

State of the Environment Report

Healthy Lakes Program



2004/05
Supplementary
State of the
Environment Report

Great Lakes Council Supplementary State of the Environment Report 2005

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1 Executive Summary

Located on the lower Mid North Coast of New South Wales the Great Lakes Local Government Area (LGA) of 3,373 km² in size supports a rapidly expanding population of approximately 34,000 residents. Containing a unique environment of immense natural, social and economic value the region relies heavily on the health of our natural surroundings.

Supporting a variety of landscapes from the extensive lake system to the mountain ranges the Great Lakes contains habitat for an incredible diversity of native plant and animal species. This environment also forms the basis of the region's economy supporting tourism, grazing, oyster production and commercial fishing worth millions of dollars annually. The region's natural environment also provides for the lifestyle many residents and tourists alike have come to enjoy. However the integrity of our natural environment is under threat and unless protected appropriately we stand to lose the uniqueness that makes this region a great place to live, work and play.

Continuation of damaging land uses combined with significant growth in residential and visitor populations as well as associated infrastructure provisions probably remain the greatest threat to the quality of our environment. As such water deterioration, land degradation and loss of biodiversity are amongst the major environmental issues facing the region. Unless these threats can be managed appropriately we will experience a continuing decline in the health of the local environment. The deterioration of the environment will inevitably impact on our economy, our way of life and the general aesthetics of the LGA.

This document, Great Lakes Council's 2004/05 supplementary State of the Environment (SoE) Report, seeks to monitor the health of the regions environment. To achieve this Council has established set indicators to assist with determining changes and trends within the environment. In line with current legislation these indicators fall under several themes, Water, Biodiversity, Waste and Toxic Hazards, Land, Air Noise and Heritage. Council has also identified the importance of community involvement in the development of this document and has utilised community comment to assist knowledge gathering and to help set priorities for action.

This supplementary State of the Environment report forms the initial data collection period for the 2008 Comprehensive SoE report. As it provides the results of one-year of monitoring, no trend analysis has been conducted. This report does however provide baseline data essential for the production of the three subsequent SoE reports, in the period 2006 to 2008. Furthermore this document provides a snapshot of the regions natural environment, which sets the scene for subsequent reports.

The Great Lakes unique and significant natural environment deserves protection to ensure its longevity for future generations whilst providing for appropriate and sustainable growth and development. Unless appropriate and effective action is taken now we stand to lose the very asset which makes the Great Lakes region a desirable and privileged place for us to live and enjoy.

2 Introduction

2.1 An Overview of the Great Lakes

The Great Lakes Local Government Area (LGA) is 3,373 km² in size and is located on the lower Mid North Coast of New South Wales, approximately 320 km north of Sydney (figure 1). For planning purposes it is considered part of the Hunter Region (Hunter Regional Environmental Plan) and is bounded by the local government areas of Port Stephens in the south, Greater Taree in the north and Gloucester in the west. It is 85 kilometres at its widest point, 62 kilometres north to south, and has a total coastline of 145 kilometres.



Figure 1: Great Lakes Region

Great Lakes has a temperate climate, averaging a daily minimum of 17°C and maximum of 27°C during summer and daily minimum of 8°C and

maximum of 17°C in winter, and has an average coastal rainfall of 1331mm.

The LGA supports a range of industries and commercial activities, which form the basis of the local economy. Tourism and primary production (oyster, commercial fishing and grazing/ timber production) are probably the most significant industries in the LGA. The viability and sustainability of all these industries critically relies upon a healthy and functioning local environment.

The Great Lakes possesses a unique environment of immense natural beauty, which includes extensive waterways, national parks, rural regions and mountain ranges. These landscapes provide habitat for an incredible diversity of native plant and animals. Vegetation communities include rainforest, moist and dry forests, wetlands and swamps, coastal heaths, seagrass beds, dunal formations and natural grasslands. To date, preliminary data suggests that over 500 fauna species and 1,200 native plant species inhabit the LGA. This includes rare, significant and threatened species.



The Great Lakes natural environment – view south of Cape Hawke

The Great Lakes region is expanding, in large part due to the “sea-change” phenomenon, which is a recent trend that has seen a population

explosion in coastal towns on the eastern seaboard. Supporting a population of approximately 34,000, the Great Lakes LGA is experiencing considerable growth at 2.1% per annum, almost double the average rate of New South Wales. The region also experiences population surges during holiday periods with over 100,000 tourists frequenting the area each year, placing considerable pressure on existing infrastructure and the local environment.

Over the past ten-years a number of factors have been identified as placing an increased pressure on the Great Lakes environment. Continuation of damaging land uses combined with significant growth in residential and visitor populations as well as associated infrastructure provisions probably remains the greatest threat. Water deterioration, land degradation and loss of biodiversity are amongst the major environmental issues facing the region and unless these threats can be managed appropriately we will experience a continuing steep decline in the health of the local environment. The deterioration of the environment will inevitably impact on our economy, way of life and the general aesthetics of the LGA. Therefore, it is imperative that we protect and manage our Great Lakes environment for present and future generations, whilst providing for appropriate and sustainable growth and development.

2.2 State of the Environment Reporting in NSW

State of the Environment (SoE) reporting provides an ongoing mechanism to monitor and to in-turn implement steps to improve the condition of the local environment. The measurement of established indicators to determine changes and trends within the environment allows this report to document environmental change, both positive

and negative, to assist the management of our natural resources. Furthermore, SoE is intended to report on government, industry and community activities to protect and restore the environment. Finally, SoE provides a valuable education and awareness tool for the general community and all tiers of government.

Local Government plays a vital role in environmental management and is one of the primary land management authorities, responsible for decision-making and regulation of land use development, as well as environmental monitoring and management programs. As several areas of Council core business directly relates to or influences environmental management, environmental reporting within local government is an important process.

The State Government identified the need for environmental reporting at the local level and established that Council's be responsible for preparing SoE reports on an annual basis. Hence a legislative framework under the *Local Government Act 1993* was established, which required:

- Council to prepare a Comprehensive SoE Report every four (4) years, coinciding with the end of the financial year following the general Council elections and the production of supplementary SoE reports every year in the interim;
- The SoE report to specifically investigate eight (8) environmental sectors: land, air, water biodiversity, waste, noise, Aboriginal heritage and non Aboriginal heritage;
- Within each of the above sectors, Council give reference to Management Plans, special Council projects and to the impact of Council's activities and decision-making on the environment;

- That SoE reporting be tied to the development and documentation of Council's Annual Management Plan;
- That the SoE Report be based on a "Pressure-State-Response" model (see below); and
- Include an emphasis on and commitment to implementing the principles and practices of Ecologically Sustainable Development (ESD) (see below).

