Coffs Coast Regional Waste Service. Handybin Waste Services provide a three-bin kerbside waste collection service for organics, recyclables

and mixed waste for homes across the region covered by the three councils. The contract also provides kitchen tidy bins for the separation of food wastes.

Handybin constructed a new \$4.5m Materials Recovery Facility (MRF) to process all recyclable materials which will operate alongside the Coffs Coast Regional Resource Recovery Facility at Englands Road. Handybin is also responsible for the processing and marketing of recyclables, which will be collected from transfer stations in Bellingen and Nambucca, as well as the disposal of residue materials. Handybin also operates a call centre to deal with customer enquiries and provides an educational facility at the site.

A \$125 million contract to process organic wastes and mixed waste materials for Coffs Harbour, Bellingen and Nambucca residents has been awarded to Biomass Solutions Coffs Harbour. Biomass Solutions commissioned the organics processing in early March 2007. The processing of mixed domestic waste commenced September 2007 using state-of-the-art technology that processes organic and mixed wastes into resources such as fuels and compost.

All mixed waste and recyclable materials generated in the region will be transported to Coffs Harbour's Waste Facility for processing into renewable resources. It is anticipated that the source separation and the recovery of reusable products will result in a diversion of waste from landfill of approximately 80 - 85% across the three LGAs. Further gains are to be had by the separation and recycling of concrete/ masonry products, greenwaste/raw timber and scrap metal products at the landfill sites.

## **6.4 STATE - LIQUID WASTE MANAGEMENT**

There are four wastewater treatment plants that service the urban and industrial areas of Nambucca Heads, Macksville, Scotts Head, Bowraville, Valla Beach and Hyland Park. The plants are located at Nambucca Heads (Mahogany Road), Macksville (River Street), Bowraville (River Street) and Scotts Head (South Pacific Drive). Each sewerage system has an Environment Protection Licence that has been issued by the Environment Protection Authority and has strict limits imposed to control the volume and quality of effluent that may be discharged from the plant (refer Table 6.2). It is important to note that although the Environment Protection Authority is now part of the Department of Environment and Climate Change, certain statutory functions and powers continue to be exercised in the name of the Environment Protection Authority.

As outlined in Section 3.5.1.4, the total volume of wastewater treated at treatment plants during the reporting year was 1, 385.9 ML (1, 308 ML treated to tertiary level, 77.84 ML treated to secondary level).

**Table 6.2: Department of Environment and Climate Change Environment Protection Licence Limits for the Wastewater Treatment Plants**

Parameter	Macksville		Nambucca Heads	Bowraville	Scotts Head
	90%	100%	100%	100%	100%
BOD (mg/L)	15	20	20	20	20
TSS (mg/L)	20	40	-	-	30
Adjusted TSS <sup>1</sup> (mg/L)	-	-	30 <sup>1</sup>	30 <sup>1</sup>	-
TP (mg/L)	1	3	-	-	-
TN (mg/L)	15	25	-	-	-
FC (CFU/100 mL)	200	600	-	-	-
O&G (mg/L)	-	10	10	10	10
pH	-	6.5-8.5	-	-	-
Ammonia (mg/L)	5	10	-	-	-
Volume (kL/day)	9500		9500	1500	2500

1: Calculated using the following equation: Adjusted TSS (mg/L) = TSS (mg/L) – 0.1 × Chlorophyll ‘a’ (mg/L).

## 6.5 PRESSURE - LIQUID WASTE MANAGEMENT

### 6.5.1 Wastewater Treatment Plants

The Nambucca Heads, Macksville, Bowraville and Scotts Head wastewater treatment plants have a capacity of 10,000, 5,500, 1,200 and 2,000 equivalent persons (ep) respectively. With the exception of Nambucca Heads (see section 6.6.3) these plants are capable of serving current and future populations.

### 6.5.2 On-Site Disposal Systems

There are various on-site effluent disposal systems used in the Local Government Area including absorption trenches, evapo-transpiration beds, spray irrigation, pumpout, reed beds, gravel/sand filters and composting. Absorption trenches are the most common, although the use of composting and aerated wastewater treatment systems has increased recently. The main pressure being placed on the effectiveness of these systems is a lack of maintenance.

## **6.6 RESPONSE - LIQUID WASTE MANAGEMENT**

### **6.6.1 *Macksville Treatment Plant***

In addition to an upgrade of the existing reticulation system, a new wastewater treatment plant for Macksville was commissioned in late 1998. This plant has a greater capacity and can treat wastewater to an increased quality level.

### **6.6.2 *Bowraville Reuse Scheme***

Full re-use of effluent from the Bowraville wastewater treatment plant commenced in August 2002. The treated waste is transferred to an utilisation area storage dam where it is then used for crop irrigation. In 2004 Council purchased the irrigation farm to ensure the security of the re-use option.

### **6.6.3 *Nambucca Heads Treatment Plant***

The load on the Nambucca Heads sewage treatment plant is nearing capacity and investigations have commenced into the options to upgrade the plant to cater for future loads. In addition to the limits imposed on each treatment works via an Environment Protection Licence from the DEC, a requirement has been placed on the Nambucca Heads treatment plant to reduce the quantity of phosphorus discharged to the environment to 1512 kg/annum. This reduction has been achieved by the introduction of a chemical dosing plant at the works.

### **6.6.4 *Monitoring***

As a condition of the Environment Protection Licenses for each of the wastewater treatment plants, Council is required to monitor the quality of effluent discharged and report this annually to the Department of Environment and Climate Change. Council monitors the discharges from the Macksville and Nambucca Heads wastewater treatment plants on a fortnightly basis, while Bowraville and Scotts Head wastewater treatment plants are monitored on a monthly basis.

Additionally, Council monitors sites upstream and downstream of the wastewater treatment plant discharge points on a monthly basis. These locations are on the Nambucca River at Bowraville and Macksville, on Warrell Creek at Scotts Head and on Deep Creek at Valla Beach and Hyland Park.

### **6.6.5 On-Site Sewage Management**

Council has developed and adopted an On-Site Sewage Management Plan. The plan relates to all premises outside the designated reticulated sewerage areas. The targets specified in the action plan component of the On-Site Sewage Management Plan are currently being achieved.

## **6.7 STATE - CONTAMINATED LAND**

Contaminated land may be due to previous use of a site or land adjacent to the site. This may have been caused by poor practice in the use, handling and/or disposal of hazardous material, or could simply be an unfortunate by-product of the nature of that use. Some contaminated sites present a significant risk to human health and the environment. The nature of site contamination is determined by the history of land use, production technology and waste management practices.

There is current concern regarding the existence of potentially contaminated or contaminated land within the Local Government Area. Under current legislative and administrative arrangements, Local Councils assume much of the responsibility for the management of contaminated land. Investigations have revealed that there are at least nineteen known potentially contaminated sites within the Shire. These sites are presented in Table 6.3.