Furthermore, the *Threatened Species Conservation Act 1995* requires that a Council that is identified within an approved Recovery Plan or approved Threat Abatement Plan as being responsible for the implementation of actions within such plans, shall report on the actions that it has undertaken within the SoE Report.

Pressure-State-Response Model

The pressure-state-response (PSR) model, developed by the OECD, is based on the use of core indicators to show the effect of human pressure on the local environment. For example, water quality can be used as an indicator, where an increase in nutrients entering a local waterway may be monitored and identified. Under the PSR-model, the source is pinpointed to a stormwater outlet that is discharging increased nutrients through excessive fertiliser use. Increased nutrients may lead to algal blooms and declining aquatic health (thus is recognised as a pressure). The declining condition of the quality of the local waterway (constitutes the state). Once identified and recognised, the issue might be addressed through an education program on stormwater pollution within the catchment or a structural solution (which is the response). The model is pictorially represented in Figure 2.

Whilst adopted by most NSW Councils, the model does have some identified shortcomings and limitations. In some cases indicators cannot be

easily categorised as a state, pressure or response and some times a particular indicator may fall in all three categories. For example, the clearing of vegetation can be an indicator of the "state" of vegetation in the local environment, "pressure" for biodiversity issue, or "response" if the rate of clearance is arrested. Furthermore, there is not always a clear indication of cause and effect.

For the purpose of this report, the PSR model has played a minor role in developing indicators. The model will however play an important role in setting priorities for actions arising from the SoE report.

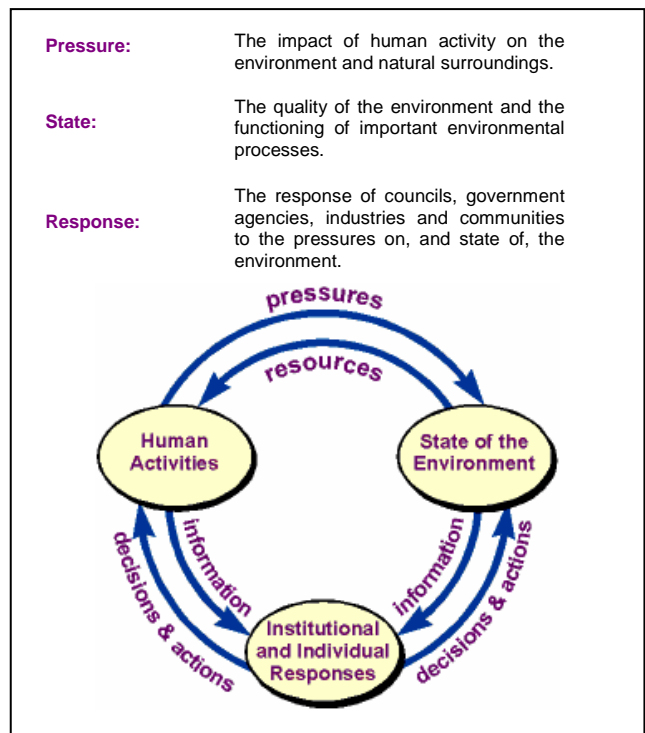


Figure 2: Pressure-state-response model.

Ecological Sustainable Development (ESD)

Ecological sustainable development (ESD) means "using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased" (Commonwealth of Australia 1992).

Essentially, ESD is a means of effectively utilising resources with minimal environmental change to protect the natural environment and its resources/ services for future generations. An important part of ESD is the application of the Precautionary Principle. In essence, this suggests that where there are risks of serious environmental damage, that lack of scientific knowledge should not be used to postpone or defer environmental protection. As such, it requires adequate scientific knowledge to form the basis of all environmental decision-making.

Typically local government has traditionally undertaken natural resource management, economic development and provision of social services in isolation from each other. However it has since been recognised that these factors are related and that they interact in a complex matter. Subsequently, Councils are now required to undertake the management of their regulatory and service functions in an ecologically sustainable manner, as legislatively required under the Local Government Act.

Under the ESD Regulation, Councils must consider its most recent comprehensive SoE report when preparing the part of its draft management plan dealing with environmental protection activities (cl 6M(b)). As such SoE reports are a key mechanism in identifying and evaluating sustainability issues.

2.3 State of the Environment Reporting in the Great Lakes

In 2004, Great Lakes Council implemented a revised approach to SoE Reporting that aimed to develop an effective and useable document designed to feed more effectively into Councils Management Plan for the purpose of identifying resources and directing staff work programs in

line with priority environmental projects. To achieve this, a SoE working group comprising of representatives of various Council sections was formed. This group has been instrumental in guiding the production of this supplementary report.

The 2004/ 05 supplementary report seeks to provide information on the state of the Great Lakes environment for the period of 1st July 2004 to 30th June 2005. It forms the initial data collection period for the 2008 Comprehensive SoE report. As it provides the results of one-year of monitoring, no trend analysis has been conducted. This report does however provide baseline data essential for the production of the three subsequent SoE reports, in the period 2006 to 2008.

Community involvement

Community involvement, although not legislatively required, has been identified as an important component of Great Lakes Council's SoE report. The process by which the community has been involved in SoE reporting was also revised in 2004 to encourage wider community participation. One of the main reasons for the revised SoE approach is to enhance the useability, function and validity of the SoE report within Council management planning, budgeting and programming. However, it is also recognised that the SoE report has the potential for considerable benefits to a range of other user groups including State and Commonwealth Government Agencies, the general public and students. Council has attempted, within the development of this report, to consider and to cater to this potentially wide-ranging audience.

3 Water

The Great Lakes LGA depends heavily on the health and sustainability of local waterways as these landscapes form the basis of the regions economy (supporting tourism, primary production), contribute to our way of life and amenity and provide habitat for extraordinary biological systems. However the catchments supporting these waterways are under increasing environmental pressure, threatening this significant resource. Pollution and impacts associated with catchment land use, development and tourism are amongst the greatest threats, potentially resulting in a decline of the health of our waterways. The current state of the majority of our waterways was classified as generally healthy modified (Healthy Rivers Commission, 2002). However, it is widely recognised that all local waterways are critically susceptible to increasing environmental pressures.



The Wallamba River – currently under threat from riverbank erosion, sedimentation, nutrient enrichment and declining riparian health

3.1 Water Quality

Introduction

The deterioration of water quality is often associated with the impact it has on human health and recreational activities as opposed to the natural environment. Subsequently the current extent of water quality monitoring within the Great

Lakes region is generally designed for this purpose. Furthermore, water quality monitoring as an indicator of general environmental health is often expensive, resource-intensive and difficult to interpret unless it can be compared with associated biological indicators such as seagrass health or the incidence of algae blooms, rainfall data and appropriate reconciliation of anomalies. The state and trends of the water quality in rivers, creeks and estuaries in part helps provide an indication of the impacts associated with environmental pressures across the entire catchment and can be an important reference from which environment trends can be determined.



Erosion caused by a rain event whereby sediment is washed into local waterways, in this case Wallis Lake

Monitoring

Despite the significance of the local waterways, no agency including Council, has ever facilitated the development of an integrated water quality-monitoring program across the LGA. Instead, local and state government, tertiary institutions, local water authorities, industry and volunteer groups have undertaken water quality monitoring independently of each other. The need for an integrated water quality-monitoring program has recently been recognised. This has led to the establishment of a sub-regional Water Quality Network group in July 2005.

This Water Quality Network comprises representatives of Great Lakes Council (GLC), Greater Taree City Council (GTCC), MidCoast Water (MCW), Hunter Central Rivers Catchment Management Authority (HCRCMA), Department of Environment and Conservation (DEC) and the Department of Natural Resources (DNR). The objectives of this network is to develop a central Geographic Information System (GIS) based water quality data repository, which is accessible to all parties via the Internet. By highlighting those sites and the water quality parameters that are currently monitored, this process will assist in identifying knowledge gaps. It will also provide baseline data that is required for management planning, the determination of the state of local waterways and allow an evaluation as to whether the relevant agencies are meeting legislative requirements, where relevant. It is hoped this regional approach to water quality monitoring will directly assist Council's SoE report. However, until the network is functioning and the information is compiled and supplied in a useable format, such data will not be available for SoE reporting. The added advantage is that identified knowledge gaps can be addressed strategically through targeted monitoring.

Depending on the specific details of current monitoring programs, it is anticipated that a combination of data in relation to the following parameters will be available for subsequent SoE reports:

- turbidity and suspended solids, which indicate the concentration of particles (sediment or microscopic aquatic life) in the water;
- temperature, which influences the productivity of aquatic ecosystems;
- pH, which measures acidity/alkalinity. A level of 7 is neutral. The pH of sea water is slightly alkaline at around 8.2;

- salinity (or conductivity), which measures the amount of salts;
- dissolved oxygen, which indicates the amount of oxygen available for aquatic life;
- nutrients such as phosphorus and nitrogen, which are essential for plant growth and indicate the potential for algal blooms;
- inorganic chemicals, mainly heavy metals, which can be toxic to aquatic life;
- organic chemicals, such as pesticides, petroleum products, which can be toxic to aquatic life;
- chlorophyll-a, which is a measure of the amount of plant matter, including microscopic algae and seaweeds;
- algal levels; and
- faecal coliform numbers, being the level of bacteria which come from animal and human wastes in water.

Results

A number of agencies and organisations have conducted water quality monitoring in this LGA during the 2004/ 05 reporting period. However this data is not currently available in a useable and manageable format. Subsequently such information will not be reported in SoE until a coordinated approach to water quality monitoring is established and a means for data sharing has been developed. The benefits of providing background information relating to water quality monitoring activities across the LGA have been identified and summarised in the tables below. This includes an overview of monitoring programs conducted by agencies across the LGA, their location and extent, aims and objectives, type of parameters measured and the frequency at which results are collected. Due to the difficulty experienced in collating such information a number of tables are currently incomplete. This summary does however provide a basis for acquiring additional information essential to

developing the Water Quality indicator in future SoE reports.

Great Lakes Council

Great Lakes Council is currently involved in 4 water-quality monitoring programs, which are summarised below.

Table 1: Water quality monitoring programs conducted by Great Lakes Council.

Program Name	Monitoring Site	Parameters	Monitoring Frequency	Purpose (aims & objectives)
Oyster Quality Assurance Program	13 sites are monitored within the lower reaches of the Wallis Lake Estuary	Temperature, density, salinity, faecal coliforms	Testing is undertaken weekly during summer and following rainfall events - sampling is reduced during winter	To determine if the harvesting of oysters is permissible based on water quality parameters
Community Water Quality Monitoring Program (Waterwatch)	18 sites, Forster Keys, Kularoo Drive Wetland, Penenton Creek, Dunes Creek and Goldens Road Wetland	Temperature, total dissolved oxygen, total dissolved solids, turbidity, pH	Testing is undertaken as often as volunteers are able to do so. Generally we encourage monitoring at least once a month	Community education through onground action. To provide a general indication of the quality of waterways within the Great Lakes
Coastal Catchment Initiative	Not yet established	Not yet established	Not yet established	To develop decision support models based on processes occurring within the Myall, Smiths and Wallis Lakes
Beachwatch	4 sites located at Little Street, Tuncurry Rock Pool, Forster Main Beach, Forster Ocean Baths	Turbidity, Temperature, Entrococci (bacteria), Faecal Coliforms, general observations including the presence of algae, sewage and stormwater pollution	5 times per month	To determine if water is suitable for swimming

Source: Great Lakes Council

MidCoast Water

Water quality monitoring forms an essential requirement of MidCoast Water's operation for the purpose of their license agreements and their environmental commitments. This organisation is involved in a variety of water quality monitoring

programs for which a summary and overview has been provided in the table below.

Table 2: Water quality monitoring programs conducted by MidCoast Water within the Great Lakes Council LGA.