### **NSW NORTH COAST REGIONAL INDICATORS**

<b>Potentially contaminated sites in the Nambucca Shire</b>	<b>Refer Table 6.3</b>
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**Table 6.3: Potentially Contaminated Sites in the Nambucca Shire**

<b>No.</b>	<b>Parish</b>	<b>Usage</b>	<b>Owner</b>	<b>Property</b>
A1.0	Nambucca	Garbage Depot	NSC	Lot 142 DP 700891, 711 Old Coast Road, Newee Creek
A2.0	Congarinni	Sanitary Depot	NSC	Lot 1 DP 510707 Gumma Road, Gumma
A3.0	Unkya	Garbage Depot	Unkya LALC	Lot 2 DP 870452, Little Tamban Rd, Eungai Creek
A4.0	Bowra	Garbage Depot	Crown Land	Lot 56 DP 755537 Gumbayngirr Road, Bowraville
A5.0	Denison	Garbage Depot	Varsanyi	Lot 622 DP 634925, 338 Greenhills Rd, Taylors Arm
A6.0	Warrell	Garbage Depot	NSC	Lot 215, DP 755562 South Pacific Drive, Scotts Head
A7.0	Nambucca	Garbage Depot	NSC	Lot 4, DP 749153, Pacific Highway, Lower Nambucca
A8.0	Valley Valley	Dip Site	Tape	Lot 154 DP 755560, 532-657 Newee Creek Road, Newee Creek
A9.0	Congarinni	Dip Site	Ainsworth	Lot 25 DP 755539, 178 Gumma Rd, Gumma
A10.0	Valley Valley	Dip Site	Cooper	Lot 2, DP 844950, Sullivan's Rd, Valla
A11.0	Nambucca	Garbage Depot	Crown (State Forest)	Nambucca State Forest, Off Old Coast Rd, Newee Creek
<b>No.</b>	<b>Parish</b>	<b>Usage</b>	<b>Owner</b>	<b>Property</b>
A12.0	Macksville	Dip Site	Boringer	Lot 4, DP 238366, 39A Boundary Street, Macksville
A13.0	Macksville	Dip Site	Fuller	Lot 5, DP 238366, 41 Boundary Street, Macksville
A14.0	Lot 71/72 DP874929 Cook/River Streets, Bowraville – <b>REMEDIATED</b>			
A15.0	Valley Valley Bellingen Shire	Old Valla Gold Mine		Bellingen Shire
A16.0	Valley Valley	Rural/Proximity to Mines	Faringdon Pty Ltd	Lot 2, DP 848520, Pacific Highway, Valla (Oyster Creek Subdivision)
A17.0	Macksville	Bus Depot/ Council Depot	MD Trisley & KL Peterkin	Lot 4 Section D DP 8624, 16 Jellico Street, Macksville
A18.0	Unkya	Garbage Depot	NSC	Lot 8 DP 870452 Little Tamban Road, Eungai Creek
A19.0	Valley Valley	Arsenic Mine/Excessive Arsenic Levels Identified Elsewhere on Property	WA Welsh & WS Childs	Lot 19 DP 755560 Cow Creek Road, Valla



Table 6.3 has been compiled following consultation with the Department of Environment and Climate Change.

A number of other sites within the Local Government Area have the potential to contain substantial levels of contamination however they require further investigations before their status can be determined.

## **6.8 PRESSURE - CONTAMINATED LAND**

There are a number of sites within the Local Government Area where it is suspected that potentially contaminating activities have occurred. These sites and contaminants include:

- Agricultural areas where persistent chemicals such as arsenic and or organochlorine chemicals (eg banana plantations, local orchards, horticultural plantations and market gardens) and organophosphate based chemicals have been applied.
- Landfills and other waste disposal and storage areas including transfer stations, where putrescible material (eg food waste), paper, plastics, metals and liquid wastes (eg solvents) have been disposed of.
- Petroleum storage areas and petrol stations with aboveground and underground storage tanks.
- Pesticide storage tanks and areas where vehicles used for transport and storage of pesticides are washed.
- Scrap yards where heavy metals and chlorinated hydrocarbon solvents have been disposed of.
- Stock dipping sites where chemicals such as arsenic, DDT and BHC were previously used and where current chemicals such as Tactic and Amitraz are in use.

## **6.9 RESPONSE - CONTAMINATED LAND**

Pursuant to State Environmental Planning Policy 55 – Remediation of Land (SEPP 55), Council cannot consent to any development unless potential land contamination has been considered. Council specifies that the Potential Land Contamination Checklist for Initial Evaluation must be completed and accompany all Development Applications.

Council has instigated the following four broad strategies when addressing the issue of potentially contaminated or contaminated land:

- **Site identification** - This encompasses the identification of potentially contaminated sites including the nature and extent of contamination, registration of sites and contaminants and or contaminated areas.

- **Prevention measures** - Encompassing land-use planning policy to restrict potentially contaminating activities or development to areas where such developments can be undertaken within accepted community standards.
- **Impact minimisation** - Formulation and imposition of restrictions and limitations on potentially contaminating developments to minimise adverse environmental impacts.
- **Remediation measures** - Removal, dispersion, destruction or mitigation of contaminated sites.

As part of an environmental review of derelict mines, the NSW Department of Mineral Resources facilitated the formation of a technical working party to review the rehabilitation process for the Old Valla Gold Mine site. The mine is located in the Bellingen Shire adjacent to the Nambucca Shire boundary and was established last century, but was abandoned many years ago. A steering committee was formed (consisting primarily of members of the technical working party) to review rehabilitation options. The steering committee agreed to proceed with an option to construct a dam and two erosion and sediment control structures, as well as removing tailings to a landfill site at Grafton. Rehabilitation works have been completed.

Council adopted a Contaminated Land Management Policy on 18 November 1999. This policy forms the basis for the management of land contamination within the Local Government Area. It is made as a policy under the *Managing Land Contamination: Planning Guidelines* (August 1998) and SEPP 55. In accordance with the *Managing Land Contamination: Planning Guidelines*, the policy provides the framework for the integration of land contamination management into the planning and development process and aims to:

- ensure that changes of landuse will not increase the risk to health or the environment;
- avoid inappropriate restrictions on landuse; and,
- provide information to support decision making and to inform the community.

The Department of Environment and Climate Change's intervention in relation to contaminated land is triggered when land contamination poses a significant risk of harm to public health or the environment (Section 7 *Contaminated Land Management Act 1997*). In general, sites that do not present a significant risk of harm will be dealt with by Council under the provisions of the Environmental Planning and Assessment Act 1979, in accordance with *Managing Land Contamination: Planning Guidelines* and SEPP 55.

## **7.0 NOISE**

Noise affects most people at some time or another. We live in a society where noise levels tend to be increasing, along with an increased potential for disruption to our home life, work or recreational activities. There are also substantial variations in the way that individuals react to noise. Noise may become annoying if it intrudes into a person's awareness, is heard against their wishes or offers them no benefits, noise can disrupt a person's activities and rest by interfering with speech, study, leisure or sleep (Department of Environment and Conservation, 2004)<sup>1</sup>.

### **7.1 STATE**

The Nambucca Shire has few major forms of noise pollution (such as major roads and industrial/commercial areas), however, as the residential and industrial areas expand, noise-related issues may exert increasing pressure on the environment. The primary sources of noise complaints in the Shire are animals in urban areas and to a lesser extent, commercial operations and construction works. Other notable sources of noise complaints include music and other forms of entertainment, quarries and rubbish removal.

### **7.2 PRESSURE**

The main forms of pressure on the Local Government Area environment from noise relate to animals, commercial/industrial operations, domestic and traffic noises. There were 49 noise complaints recorded on Councils Customer Service Request system during the 2006/2007 reporting period. While this is an underestimate of the actual number of noise complaints received (due to written complaints and complaints direct to Council's Regulatory Contractor not being recorded on the system), the number is worthy of inclusion in this report.

During the reporting year the Department of Environment and Climate Change received 6 complaints relating to noise in the Local Government Area. This figure includes public calls to the pollution line, public calls to the pollution line requesting information and information calls referred from the pollution line to Council (SoEdirect, 2007).

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<sup>1</sup> Now Department of Environment and Climate Change

## **NSW NORTH COAST REGIONAL INDICATORS**

<b>Number of noise complaints to Council (CSR) during the reporting year</b>	<b>59</b>
<b>Number of noise complaints to Department of Environment and Climate Change during the reporting year</b>	<b>7</b>

The main sources of pressure being exerted on the Local Government Area environment through noise are outlined below.

### **7.2.1 Noise from Animals**

The most common form of noise complaint in urban areas relates to animals. Barking dogs and crowing roosters, particularly at night, are a major source of these complaints.

### **7.2.2 Commercial and Industrial Operations**

The noise generated from commercial (licensed premises) and industrial operations varies considerably depending on the type, size and location of the operation. Generally, commercial (licensed premises) and industrial areas create a considerable amount of on-going noise which, when located adjacent to residential areas, can create a substantial long-term problem.

### **7.2.3 Domestic Noise**

The majority of domestic noise complaints relate to air conditioners and pool filters. The complaints are usually the result of the inappropriate placement of such devices adjacent to bedrooms of neighbouring dwellings. A number of domestic noise complaints also arise from private parties and gatherings that continue late into the night.

### **7.2.4 Traffic**

Traffic noise is affected by many factors including the road surface, the speed of the vehicle, the type of vehicle and the volume of traffic. Problems commonly arise from the major roads such as highways and major arterial roads or those with large volumes of heavy vehicles.

## 7.3 RESPONSE

The control of noise is the responsibility of a number of different organisations. The organisation responsible is dependent on the type, location and time of the noise. Table 7.1 outlines the regulatory authorities responsible for the major sources of noisy activities in NSW.

**Table 7.1: Regulatory Authorities Responsible for Noisy Activities**

Activity	Local Council	Police	Waterways Authority	EPA	LAB	RTA	Commonwealth
Premises not licensed under <i>POEO Act 1997</i>	✓						
Neighbourhood noise eg residential	✓	✓					
Vehicles in off-road locations	✓	✓					
Marine vessels and premises		✓	✓				
Recreational activities	✓			✓ Limited to major public venues			
Hotels & licensed premises	✓	✓			✓		
Vehicles on roads		✓		✓		✓	
Licensed premises under <i>POEO Act 1997</i>				✓			
Public authority activities				✓			
Commonwealth activities							✓
Airports	✓ Private airports			✓ Councils that operate airports			✓ Commonwealth and military airports

**Source:** Department of Environment and Conservation (2004).

Council addresses noise issues through various avenues. Firstly, the development assessment process is designed to anticipate noise problems and prevent these from arising in the first instance. This is achieved by considering each application for their noise generating potential and the sensitivity of the surrounding area.

Additionally, Council has adopted certain policies that aim to reduce conflicts arising due to noise. An example of this is Council's Rural Buffer Policy that prohibits certain development within 150m of an adjoining rural zone. The purpose of this policy is to reduce the likelihood of complaints from new rural-residential properties abutting existing agricultural farmlands.

Secondly, officers of Council's Department of Environment and Planning investigate noise complaints. These investigations involve assessing the nature of the complaint and the source of the noise. If deemed necessary, this is followed by consultation with the parties involved to attempt to achieve a suitable arrangement through relocation of noise generating equipment, installation of buffers and time management. If these measures are ignored or a suitable arrangement is not achieved, Council can issue control notices and on-the-spot penalty Notices for ongoing breaches.

## 8.0 HERITAGE

### 8.1 STATE – ABORIGINAL HERITAGE

Aboriginal sites are the physical remains of a culture that is more than 40,000 years old. It is important that Aboriginal sites are recorded, studied and preserved as part of the cultural heritage of the Aboriginal people in the Nambucca Shire and as part of the wider community's historic and cultural heritage. Aboriginal sites are also an important scientific resource.

At present there are nineteen Aboriginal relic sites and fifteen mythological sites recorded in the Nambucca Shire by the NSW National Parks and Wildlife Service (NPWS). These sites have been surveyed by NPWS to determine their significance. The location of the relic sites is generally well dispersed throughout the Nambucca Valley although there is a noticeable concentration along the coastal region. Some of the sites identified include camp-sites, carved trees, wells, burial grounds, middens, ceremonial grounds and sacred artefacts.

The mythological sites are also generally evenly distributed throughout the Nambucca Shire and further indicate a noticeable concentration along the coastal region.

In addition to the thirty four relic and mythological sites listed in the Nambucca Shire, there are a number of other identified artefacts and features representative of Aboriginal land use and history which contribute to the total number of identified sites and artefacts.

A summary of the total number and nature of Aboriginal sites including relic and mythological sites and other artefacts is displayed in Table 8.1

#### ***NSW NORTH COAST REGIONAL INDICATORS***

<b>Aboriginal relic and mythological sites and other artefacts in the Nambucca Shire</b>	<b>Refer Table 8.1</b>
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**Table 8.1: Number and Nature of Aboriginal Sites and Artefacts**

<b>Site Feature</b>	<b>Number</b>
Aboriginal Resource and Gathering	3 (1)
Aboriginal Ceremony and Dreaming	19 (1)
Art (Pigment or Engraved)	1 (0)
Artefact	59 (2)
Burial	7 (1)
Ceremonial Ring (Stone or Earth)	10 (1)
Conflict	2 (1)
Earth Mound	19 (5)
Fish Trap	- (0)
Grinding Groove	- (0)
Habitation Structure	9 (0)
Hearth	- (0)
Non-Human Bone and Organic Material	1 (0)
Ochre Quarry	- (0)
Potential Archaeological Deposit (PAD)	- (0)
Shell	17 (0)
Stone Arrangement	2 (1)
Stone Quarry	- (0)
Modified Tree (Carved or Scarred)	18 (2)
Water Hole	2 (0)
<b>Total</b>	<b>169 (15)</b>

(**Source:** Department of Environment and Climate Change - Provision of Information for State of the Environment Report 2006-2007).

**Note:** The figures in brackets are for Aboriginal Sites/Places that have been recorded and entered onto Department of Environment and Climate Change's Aboriginal Heritage Information System (AHIMS) in 2006/2007 (Source: DECC – Provision of Information for State of the Environment Report 2006/2007).



## 8.2 PRESSURE – ABORIGINAL HERITAGE

Many Aboriginal sites in the Nambucca Shire are likely to have been damaged over time. A lack of understanding is one of the main issues impacting on Aboriginal Heritage within the Shire. This lack of understanding can lead to pressure on Aboriginal heritage through either indifference as to the significance of Aboriginal heritage items, or ignorance as to the actual or likely location of areas of significance. However, urban and rural development still presents the greatest threat to the conservation of relic and mythological sites within the Nambucca Shire.

## 8.3 RESPONSE – ABORIGINAL HERITAGE

The NSW *National Parks and Wildlife Act, 1974* sets out regulations for the protection and preservation of all Aboriginal relics and places throughout NSW. The Act defines a relic as "any deposit, object as material evidence (not being a handicraft made for sale) relating to indigenous and non-European habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains". A relic also encompasses natural landscape features of spiritual or mythological significance or recognised ceremonial grounds.

The Act further defines that an Aboriginal place is "a place which has been declared so by the minister for the Environment because he or she believes that the place is or was of special significance to Aboriginal culture". It may or may not contain physical relics.

In addition to maintaining a register of known relics in the Nambucca Shire, Council has procedures in place to ensure that all proposals on land that have the potential to contain a relic or Aboriginal conservation area are referred to both NPWS (Aboriginal Cultural Heritage Division) and the relevant Local Aboriginal Land Council (LALC) for comment.

On 7 June 2001 Council adopted a recommendation from the Committee as follows:

**Recommendation 1:** That any correspondence from the Bowraville Local Aboriginal Land Council in reply to Nambucca Shire Council development applications be signed by the Land Council Chairperson.

**Recommendation 2:** That correspondence to Bowraville Local Aboriginal Land Council in relation to development applications includes all wording of Legislative requirements including the wording "sites of significance".

**Recommendation 3:** That a representative from the Department of Environment and Planning, Nambucca Shire Council offer to go out and meet with the Local Aboriginal Land Council Executive, community and Elders for future major development applications.

Developers are also made aware of their obligations and Council's procedures for site protection and if necessary, conditions of development consent are imposed on approved development applications to ensure adequate procedures are in place should significant items of Aboriginal heritage be discovered. In some cases applicants are requested to submit a letter from the Local Aboriginal Land Councils that they have no objection to their development. This procedure is supported by NPWS.