Program Name	Monitoring Site	Parameters	Monitoring Frequency	Purpose (aims & objectives)
Stormwater Program	41 Sites located within Stormwater drains in the Forster / Tuncurry area	FC	Bimonthly	To determine if sewage is entering the stormwater drainage system
Tuncurry Sewage Treatment Plant - Groundwater Monitoring Program	8 bores around stand exfiltration area	pH, BOD, FC, Conductivity, Total Nitrogen, Ammonia, Nitrogen, Oxidised Nitrogen, Total Phosphorus	Quarterly	To monitor the impact of treated effluent release on the receiving water environment
Hawks Nest Sewage Treatment Plant - Groundwater Monitoring Program	11 bores around sand exfiltration area	pH, BOD, FC, Conductivity, Total Nitrogen, Ammonia Nitrogen, Oxidised Nitrogen, Total Phosphorus	Quarterly	To monitor the impact of treated effluent release on the receiving water environment
Holidays Point Sewage Treatment Plant - Ground Water Program	25 bores around existing and future sand exfiltration areas	pH, BOD, Suspended Solids, Alkalinity, Sulphate, FC, Conductivity, Total Nitrogen, Ammonia Nitrogen, Total Kjeldahl Nitrogen, Nitrate, Nitrite, Total Phosphorus, Sodium, Calcium, Magnesium, Potassium, Lead	Quarterly	To monitor the impact of treated effluent release on the receiving water environment
Bulahdelah Sewage Treatment Plant - Surface Water Program	3 sites at Frys Creek and 2 at Myall River	FC, Enterococci, BOD, Suspended Solids, Total Phosphorus, Dissolved Reactive Phosphorus, Total Nitrogen, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Nitrate, Nitrite, Chlorophyll a	Quarterly	To monitor the impact of treated effluent release on the receiving water environment
Stroud Sewage Treatment Plant - Surface Water	2 sites at Mills Creek & 2 on the Karuah River	FC, Suspended Solids, Total Phosphorus, Dissolved Reactive Phosphorus, Total Nitrogen, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Oxidised Nitrogen, Chlorophyll a	Quarterly	To monitor the impact of treated effluent release on the receiving water environment
Reticulated Water Quality Monitoring Program	Water taken from raw water sources, water storages and customers taps	According to Australian Drinking Water Guidelines 2004	Weekly	Ensure drinking water meets health standards

Source: MidCoast Water

NSW Shellfish Program (NSWSP)

The NSW Shellfish Program (NSWSP) aims to protect the health of shellfish consumers. The main objective of this program is to ensure all shellfish produced within Wallis Lake are of the highest possible quality, conforming to internationally accepted standards.

This program involves monthly sampling of water samples for faecal coliform and oyster meat for *Escherichia coli*. Every other fortnight NSW Food Authority conducts water and oyster meat testing as well as full phytoplankton counts and bio-toxin testing from 3 sites within Wallis Lake. The NSW Food Authority also conducts metal and pesticide analyses of oyster meat annually.

The Oyster Quality Assurance program (table 1), conducted in partnership with Great Lakes Council forms a component of the NSWSP. Testing is undertaken weekly during summer and following rainfall events with sampling reduced during the winter seasons. This program measures temperature, density, salinity and faecal coliforms.

In terms of State of the Environment reporting, water data collected through these programs could potentially provide an indication of water quality health within the estuary of the Wallis Lake catchment adding to the overall picture of the health of the regions waterways.

Department of Natural Resources (DNR)

Further investigation is required to determine the extent of water quality monitoring activities conducted by the Department of Natural Resources (DNR) within the Great Lakes LGA. To obtain such information a list of sites monitored by DNR and their corresponding codes/ numbers are available on the agency's website. By selecting the sites located within the Great Lakes LGA and providing the relevant code/number,

DIPNR can provide all water quality information related to that site. However isolating sites which lie within the Great Lakes region based on the site name has proven difficult and time-consuming. As such, data has not been sourced in time for the completion of this report.

Department of Environment and Conservation (DEC)

Further investigation is required to determine the extent of water quality monitoring activities conducted by the Department of Environment and Conservation (DEC) throughout the Great Lakes LGA. It is known that DEC does conduct some water quality monitoring within the Myall Lake Catchment. The extent and results of this program are yet to be documented within Councils SoE report.

University of Newcastle – See Brian

The University of Newcastle is in the process of developing and implementing a project to determine the type and source of faecal pollutants entering waterways across several Council areas. Established in partnership with relevant Councils this project is yet to be fully developed and implemented. However the project has commenced with some water quality samples collected in November 2004. This data is yet to be made available for this report.

University of New South Wales

The University of New South Wales in collaboration with Great Lakes Council is conducting a PhD project to analyse nutrient sources within the Smiths Lake Catchment.

Council was also an industry partner in the investigation by Doctor Stephanie Moore into tracers and indicators of estuarine nutrients in Wallis Lake, which was a recently completed PhD thesis.

Other Projects

Council has also been involved in undertaking an assessment of estuarine health parameters, which involved a study of the denitrification efficiency of sediments. This assessment was undertaken in 2000 and 2003.

Summary

Water quality monitoring must play a vital role in assessing the state of the natural environment as well as providing an assessment/ performance tool for Council's environmental management projects. As documented above, a range of agencies and organisations conducts various water quality-monitoring programs across the Great Lakes LGA. However unless a coordinated and scientifically valid and integrated approach is developed this indicator will remain difficult to assess. In recognition of these obstacles, Council proposed the development of a Great Lakes Water Quality Monitoring Strategy (GLWQMS) to provide a comprehensive and holistic approach to monitoring this indicator. The production of such a document will undoubtedly take a number of years and require the commitment of resources that are currently not dedicated. However, the recent formation of the Mid North Coast Water Quality Network is hoped to greatly assist in providing the background information required to develop such a strategy. In the meantime Council aims to provide an overview of water quality monitoring programs conducted within the region upon which additional information can be included as it comes to light. Hopefully this will assist in eventually providing meaningful water quality data, which paints an accurate picture of the health of our local waterways, and hence the surrounding catchment environment.

3.2 Water Usage

Introduction

Water usage and supply has become a contentious issue throughout Australia in light of the recent drought situation and the increasing demand for domestic and industrial water. To meet the ongoing future water requirements of residents, industry, agriculture and the environment it is essential that this natural resource be managed appropriately. Water conservation is both a human resource issue, but also an environmental issue, as adequate flows in streams, floodplains and wetlands is important for general environmental health.