Council's Nambucca Local Environmental Plan 1995 (LEP) (Clause 54) requires Council to maintain a register of Aboriginal Conservation areas and sites containing Aboriginal relics within the Shire. NPWS is required to notify Council of any additions to this register.

An "Aboriginal Conservation Area" means an area of special significance with respect to Aboriginal culture, whether containing a relic or not, and includes natural landscape features with mythological or spiritual significance and ceremonial grounds.

Council's LEP specifies an Aboriginal conservation area or relic included in the register must not be altered, disturbed, excavated or built on without the consent of Council and concurrence of the Director-General, NPWS. The two Aboriginal areas that are identified by NPWS are Nungumirar Aboriginal Area, Valla and Nambucca Aboriginal Area, near Bowraville.

Discussions held with NPWS (Aboriginal Cultural Heritage Division) have highlighted the need for an improved approach to the assessment of cultural heritage significance during the planning process. In particular, there is a clear need for the formulation of an Aboriginal Cultural Heritage Management Plan (ACHMP) for the Nambucca Shire which would not only promote the identification and conservation of significant Aboriginal sites, but also deliver a greater degree of procedural certainty to both developers and Council.

In July 2000, Council applied to the NSW Heritage Office for \$10,000 funding under the 2001 Heritage Incentives Program towards preparing an ACHMP to identify the impact of development on Aboriginal cultural heritage sites.

In February 2001 Dr Andrew Refshauge, MP, Deputy Premier, Minister for Urban Affairs and Planning, Minister for Aboriginal Affairs and Minister for Housing, approved a dollar for dollar grant of up to \$10,000 for the preparation of an Aboriginal site survey of the Nambucca Shire. It

should be noted that Council was unsuccessful for the same funding in the 1999/2000 period under the Federal Governments Cultural Heritage Projects Program.

Council has budgeted \$5,000 in its 2000/2001 budget and \$5,000 in its 2001/2002 budget towards the ACHMP. The total \$10,000 allocated to the project has also been carried over into the 2002-2003 budget.

The ACHMP will be implemented to assist in the identification of future conservation and management of Aboriginal cultural heritage in the area. The survey will assist both applicants preparing development applications and Council in determining development applications.

It is envisaged that the Plan will be prepared in consultation with NPWS, relevant LALC's, North Eastern State Forestry (NESF) and the Heritage Office.

The tendering process was completed in April 2002 and a consultant was appointed in late May 2002. It was expected that the consultant would have a draft plan completed by late December 2002. Due to problems in formatting the consultant's information, a draft plan was not received until June 2003. The draft ACHMP was then placed on exhibition in July for a period of 1 month and copies referred to the Nambucca Heads Local Aboriginal Land Council, Bowraville Local Aboriginal Land Council, Unkya Local Aboriginal Land Council and Yilaaming Duguula centre for comment.

Following the exhibition period, a meeting was held between Council staff and several of the local Aboriginal elders. Upon completion of the meeting it was decided that additional time was required to allow the local Aboriginal elders to provide comment on the draft plan. It is expected that any comments from the elders will be received prior to the end of 2004, so that the ACHMP can be finalised in 2004.

It is imperative that the remaining Aboriginal sites in the Nambucca Shire be protected. An ACHMP will ensure that appropriate assessment is made of the potential impact of proposed development and that ameliorative measures are taken to prevent or minimise potential adverse impacts.

## **8.4 STATE – NON-ABORIGINAL HERITAGE**

At present there are 37 individual items of environmental heritage scheduled for protection and two designated Heritage Conservation areas in the Shire through Council's LEP 1995. These include:

## **NSW NORTH COAST REGIONAL INDICATORS**

<b>Non-Aboriginal heritage items and areas in the Nambucca Shire</b>	<b>Refer Section 8.4</b>
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### **8.4.1 Heritage Conservation Areas**

- **New England National Park** (85 km east of Armidale)
- **Nambucca North Headland** - approximately 12 ha, located immediately north of the mouth of the Nambucca River, comprising the rock platforms and adjacent rocky cliff section between the mouth of the Nambucca River and the south end of Shelley Beach.

### **8.4.2 Heritage Items**

#### **Macksville**

- **Nambucca Hotel** - Corner of Cooper and Wallace Streets, Macksville (Figure 8.1)
- **The Star Hotel** - River Street, Macksville (Figure 8.2)

#### **Bowraville**

- **St James Anglican Church** - 19 High Street, Bowraville (Figure 8.5)
- **Bowraville Central School** - 23 High Street, Bowraville
- **Police Station & Court House** - 25 High Street, Bowraville (Figure 8.8)
- **Post Office** - 27 High Street, Bowraville (Figure 8.3)
- **Former Council Chambers** - 29 High Street, Bowraville
- **"Sullivans Bowra Hotel"** - 33 High Street, Bowraville (Figure 8.4)
- **Dwelling** - 34 High Street, Bowraville
- **Dwelling** - 36 High Street, Bowraville
- **Dwelling** - 38 High Street, Bowraville
- **Banacoast Credit Union** - 39 High Street, Bowraville
- **Dwelling** - 40 High Street, Bowraville
- **Dwelling** - 42 High Street, Bowraville
- **Shop** - 45 High Street, Bowraville
- **Shop** - 45A High Street, Bowraville
- **Commercial Building** - 46 High Street, Bowraville
- **Shop** - 47 High Street, Bowraville
- **Scout Hall** - 48 High Street, Bowraville
- **Medical Rooms** - 49 High Street, Bowraville
- **Dwelling** - 52 High Street, Bowraville
- **Fire Station** - 55 High Street, Bowraville (Figure 8.7)
- **Garage/Workshop** - 56 High Street, Bowraville
- **Bowraville Services Club** - 57-59 High Street, Bowraville
- **Shop/Dwelling** - 58A High Street, Bowraville

- **Shop** - 64 High Street, Bowraville
- **"Pioneer Community Centre"** - 70 High Street, Bowraville
- **"State Bank"** - 72 High Street, Bowraville
- **"The Remnant Basket"** - 74 High Street, Bowraville
- **Shop** - 80 High Street, Bowraville
- **"Grants Hall"** - 82 High Street, Bowraville
- **"Royal Hotel"** – 84 High Street, Bowraville
- **"Museum and Former Presbyterian Church"** - 86-86B High Street, Bowraville
- **Dwelling** - 86c High Street, Bowraville
- **Eliza and Joseph Newman Folk Museum** - 86D High Street, Bowraville
- **"The Bank"** - 88 High Street, Bowraville

**Note:** Only includes properties where owner has volunteered to be included in Council's LEP. Other heritage buildings not listed are located within the Bowraville Conservation Area (see map).

- **Osprey nest sites and land within 100m of those sites** - Portion 22, Parish Bowra, Lot 1, DP 258205, Parish Valley Valley and Portion 189, Parish Bowra and Crown Reserve, Parish Congarinni (eastern side Warrell Creek)

The North Coast Regional Environmental Plan (Amendment No 1) identified both sides of High Street, Bowraville from Lower North Arm Road to Bowra Street (Figures 8.6 & 8.9) of being a significant Urban Conservation Area. The Plan also identifies the Bowra Hotel at Bowraville and the Star Hotel at Macksville as Heritage Items of Regional Environmental significance. Amendment No. 3 to the North Coast REP added the following properties to Schedules 1, 2 and 3 of the plan.

#### **Schedule 1 - Conservation Areas:**

- St James Anglican Church to be added to Bowraville Conservation Area.

#### **Schedule 2 - Heritage items of State and Regional Environmental Significance:**

- "Royal Tar" Bed Logs, Nambucca River near Nambucca Heads

#### **Schedule 3 - Heritage Items of Regional Environmental Significance:**

- Former Bowraville Court House (now Bowraville Police Station) 25 High Street
- Nambucca Hotel, Corner Wallace and Cooper Streets
- Macksville Court House, 50 River Street
- Sea Wall, northern side of the mouth of the Nambucca River (guarding the northern side of the East entrance to the Nambucca Inner Harbour)

A summary of the total number of heritage items listed within the Shire is displayed in Table 8.2.

**Table 8.2: Heritage Indicators within Nambucca Shire**

<b>Environmental Issue</b>	<b>Indicator</b>	<b>Number of Listings</b>
Heritage	Number of Aboriginal Relic and Mythological Site Listings (Register)	34
	Number of Heritage Site Listings (LEP)	37
	Number of Heritage Conservation Areas (LEP)	2
	Number of heritage sites destroyed or demolished	Nil
	Number of items of Regional environmental significance (REP)	6
	Number of items of State and Regional Environmental Significance (REP)	1
	Number of Conservation Areas (REP)	1

## **8.5 PRESSURE – NON-ABORIGINAL HERITAGE**

There are a number of factors that are currently exerting significant pressure on the heritage value of many identified items and places within the Nambucca. These pressures include new development, redevelopment, wilful neglect due to high maintenance costs and deterioration by natural weathering processes. Other factors that also contribute to diminishing the heritage significance, including their character, are setting and integrity of many items, inappropriate alterations, additions and repairs.

It is important to note that the existing inventory of heritage listed sites within the Nambucca Shire could not be viewed as definitive and that many items of heritage significance may exist without the benefit of protection provided by planning instruments such as the Nambucca Local Environmental Plan 1995 and the North Coast Regional Environmental Plan 1988. It is considered that items such as these face the greatest degree of pressure from factors such as the lack of understanding and redevelopment.

Fortunately, the heritage towns of Macksville and Bowraville do not face significant redevelopment pressures and the character and preservation of these townships have been largely retained. Council will however, need to carefully consider redevelopment of these urban areas, in particular the business centres that display unique heritage qualities.

## 8.6 RESPONSE – NON-ABORIGINAL HERITAGE

Statutory mechanisms for heritage conservation exist through the *Environmental Planning and Assessment Act*, *Heritage Act* and *National Parks and Wildlife Act*. Council has responsibility under these pieces of legislation during the development assessment and environmental impact assessment process to identify and manage heritage items which are of significance for the Nambucca Shire. Council addresses these responsibilities through the promotion of the following techniques:

- Statutory development controls;
- Conservation incentives;
- Public initiatives; and
- Specific local policies

An important function of the recent amendments to the Heritage Act has been the steady devolution of responsibility for heritage management from the Heritage Council to local government and the ability of Councils to use specific delegations where consistent with the guidelines of the Heritage Council. The benefits of these delegations include improved efficiencies in the approvals process resulting in time and cost savings and greater involvement and interest in the responsible management of heritage items by the local community in cooperation with Councils.

Council obtained funding from the NSW Heritage Office to establish a Local Heritage Fund for Macksville and to complete a Main Street Heritage Study of Macksville which was completed in December 1999. Funding for both projects was made available on the proviso that Council matched the heritage grants on a dollar for dollar basis.

The Local Heritage Fund was available to assist property owners located in the study area to restore and enhance their premises in accordance with the guidelines and recommendations from the Main Street Heritage Study for Macksville. The Local Heritage Fund ceased to operate in 2003 as funding was not allocated in the 2002/2003 budget.

The primary purpose of the Main Street Heritage Study was to:

- i Provide advice to Council which would enable it to take measures to conserve and enhance the identified heritage character and heritage items of the Central Business District (CBD) of Macksville; and
- ii Provide advice, information and guidelines to building owners and the Council to enable appropriate restoration, painting, infill and streetscape design including street furniture, paving and tree planting.

A detailed inventory of 62 buildings and three precincts within the Macksville CBD was undertaken with each item having information on the following details:

Building/precinct name, location, heritage significance, present business use, present owners, real property description, architectural style, principal materials, original verandah/awning type, significant facade elements, modifications, history, principal date, architect or builder, contribution to streetscape and recommendations.

The 5 main recommendations of the study were to:

- 1 Recognise the River Street precinct as having regional cultural significance. All buildings in this precinct to be preserved unless listed as intrusive in the Inventory. Encourage the renovation of existing buildings, the re-instatement of verandahs, use of appropriate signs and colour schemes. Provide suitable street seating, lighting, bins and interpretive signage.
- 2 Prepare a landscape master plan for the River Street precinct to guide the design of the future paving and landscaping to include the park area opposite. To prepare a street tree planting programme for River Street, Princess Street and Wallace Street.
- 3 Recognise the other two precincts in the town block – Princess Street and Wallace Street, as having local and cultural significance.
- 4 Recognise the School of Arts building in Princess Street as having regional and cultural significance.
- 5 Encourage the reinstatement of verandahs, use of signs and colour schemes to suit the building and the precinct it is in. Emphasise the inherent differences of the three precincts. Provide seating, street lights, bins, and landscaping to suit the historical characteristics of each precinct.

A Main Street Heritage Questionnaire was also undertaken as part of the Main Street Heritage Study for Macksville. The survey results showed:

- There were over 80% in favour of painting each building in the colour range of its era and for developing a theme in Macksville on the historic character of the buildings.
- Over 75% were in favour of signs being in character with the buildings and in reinstating the verandahs to the town.
- In reinstating the verandahs 53% wanted similar to the original, 26% reinstate only the verandahs to the ground floor and 21% wanted verandahs to be replicas of the originals.
- In the location to concentrate limited resources 50% said River Street, 27% said the whole town and 23% said Princess Street and Wallace Street.
- The favourite features of the town were the Star Hotel (25%), the river or river bank (25%), the river precinct (21%), the block (17%) and the Nambucca Hotel (12%).



The Main Street Heritage Study for Macksville is currently being used as a catalyst to upgrade many of the heritage items within the community and foster civic pride. It has given guidance to Council for general Council works in the area and in particular, guidance on the improvement of approaches to the town.

The NSW Heritage Office provides dollar for dollar funding through the Heritage Assistance Program to assist Councils such as Nambucca with Heritage Conservation. Funding is available for the following proposals (Note: In 2002 and 2003, the Nambucca Shire Council did not carry out any of the following projects and therefore did not request any funding):

- 1 To identify heritage items in your area and protect them in the local environmental plan;
- 2 To appoint a heritage adviser to assist the Council to introduce heritage educational, management and promotional measures;
- 3 To establish a local heritage assistance fund to provide small grants to encourage local heritage projects;
- 4 To run a heritage main street program; and
- 5 To run educational and promotional programs.

A Shirewide Heritage Plan is considered essential as a future planning project. The estimated cost of such a study is \$60,000 (\$30,000 required from the Heritage Assistance Program). Funding could be considered in Council's 2004/2005 budget subject to finance availability. Overall, further investigation is needed to identify and analyse the environmental heritage of the Nambucca.