Potentially the over-exploitation of water resources can have a significant effect on the local environment, depriving rivers, lakes and estuaries of natural water flows essential to their function. As such, monitoring water usage provides an indication of the pressure on the local environment. Within the Great Lakes, this information is available from the local water authority, MidCoast Water, who are responsible for administering water resources and infrastructure throughout the wider region.

The Great Lakes relies on a number of different water sources. The major towns, including Forster/ Tuncurry, Nahiab and Pacific Palms, receive water from Bootawa Dam (off-river storage of the Manning River), which is located in the Greater Taree City Council LGA. Other areas including Hawks Nest/Tea Gardens draws its water supply from bore fields to the north of Tea Gardens on the Myall Lakes/ Viney Creek sand beds. The Stroud water supply is drawn from the Karuah River and Bulahdelah draws its water from the Crawford River. To secure future water supplies and meet predicted demand, a proposal is being investigated for the collection of potable

domestic water supplies to supplement the Bootawa Dam supply from the Minimbah aquifer.



Bootawa Dam: the main storage area for the Manning water supply scheme.

Monitoring

For this indicator, the total volume of water used and a breakdown of usage for residential, commercial, industrial, institutional and public use purposes provides information on the pressure placed on the local environment and attributes water demand to different sectors. This data is accessible from the local water authority, MidCoast Water, as water meters record the information for all properties connected to reticulated water systems.

Results

For the 2004/05 reporting period a total of 16,513 properties were connected to the water supply system within the Great Lakes area with 208 new connections during this period. The total volume of water consumed during this period was 4339 million litres. A breakdown of water consumed by each sector of the community has been provided in the table below.

Table 3: Volume of water consumed by each community sector

Consumption Category	Volume million litres (ML) 2004/05
Residential	3911
Commercial	301
Industrial	73
Institutional	17
Public Use	37
Total	4339

Source: MidCoast Water

Summary

Little analysis of the information provided above is possible due to the initial stages of data collection. In general, within the Great Lakes region the residential community is by far the greatest consumers of potable water with over 4300 million litres consumed during 2003/04. Subsequently any programs aimed at reducing water consumption ideally would be targeted to this sector.

3.3 Algae Blooms

Introduction

Algal blooms are complex events that are influenced by a combination of different factors including flow, turbidity, light, salinity and nutrient loads. Although algal blooms can occur naturally, typically the most problematic algal blooms are the result of human influences/ activities such as the barriers to water flows and the introduction of excessive nutrients. Problematic and often harmful human-induced algal blooms pose a significant threat and can result in economic and social impacts (increase in water supply treatment costs, need to use alternate supplies, loss of oyster production, disruption of waterway usage). Furthermore harmful algal blooms can seriously effect the health of aquatic ecosystems, as they tend to reduce the ability of aquatic plants to photosynthesise and reduce the amount of oxygen in the water. This can lead to the death of aquatic plants and animals (eg. fish kills).

Within the Great Lakes region algae blooms occur in both fresh and salt water often as a result of natural or seasonal events. However on occasion algae blooms within the LGA often occur as a result of human impacts and provide an accurate indication of the increased pressure placed on our natural waterways.



An example of a blue-green algae outbreak.

Monitoring

The management and reporting of algal bloom events prior to June 2004 was the responsibility of the then DIPNR. Following the disbandment of the governing committee, reporting responsibilities have since shifted to Local Government. Council's Environmental Health section has the responsibility for investigating and recording algal bloom events within the Great Lakes LGA.

These are generally detected through visual observation, routine monitoring and reports from the community. Following detection of a bloom event, a Council Officer inspects the bloom, collects samples for analysis and records the species type and describes its location and extent. Council officers then monitor the bloom weekly and record its duration and spread on a Geographical Information System (GIS). Information on algal blooms is also received from relevant government agencies, including the Department of Environment and Conservation (DEC) – Parks and Wildlife Division (which is particularly relevant to the ongoing issue of Blue-Green Algae outbreaks in Myall Lakes), NSW Maritime and the Department of Primary Industries (Fisheries).

Results

For the 2004/05 reporting period there have been no reports of algal blooms occurring within the Great Lakes Local Government Area (LGA).

Table 4: Number of algae bloom events

Year	No. of Algae Bloom Events
2004/05	0

Source: Great Lakes Council

Summary

Of greatest concern, are algal blooms driven by human causes or land use-pressures. Such blooms are the focus of this monitoring protocol. According to available records, no algal blooms have been recorded for this reporting period. However algal blooms may be unreported. There would be value in increasing the awareness within the community in the identification of algal bloom events to assist the development of this indicator.

Information Box:

Noctilucus scintillans (red tide)

Over recent years there have been reported cases of Noctilucus scintillans (red tide) blooms within reaches of the Wallis Lake estuary and off shore in the Pacific Ocean. This natural event occurs when infrequent ocean currents uplift nutrient rich cool water from the ocean floor triggering the lifecycle of the algae. This phenomenon is commonly known as a red tide because of the thick red characteristics of the algae. No human or environmental risk has been associated with this natural event within the Great Lakes region and as such the inclusion of this event in this report is not relevant. However this is an event which often causes interest from the general public with concern over the impact it may have on the local environment and importantly human health.

3.4 Fish Kills

Introduction

The term "fish kill" applies to the localised and specific death of a large number of fish or associated marine or aquatic species, such as prawns and crabs. Fish kills may occur in marine, estuarine and inland waters and usually take place in a defined area over a defined period of

time. Fish kills are typically (but not always) a result of human activities and especially actions that lead to declining environmental conditions such as low dissolved oxygen levels, pH stress, changes in water temperature and toxic pollution. False fish kills may result from throwbacks of dead fish from fishing vessels.

Although currently not a common event within the Great Lakes, there is the potential for fish kill events to become more prevalent as development impacts increase. Unless these impacts are managed appropriately the regions fish stocks may be seriously depleted. Fish kills tend to be indiscriminate and can remove whole populations or specific recruitment/ breeding classes. Recolonisation of habitats following fish kills may be seriously hampered by barriers to fish passage.



Fish effected by redspot disease – ulcerations appear on fish, which are effected by acid sulfate in our waterways.