Figure 8.1: The Nambucca Hotel, Macksville



Figure 8.2: The Star Hotel, River Street Macksville



**Figure 8.3: Post Office, 27 High Street, Bowraville**



**Figure 8.4: Sullivan's Bowra Hotel, 33 High Street Bowraville**



**Figure 8.5: St James Anglican Church, 19 High Street, Bowraville**



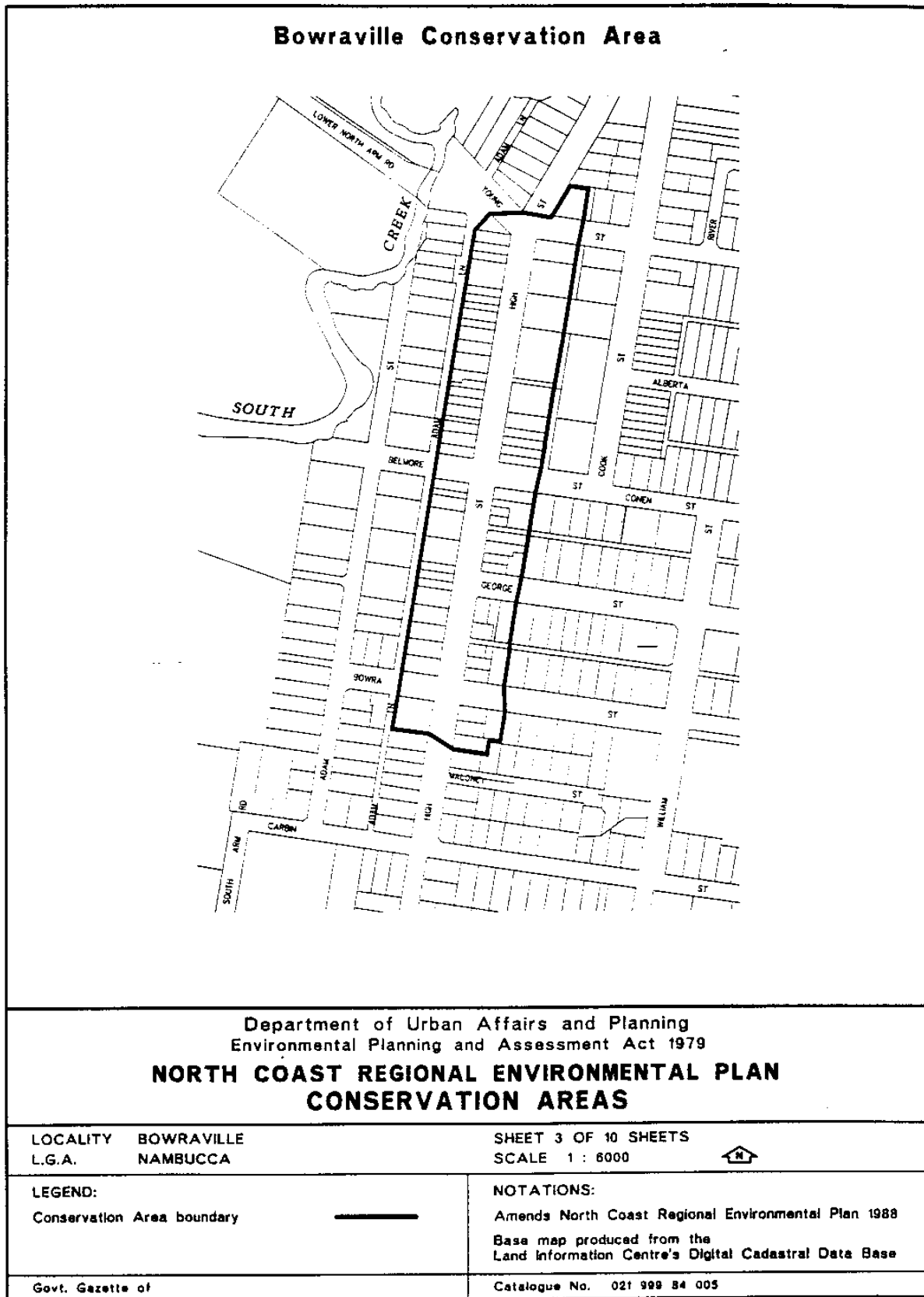
**Figure 8.6: High Street, Bowraville (Bowraville Conservation Area)**



**Figure 8.7: Fire Station, 55 High Street, Bowraville**



**Figure 8.8: Court House, 25 High Street, Bowraville**



**Figure 8.9: Bowraville Heritage Areas**

(Source: North Coast Regional Environmental Plan)

## 9.0 ENVIRONMENTAL MANAGEMENT PLANS AND SPECIAL PROJECTS

Council is responsible for a range of areas of environmental protection and enhancement. Council also supports community groups and other organisations responsible for the protection and improvement of environment conditions. Table 9.1 details projects and environmental programs undertaken or supported by Council during the reporting year.

**Table 9.1: Environmental Programs and Projects to Preserve Protected, Restore and Enhance Environmental Sensitive Areas and Promote Ecological Sustainability in the Shire**

Environmental Issue	Environmental Program/Project	Objective	Recommendation	Comments
Land	Environmental Management Plan - Council Works Depot	Ensure Council's compliance with environmental statutory requirements.	Carry out recommendations	Works Depot Audit completed. Works commenced. On-going compliance
	Consider ESD principles	Compliance with legislation	Integration with DA assessments	On-going
	Part V Assessment of Council Activities including EMP's for major projects	Compliance with legislation.	Continue to complete assessments as required	On-going assessment
	Bitou Bush Management Strategy	Produce distribution maps & develop eradication strategies	Working Party to implement strategies	Mapping and strategies completed
	Continuing Council support for local Landcare, Dunecare and Rivercare groups	Maintain and restore environmentally degraded areas	Continue support	On-going support
Water Systems	Newee Creek Water Quality Monitoring Project	Management of the creek. Effective management of water quality and related issues	Form a Working Party to continue with preparation of the Management Strategy	Data Compilation Study on-going
	Stormwater Management Plan	Improve water quality of stormwater	Carry out recommendations of Management Plan. Review Management Plan as required.	Education for builders and audits of motor repairers carried out. On-going education
	Nambucca River Estuary Management Plan (Draft)	Manage issues relating to estuary health, resource user groups and sustainability	Adoption of and implementation of Nambucca River Estuary Management Plan	Nambucca River Estuary Management Plan forms basis of sustainable resource usage

<b>Environmental Issue</b>	<b>Environmental Program/Project</b>	<b>Objective</b>	<b>Recommendation</b>	<b>Comments</b>
Water Systems	Integrated Water Cycle Management	To identify and reduce sources of wastage, to better manage drinking water supply and sustainable use of water resources	Implementation of complete IWCM plan to occur after full assessment and review	Requires community consultation, Council input and guidance by relevant government departments
	Deep Creek Water Quality Monitoring	Improve knowledge of water quality conditions in Deep Creek and ICOLLs	Continue monitoring and data analysis	On-going
	Maintain water quality	Provision of infrastructure that effectively collects and treats sewerage	Compliance with EPA requirements and licence conditions	On-going
	On-Site Effluent Disposal System Audits	Reduce pollution from existing septic systems	On-going survey of rural properties over next 3-5 years	Intensive inspection and approval process commenced.
	Extractive Industry Monitoring	Ensure extractive industries are not impacting on water quality	On-going monitoring and auditing of extractive industries	On-going
Biological Diversity	Gumma Gumma Wetland rehabilitation	Improve aquatic habitat, management of Acid Sulphate Soils, improvement and maintenance of water quality	Establish protocol for monitoring of water quality and water heights at identified locations	Trial of dropboard weirs to continue. On-going monitoring of water quality and quantity
	Vegetation Management Study	Comprehensively map vegetation and develop future management options	Take findings of the study into consideration	Vegetation mapping and final report completed by consultant
	Nambucca Valley Vegetation and Planting Guide	Encourage weed removal and replanting with suitable native species	Distribution of document to residents and landholders within Nambucca Shire	Opportunity for community education into plant diversity
Air and Water	Register all air and water quality complaints to allow easy access for reporting requirements	Investigate and monitor environmental conditions	Monitoring by Department of Environment & Planning	Customer Service Request system in place



<b>Environmental Issue</b>	<b>Environmental Program/Project</b>	<b>Objective</b>	<b>Recommendation</b>	<b>Comments</b>
Waste and Toxic Hazards	Biosolids re-use from local wastewater treatment plants.	To re-use biosolids produced during the treatment of sewage at local treatment plants	Trial compost methods	On-going. Some biosolids removed to Coffs Harbour Resource Recovery park for re-use
	To minimise quantity of material disposed of to landfill	Promote alternative uses rather than disposal	Investigate recycling options	On-going. Introduction of Green Waste bins commenced
	Full effluent re-use at Bowraville Sewage Treatment Plant	Zero discharge to the Nambucca River at Bowraville Sewage Treatment Plant	Design and contract for agricultural use	Full effluent re-use has commenced at Bowraville Treatment Plant
	To continue to identify contaminated land sites	To minimise health and environmental hazards	Continue identifying in the development application process	On-going
	On-site Sewage Management Plan	To provide the framework for ecologically sustainable on-site sewage management practices	Set up a framework to manage and regulate the impact of on-site Sewage Management Systems in the Shire	Plan adopted. Survey of all systems to continue
Noise	Register all noise complaints to allow easy access for reporting requirements	Investigate and monitor environmental conditions	Monitoring by Department of Environment & Community Planning	Customer Service Request system in place
Heritage	Main Street Heritage Study for Macksville and establishment of Local Heritage Fund	To provide advice, funding and guidance to building owners to restore and protect heritage	Complete study and establish Heritage Fund to assist implementation	Provide formal assistance to upgrade and maintain properties
	Aboriginal Heritage Management Plan	Classify areas of varying archaeological sensitivity and clarify procedures relating to assessment	Council investigate funding for plan and engage relevant consultants	
Heritage	State-wide Heritage Study	To identify buildings and places worthy of preservation for historical purposes	Council apply for 50% funding from the NSW Heritage Office	

## 10.0 GLOSSARY

AHD:	Australian Height Datum.
ANZECC:	Australian and New Zealand Environment and Conservation Council.
EPA:	Environment Protection Authority.
ESD:	Ecologically sustainable development.
DECC:	Department of Environment and Climate Change.
DIPNR:	Department of Infrastructure, Planning and Natural Resources.
DLWC:	Department of Land and Water Conservation.
ha:	Hectare.
ICOLL:	Intermittently closed/open lakes and lagoons.
kl:	Kilolitre.
L:	Litre.
LAB:	Liquor Administration Board.
LEMP:	Landfill Environmental Management Plan.
LEP:	Local Environmental Plan.
m:	Metre.
mg/L:	Milligrams per litre.
ML:	Megalitre.
mm:	Millimetres.
NPWS:	National Parks and Wildlife Service.
<i>POEO:</i>	<i>Protection of the Environment Operations Act 1997.</i>
PSR:	Pressure-state-response model.
Riparian:	Riverside (commonly referring to vegetation).
RTA:	Roads and Traffic Authority.
SEPP:	State Environmental Planning Policy.

## APPENDIX A

**Table A: Threatened Species under the Threatened Species Conservation Act 1995 identified in the Nambucca Shire**

Fauna	TSC Act	Fauna	TSC Act
Beach Stone-curlew	E1	Osprey	V
Black-necked Stork	E1	Pale-headed Snake	V
Booroolong Frog	E1	Parma Wallaby	V
Brush-tailed Rock-Wallaby	E1	Pied Oystercatcher	V
Bush Stone-curlew	E1	Powerful Owl	V
Giant Barred Frog	E1	Providence Petrel	V
Green and Golden Bell Frog	E1	Red-legged Pademelon	V
Little Tern	E1	Red-tailed Black-Cockatoo	V
Loggerhead Turtle	E1	Rose-crowned Fruit-Dove	V
Regent Honey Eater	E1	Rufous Bettong	V
Stuttering Frog	E1	Rufous Scrub-bird	V
Australasian Bittern	V	Sooty Owl	V
Barking Owl	V	Sooty Oystercatcher	V
Barred Cuckoo-shrike	V	Sooty Tern	V
Black Bittern	V	Speckled Warbler	V
Black-tailed Godwit	V	Sphagnum Frog	V
Brolga	V	Spotted-tailed Quoll	V
Brown Treecreeper	V	Square-tailed Kite	V
Brush-tailed Phascogale	V	Squirrel Glider	V
Comb-crested Jacana	V	Stephens' Banded Snake	V
Common Blossom-bat	V	Superb Fruit-Dove	V
Common Planigale	V	Wompoo Fruit-Dove	V
Eastern Bent-wing Bat	V	Yellow-bellied Glider	V
Eastern Freetail-bat		<b>Flora</b>	<b>TSC Act</b>
Eastern False Pipistrelle	V	Cryptic Forest Twiner	E1
Eastern Long-eared Bat	V	Newry Golden Wattle	E1
Glandular Frog	V	Rainforest Cassia	E1
Glossy Black-Cockatoo	V	Sand Spurge	E1
Golden-tipped Bat	V	Scant Pomaderris	E1
Greater Broad-nosed Bat	V	Slender Marsdenia	E1
Green-thighed Frog	V	Tinospora Vine	E1
Green Turtle	V	Arrow-Head Vine	V
Grey-headed Flying-fox	V	Fragrant Pepperbush	V
Humpback Whale	V	Grove's Paperbark	V
Koala	V	Milky Silkpod	V
Large-footed Myotis	V	Red Boppel Nut	V
Little Bentwing-bat	V	Rough-shelled Bush Nut	V
Long-nosed Potoroo	V	Rusty Plum	V
Mangrove Honeyeater	V	Silver Sword Lily	V
Marbled Frogmouth	V	Veined Doubletail	V
Masked Booby	V		
Masked Owl	V	<b>Invertebrates</b>	<b>TSC Act</b>
New Zealand Fur Seal	V	Giant Dragonfly	E1
Olive Whistler	V	Australian Fritillary Butterfly	E1

E1: Endangered;  
Conservation (2006).

V: Vulnerable

Source: Department Of Environment and

## APPENDIX B

**Table B: Weeds Declared Noxious in the Nambucca Control Area**

<b>Scientific name</b>	<b>Common name</b>	<b>Category</b>
<i>Pennisetum macrourum</i>	African feathergrass	5
<i>Sisymbrium runcinatum</i>	African turnipweed	5
<i>Sisymbrium thellungii</i>	African turnipweed	5
<i>Alternanthera philoxeroides</i>	Alligator Weed	2
<i>Eichhornia azurea</i>	Achored water hyacinth	1
<i>Ambrosia artemisiifolia</i>	Annual ragweed	5
<i>Sagittaria montevidensis</i>	Arrowhead	5
<i>Cynara cardunculus</i>	Artichoke thistle	5
<i>Tamarix aphylla</i>	Athel Tree	5
<i>Xanthium spp.</i>	Bathurst, Noogoora, Californian and Cockle burrs	4
<i>Chrysanthemoides monilifera</i>	Bitou bush, Boneseed	4
<i>Centaurea nigra</i>	Black knapweed	1
<i>Rubus fruticosus (agg. spp.)</i>	Blackberry	4
<i>Chrysanthemoides monilifera</i>	Boneseed	4
<i>Asparagus asparagoides</i>	Bridal Creep	5
<i>Schinus terebinthifolia</i>	Broadleaf pepper	3
<i>Orobanche spp.</i>	Broomrape	1
<i>Ambrosia confertiflora</i>	Burr ragweed	5
<i>Cabomba spp.</i>	Cabomba	5
<i>Xanthium species</i>	California burrs	4
<i>Cinnamomum camphora</i>	Camphor Laurel	4
<i>Stachytarpheta cayennensis</i>	Cayenne snakeweed	5
<i>Nassella neesiana</i>	Chilean needle grass	4
<i>Celtis sinensis</i>	Chinese celtis	3
<i>Triadica sebifera</i>	Chinese tallow tree	3
<i>Asystasia gangetica subspp. micrantha</i>	Chinese violet	1
<i>Gaudra lindheimeri</i>	Clockweed	5
<i>Gaura parviflora</i>	Clockweed	5
<i>Sorghum x alnum</i>	Columbus grass	4
<i>Sonchus arvensis</i>	Corn sowthistle	5
<i>Ageratina adenophora</i>	Crofton weed	5
<i>Cucuta Species</i>	Dodder	4
<i>Hygrophilia polysperma</i>	East Indian hygrophilia	1
<i>Achnatherum brachychaetum</i>	Espartillo	5
<i>Myriophyllum spicatum</i>	Eurasian water milfoil	1
<i>Cenchrus brownie</i>	Fine-bristle burr grass	5
<i>Senecio madagascariensis</i>	Fireweed	4
<i>Pennisetum setaceum</i>	Fountain grass	5
<i>Cechrus biflorus</i>	Gallon's curse	5
<i>Sporobolus fertilis syn. Sporobolus indicus var. major</i>	Giant Parramatta grass	4
<i>Sporobolus pyramidalis</i>	Giant rat's tail grass	3
<i>Carthamus glaucus</i>	Glaucous Starthistle	5
<i>Scolymus hispanicus</i>	Golden Thistle	5
<i>Cestrum parqui</i>	Green cestrum	3
<i>Baccharis halimifolia</i>	Groundsel bush	3
<i>Harrisia spp.</i>	Harrisia cactus	4
<i>Hieracium spp.</i>	Hawkweed	1