Monitoring

Council's Environmental Health section maintains records on fish kill events within the LGA. When a fish kill occurs, Council Officers conduct an investigation and record detail of the location, extent, species affected and possible cause(s). Council also completes an investigation report, which is forwarded to the Department of Primary Industries (Fisheries). Hence, there is often relatively detailed information on the number and extent of fish kills, including the number of

individuals, affected species, location and extent. The DPI (Fisheries) office located at Huskisson also maintains records, which are sourced for the purpose of SoE reporting.

Results

For the 2004/05 reporting period there have been no reports of fish kills occurring within the Great Lakes LGA.

Table 5: Number of Fish Kill events

Year	No. of Fish kill Events
2004/05	0

Source: Great Lakes Council & DPI (Fisheries)

Summary

There has been no record of fish kills occurring within the Great Lakes area for this reporting period. Subsequently there is nothing to report for the 2005 reporting period.

3.5 Stormwater Pollution

Introduction

Stormwater pollution is a major environmental issue within the Great Lakes LGA and unless managed and treated, can have long-term negative impacts on the health of local waterways. Stormwater pollution is generated during rain events as the water collects pollutants (sediment, organic matter, chemicals, litter, fertiliser's, etc) before washing into stormwater drains and street gutters and/ or entering local waterways. Stormwater pollution impacts on aquatic plants and animals, the aesthetics of local waterways and potentially human-health.

Council has installed structural solutions in parts of the LGA with the aim of effectively managing urban stormwater pollution and to reduce the amount of pollutants entering local waterways. In total, seven (7) constructed wetlands, two (2) GPT's, one hundred and forty-one (141) litter baskets and three (3) Nicholas Ski Jumps have

been commissioned. By monitoring the quantity of pollutants captured within these water quality improvement devices an indication of stormwater pollution levels within these catchments can be derived (and monitored).



Goldens Road South constructed wetland – designed to remove pollutants before draining into Wallis Lake.

Monitoring

To monitor the quantities of pollutants captured in Councils structural solutions, during routine maintenance works, staff record the total weight as well as the approximate percentage of material composition of sediment, litter and organic material captured in each device. The frequency at which maintenance works are conducted influences the frequency of data collected. Litter baskets are cleaned out once every month. GPTs and wetlands are typically maintained on a needs basis. However, the recent detection of serious aquatic weeds and pests within some constructed wetlands has increased the regularity of inspections and maintenance. Wetland and GPT data is forwarded to Councils Natural Systems and Estuaries section whilst litter basket data is forwarded to the Engineering section for analysis.

Results

The results section of this indicator takes into consideration pollutants captured during routine maintenance clean-outs of structural solutions including litter baskets, GPTs, ski jumps and constructed wetlands. In total, over 10,000kg of pollutants were captured in Councils structural

solutions during the reporting period. This result indicates the effectiveness of this as a protection measure, with over 10-tonnes of material prevented from entering local waterways. A break down of the devices installed and the type of pollutants captured is provided below.

Litter Baskets

In total 4,404 kg of sediment, litter and organic matter was removed from 141 litter baskets within Bulahdelah (2 baskets), Forster (45), Hawks Nest (19), Nahiab (10), Stroud (17), Tea Gardens (25) and Tuncurry (23).

Table 6: Total weight of pollutants removed from litter baskets on a monthly basis

Month	Pollutants Captured (kg) 2004/05
June	62
July	No clean out occurred
August	127
September	No clean out occurred
October	344
November	401
December	1510
January	319
February	425
March	213
April	649
May	No clean out occurred
June	354
Total	4404

Source: Great Lakes Council

Litter basket clean outs occurred each month with the exception of July and September 2004 and May 2005. During the months of maintenance the largest quantity of pollutants collected occurred during the month of December with the least collected during June (Table 7).

Table 7: Total weight of pollutants captured in litter baskets for each town.

Year	2004/05
Bulahdelah	2
Forster	1391
Hawks Nest	619
Nahiab	353
Stroud	1137
Tea Gardens	400
Tuncurry	570
Total	4404

Source: Great Lakes Council

The greatest amount of pollutants collected was from baskets located within the Forster town centre a total of 1,391kg of pollutants removed,

followed by Stroud with 1137kg pollutants captured (Table 8).

Table 8: A breakdown of the type of pollutants captured and their quantities

Year	2004/05
Sediment	2832.816 kg
Litter	1179.944 kg
Organic	391.24 kg
Total	4404 kg

Source: Great Lakes Council

Of the pollutants captured, sediment was by far the most abundant with a recording of 2,832kg followed by litter with 1,179kg and organic matter 391kg.

Gross Pollutant Traps (GPT)

The Little Street GPT was the only structure of its type to be clean out during the 2004/05 reporting period. Material with a total weight of 3,500kg was collected of which approximately 350kg was litter, 2,100kg was sediment and 1,050kg was leaf litter.

Table 9: Total amount of pollutants removed from Council's Gross Pollutant Trap located in Little Street, Forster

Year	2004/05
Sediment	2100 kg
Litter	350 kg
Leaf litter	1050 kg
Total	3500 kg

Source: Great Lakes Council

Nicholas Ski Jumps

In total 2,320kg of pollutants were removed from 3 Nicolas Ski Jumps located on Patsy Flat Road (north and south) and Kularoo Drive Wetland during two clean-out periods. A breakdown of the material collected is provided in Table 10.

Table 10: The total quantity of pollutants removed from gross pollutant traps (GPT) during two clean out periods

Year	2004/05
Location	Patsy Flat North
Sediment	21 kg
Gravel	243 kg
Litter	6 kg
Leaf litter	387 kg
Other	43 kg
Total	700 kg
Location	Patsy Flat South
Sediment	46 kg
Gravel	162.6 kg
Litter	8.4 kg
Leaf litter	673.8 kg
Other	29.2 kg

Total	920 kg
Location	Kularoo Wetland
Sediment	135 kg
Gravel	70 kg
Litter	43 kg
Leaf litter	429 kg
Other	23 kg
Total	700 kg
TOTAL	2,320 kg

Source: Great Lakes Council

Constructed Wetlands

No data has been collated for the cleaning of constructed wetlands for this reporting period as no data in this regard has been supplied from the Councils Tuncurry works depot. Further investigation is required to successfully access data for next years SoE report. This may require the establishment of a more formal protocol and working partnership to be implemented for subsequent reporting periods.