<i>Gleditsia triacanthos</i>	Honey Locus	3
<i>Equisetum spp.</i>	Horsetail	1
<i>Hygrophilia costata</i>	Hygrophilia	2
<i>Hymenachne amplexicaulis</i>	Hymenachne	1
<i>Sorghum halepense</i>	Johnson grass	4
<i>Acacia karroo</i>	Karoo thorn	1
<i>Kochia scoparia</i>	Kochia	1
<i>Bassia scoparia</i>	Kochia	1
<i>Lagarosiphon major</i>	Lagarosiphon	1
<i>Lantana camara</i>	Lantana (Red flowered)	4
<i>Ludwigia longifolia</i>	Long-leaf willow primrose	5
<i>Nassella tenuissima</i> syn <i>Stipa tenuissima</i>	Mexican feather grass	1
<i>Argemone mexicana</i>	Mexican poppy	5
<i>Miconia spp.</i>	Miconia	1
<i>Mimosa pigra</i>	Mimosa	1
<i>Ageratina riparia</i>	Mistflower	4
<i>Cenchrus echinatus</i>	Mossman River grass	5
<i>Caesalpinia decpetala</i>	Mysore thorn	3
<i>Romulea species</i>	Onion Grass	5
<i>Oxalis species</i>	Oxalis	5
<i>Cortaderia spp.</i>	Pampas grass	4
<i>Parthenium hysterophorus</i>	Parthenium weed	1
<i>Annona glabra</i>	Pond apple	1
<i>Acacia nilotica</i>	Prickly acacia	1
<i>Cylindropuntia species</i>	Prickly pear	4
<i>Opuntia spp.</i>	Prickly pears	4
<i>Ligustrum lucidum</i>	Privet (Broad leaf)	4
<i>Ligustrum sinense</i>	Privet (Narrow-leaf/Chinese)	4
<i>Oryza rufipogon</i>	Red rice	5
<i>Toxicodendron succedaneum</i>	Rhus tree	4
<i>Cryptostegia grandiflora</i>	Rubbervine	1
<i>Sagittaria platyphylla</i>	Sagittaria	5
<i>Salvinia molesta</i>	Salvinia	3
<i>Avena strigose</i>	Sand oat	5
<i>Gymnocoronis spilanthoides</i>	Senegal tea plant	1
<i>Nassella trichotoma</i>	Serrated tussock	4
<i>Chromolaena odorata</i>	Siam weed	1
<i>Brassica barrelieri subsp. oxyrrhina</i>	Smooth-stemmed turnip	5
<i>Picnomon acarna</i>	Soldier thistle	5
<i>Cenchrus longispinus</i>	Spiny burgrass	4
<i>Cenchrus incertus</i>	Spiny burgrass	4
<i>Centaurea maculosa</i>	Spotted knapweed	1
<i>Helianthus ciliaris</i>	Texas blueweed	5
<i>Trapa species</i>	Water caltrop	1
<i>Eichhornia crassipes</i>	Water hyacinth	3
<i>Pistia stratiotes</i>	Water lettuce	1
<i>Stratiotes aloides</i>	Water soldier	1
<i>Salix spp.</i>	Willows	5
<i>Striga species</i>	Witchweed	1
<i>Tecoma stans</i>	Yellow beels	3
<i>Limnocharis flava</i>	Yellow burhead	1
<i>Cyperus esculentus</i>	Yellow nutgrass	5

**Categories**

- 1 – The plant must be eradicated from the land and the land must be kept free of the plant (This is an all of NSW declaration).
- 2 - The plant must be eradicated from the land and the land must be kept free of the plant.
- 3 – The plant must be fully and continuously suppressed and destroyed.
- 4 – The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant must not be sold, propagated or knowingly distributed.
- 5 – The requirements in the Noxious Weed Act 1993 for a notifiable weed must be complied with (This is an all of NSW declaration).

The above information is based on knowledge and understanding at the time of writing. **Source:** NSW Department of Primary Industries (2007).

## APPENDIX C

Table C: NSW NORTH COAST REGIONAL INDICATORS Reported in 2006/2007 Nambucca Shire Council SoE Report

Indicator	Indicator Type	Page No
Population of the Nambucca Shire (2001)	S	10
Population growth rate of the Nambucca Shire (1996 to 2001)	P	10
Area of Local Government Area occupied for State Forest	S	19
Percentage of Local Government Area occupied for State Forest	S	19
Native forest logged on State Forest land during the reporting year	P	22
Land determined by DNR to be cleared for logging/clearing purposes during the reporting year	P	23
Non-dedicated State Forest land	S	26
Number of on-site effluent disposal systems approved during the reporting year	P	27
Number of existing on-site effluent disposal system inspections during the reporting year	R	27
Percentage of exceedances of ANZECC water quality guidelines	S	57
Wastewater treated at treatment plants during the reporting year	P	62
Wastewater treated at treatment plants to tertiary level during the reporting year	P	62
Wastewater treated at treatment plants to secondary level during the reporting year	P	62
Population serviced by the sewerage system	S	62
Population serviced by on-site effluent disposal systems	S	62
Reticulated water consumed during the reporting year	P	70
Per capita reticulated water consumed during the reporting year	P	70
Daily per capita reticulated water consumed during the reporting year	P	70
Reticulated water peak daily demand during the reporting year	P	70
Population connected to the reticulated water supply	S	70
Threatened flora species under the <i>Threatened Species Conservation Act 1995</i> occurring in the Nambucca Shire	S	76
Declared noxious weeds under the <i>Noxious Weeds Act 1993</i> in the Nambucca Shire	S	80

Indicator	Indicator Type	Page No
Threatened fauna species under the <i>Threatened Species Conservation Act 1995</i> occurring in the Nambucca Shire	S	84
Number of air quality complaints to Council (CSR) during the reporting year	P	92
Number of air quality complaints to Department of Environment and Conservation during the reporting year	P	92
Municipal water disposed to landfill during the reporting year	P	98
Weight of green organics diverted at the landfill during reporting year	R	99
Weight of scrap metal diverted at the landfill during the reporting year	R	99
Weight of batteries diverted at the landfill during the reporting year	R	99
Volume of motor oil diverted at the landfill during the reporting year	R	99
Potentially contaminated sites in the Nambucca Shire	S	105
Number of noise complaints to Council (CSR) during the reporting year	P	110
Number of noise complaints to Department of Environment and Conservation during the reporting year	P	110
Aboriginal relic and mythological sites and other artefacts in the Nambucca Shire	S	113
Non-Aboriginal heritage items and areas in the Nambucca Shire	S	118

**S: State, P: Pressure, R: Response**

The majority of the above indicators were derived from *Regional State of the Environment Reporting for Local Government Areas on the North Coast of NSW – An Agreed and Consistent Set of Indicators* (NSW Premier's Department, 2000). These indicators will be updated with each subsequent SoE Report, where data is available.



## APPENDIX D

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