Summary

Overall the quantity of pollutants captured prior to entering local water bodies is significant and indicates the success of the installed structures. However these structures do not prevent the cause of stormwater pollution, instead they treat the result of this environmental issue. Ultimately a decrease in the amount of pollutants over subsequent years would be ideal and serve as an indication of a decline in the amount of pollutants entering the stormwater systems. This requires both behavioural change and adoption of best management practices. Subsequent SoE reports will provide data that will enable trend analysis in regards to this issue.

Education has been identified as an essential tool in reducing the quantity of stormwater pollution. Subsequently, Council has developed an education and awareness program to target stormwater pollution. Developed in 2001, the Healthy Lakes Program has been successful in raising awareness and educating the local community on a number of water quality issues.

3.6 Fish Passage Barriers

Introduction

A fish passage barrier is an obstacle that prevents fish from moving either upstream or downstream and can include structures such as dams, weirs, floodgates, roads, bridges, causeways and culverts. The natural behaviour of most native fish species requires the ability to move at least some distance and when restricted by the presence of a barrier these migrations are restricted or curtailed. Barriers can have the following effect on native fish species:

- restrict migration of fish for spawning;
- reduce dispersal of juvenile fish;
- create isolated populations and reduce gene flow between fish populations;
- limit passage of fish between feeding grounds;
- cause fish to congregate at a barrier leaving them open to disease or predators;
- create unsuitable living or breeding conditions (leading to fish kills);
- cause the extinction of upstream or downstream migrating species; and
- alter species diversity because of the local disappearance of some species and changes to the abundance of remaining species.

There is increasing knowledge on the means to modify existing barriers to reduce their impact. For example, modifications of openings, crest levels and the installation of fish ways/ ladders have been utilised successfully. Fishways can provide essential passage through or around barriers, reduce the energy of water flow and decrease stress to fish. Fishways can range from simple rockramps on small weirs to powerful lifts and locks on large dams. DPI (Fisheries) can provide information on options for building fishways. Further, some structures that act as barriers are no longer operational or are obsolete.

Such structures, depending on associated environmental issues, should be removed.

Monitoring

Under the *Fisheries Management Act 1994*, proposals that require construction or modification of a dam, weir or floodgate, or will obstruct the free passage of fish, must be referred to DPI (Fisheries) for comment and to determine whether a fishway is required. Further, DPI (Fisheries) Port Stephens Research Centre maintains a record on the number, type, location and extent of some of the fish passage barriers within the LGA. However, this database is not comprehensive. There is no detailed catalogue of the type, nature, location and significance of fish barriers throughout the Great Lakes LGA. The baseline for this indicator is that such information must be obtained and collated within a reference document. Subsequent to this, Council and relevant agencies and stakeholders must prioritise each fish barrier and seek resources to address and facilitate fish passage on a case by case basis. Consequently, over time it is hoped that progress on removing fish passage obstructions can be achieved in a prioritised and strategic manner.



Locketts Crossing – a physical barrier that restricts fish migrations.

Results

Seven (7) fish passage barriers have been identified to date within the Great Lakes LGA. Details of the known, documented obstructions as

noted by DPI (Fisheries) are provided in the table below.

Table 11: Fish passage barriers

Year	Location	Structure Name	Structure Length	Type of Structure
2004/05	Coolongolook River	Locketts Crossing	0.5m	Other
	Crawford River	Bulahdelah Weir	0.6m Rock	Over/Shot Dam
	Karuah River	Stroud Water Supply Weir	0.7m Concrete	Over/Shot Dam
	Wallamba River	Farm Dam	-	Over/Shot Dam
	Bundacree Creek	Farm Dam	-	By/Wash Dam
	Khoribakh Creek	Farm Dam	-	Over/ Shot Dam
	Wallamba River	Dyers Crossing Weir	3m masonry	Dam/ Weir
	Wallamba River	Clarksons Crossing Nabiac	Concrete	Road Crossing

Source: NSW Department of Primary Industries (Fisheries NSW)

The seven fish passage barriers identified in the table above are by no means the only structures of this nature within the Great Lakes LGA. These fish passage barriers have been identified as they reside on public land there are bound to be many barriers to fish passage located on private land.

Summary

At this stage, there has been no comprehensive study of fish passage barriers within the LGA. Unless a detailed investigation is conducted using aerial photograph interpretation and ground-truthing, such knowledge will not be collated.

The structures identified in Table 10 have been listed as significant barriers which unless removed or redesigned to allow for fish passage and the restoration of natural flows will continue to significantly impact natural processes. Environmentally it would be ideal to remove all barriers however this does pose a number of social and economic concerns as some of these barriers facilitate access, irrigation weir pools or domestic water supply. As such, the environmental, economic and social cost of management actions needs to be inherently considered.

4 Biodiversity

The Great Lakes supports a variety of unique landscapes and vegetation communities as well as a diversity of plants and animals. As the local economy relies heavily on tourism and primary production, which depend upon a healthy and functioning environment, the conservation of the regions' biodiversity is critical. It is increasingly recognised that the natural environment performs essential biological and ecosystem services such as water quality protection. Despite this, human impacts are placing an increased pressure on the variety of species present and the integrity of habitats within the LGA. Land development and clearing particularly are significant threats to our native plants and animals and unless these impacts are managed appropriately the extent of biodiversity currently present in the region would decrease. Ultimately this will impact on the economy, the wellbeing of residents as well as the regions' aesthetics and general appeal.



Natural Vegetation – open forest community at Carefree Road Failford.

4.1 Native Vegetation

Introduction

The extent and integrity of natural vegetation is, along with water quality, the most important environmental indicator for the Great Lakes LGA. Adequate native vegetation representation across

the LGA is associated with significant direct and indirect environmental benefits, along with a range of socio-economic opportunities and values. Conversely, the degradation of native vegetation beyond appropriate thresholds is known to result in significant declines in biodiversity, water quality, land quality (eg. salinity, rising watertables, erosion), and subsequently affect land productivity and critical social and economic resources. It has been demonstrated that vegetation decline can impinge seriously on attributes of the landscape that underpin the sustainability and viability of the entire Great Lakes area and permanently alter the values that the community itself regards as being important.



Important vegetation - a healthy and functioning riparian zone on the Cureeki Creek, Coolongolook

Monitoring

To date, no comprehensive and detailed account of the vegetation of the entire Great Lakes LGA has been collated. Reasonable mapping of vegetation is however available for the eastern half of the LGA. Consequently, it is a priority to extend the vegetation community description and mapping through the western portion of the LGA to develop a whole of Council-map of vegetation.

Further, no agency routinely monitors rates of vegetation change in a meaningful manner. However, this is critically important to strategic,

proactive and integrated natural resource management and biodiversity conservation. Council intends to address this deficiency through a defined vegetation monitoring protocol to be implemented as part of the SoE reporting process.

In this regard, following collation of the baseline data of vegetation across the entire LGA, the Natural Systems and Estuaries Branch shall implement its Vegetation Strategy, which requires a formal and repeatable monitoring of vegetation change.

It is currently proposed that for every comprehensive SoE (once every four-years), Council shall obtain updated aerial photography or high-resolution satellite images for the entire LGA. This imagery shall be analysed both digitally and visually to identify where loss and changes to natural vegetation type, structure or extent have occurred. Ground-truthing would also be required. The vegetation mapping shall be updated on the basis of this investigation and a concise report shall describe the changes to vegetation type and extent over the four-year assessment period. This information is critical in that it represents an LGA-wide analysis of cumulative change and may allow the identification of vegetation communities and localities suffering from the greatest clearing pressures.

The data generated would be useful for strategic and development assessment planning and contribute to conservation planning. It should be used to amend and adopt refined priorities through Council's Biodiversity Conservation Framework.

Further, a secondary component of this indicator requires that Council monitor and report on approved native vegetation clearing operations within the LGA. Essentially, this is restricted to an evaluation of the native vegetation cleared under

approval from DIPNR under the *Native Vegetation Conservation Act* (1997) or Council under the *Environmental Planning and Assessment Act* (1979).

Finally, the issue of unauthorised clearing is also considered and reported on. This is restricted to an analysis of the number of breaches investigated by DIPNR staff.

Results

Until the LGA-scale vegetation mapping has been completed and the monitoring protocol adopted for monitoring vegetation change, results cannot be provided for part a) of this Indicator. As stated in the previous SoE, it remains fundamental that Council, within its areas of influence, adequately manages native vegetation and protect the landscape from any significant depletion of native vegetation representation across the LGA. Further, Council must also recognise that in some localities and community types, native vegetation restoration is clearly very important.

For part b) of this Indicator, information has been provided by DIPNR regarding clearing approved under the NVC Act within the Great Lakes LGA for the SoE reporting period. This information is provided below:

Table 12: Clearing of Native Vegetation Consents by DIPNR

Clearing Type	No	Area Cleared	Area Protected from Clearing
Bulldozing	1	2.57ha	0ha
Silvicultural/ Selective Logging	4	2,535.87ha	618.64ha
TOTAL	5	2,538.44ha	618.64ha

Source: Department of Infrastructure, Planning and Natural Resources

DIPNR has indicated:

- There were five (5) breaches of the NVC Act in this LGA during the reporting period, that resulted in compliance actions:
 - Three (3) warning letters were issued
 - Two (2) remediation notices were issued

The details of the locations, areas and vegetation affected by these cases of illegal clearing were not reported to Council

- There was also no details provided of the total number of alleged breaches investigated by DIPNR officers.

Illegal or unauthorised clearing remains a key issue for Council and pertinent State authorities.

In relation to clearing associated with developments approved by Great Lakes Council, some **135** DA's were referred to Council's Natural Systems and Estuaries section pertaining to environmental matters. From these referrals, the following data has been collated:

Tables 13: DA Referrals to the Natural Systems section

Location and development type

Location	No of DA Referrals	Development Type	No of DA Referrals
Hawks Nest	18	Single Dwellings	55
Tea Gardens	13	Multiple Dwellings	21
Smiths Lake	12	Residential Subdivision	14
Pindimar	9	Sheds	7
Nabiac	8	Rural Subdivision	6
Tuncurry	8	Commercial	6
Pacific Palms	7	Additions	4
Forster	7	Rural Res Subdivision	3
North Arm Cove	7	Boundary Adjustment	3
Seal Rocks	5	Tourist Development	2
Green Point	4	Swimming Pool	2
Booral	4	Aged Care	2
Bungwahl	3	Recreational Activities	2
Failford	3	Agriculture	1
Bulahdelah	3	Driveway	1
Bundabah	3	Place of Worship	1
Stroud	3	Poultry Shed	1
Boolambayte	2	Other	3
Coolongolook	2		
Minimbah	2		
Wootton	2		
Wallingat	2		
Karuah	1		
Limeburners	1		
Markwell	1		
Mayers Flat	1		
Nerong	1		
Wards River	1		
Tiona	1		

Source: Great Lakes Council

Ecological Reporting and Outcomes

No/ Percentage of DA's requiring no specific ecological reporting	90 (66.7%)
No/ Percentage of DA's requiring/ provided with an Assessment of Significance	44 (32.6%)
No/ Percentage of DA's requiring an SIS	0 (0.0%)
No/ Percentage of DA's requiring an EIS	1 (0.7%)
No/ Percentage of DA's approved with no ecological conditions	23 (17.0%)
No/ Percentage of DA's approved subject to specified ecological conditions	90 (66.7%)
No/ Percentage of DA's where assessment was deferred pending the provision of additional information	9 (6.7%)
No of DA's assessed as State Significant Developments	No data
No of DA's assessed in the NSW Land and Environment Court	1
No/ Percentage of DA's withdrawn by the Applicant	2 (1.5%)
No/ Percentage of DA's recommended for refusal by the Natural Systems Branch on ecological grounds	11 (8.1%)

Source: Great Lakes Council

Threatened Species

No/ Percentage of DA's involving land known or found to contain habitat of an endangered ecological community	2 (1.5%)
No/ Percentage of DA's involving land known or found to contain the habitat of an endangered population	2 (1.5%)
No/ Percentage of DA's involving land known or found to contain threatened flora or fauna species	20 (14.8%)
No of DA's where Grey-headed Flying Fox was detected	6
No of DA's where Glossy Black Cockatoo was detected	6
No of DA's where Koala was detected	5
No of DA's where Eastern Freetail Bat was detected	4
No of DA's where Squirrel Glider was detected	4
No of DA's where Brush-tailed Phascogale was detected	2
No of DA's where Little Bent-wing Bat was detected	2
No of DA's where Large Bent-wing Bat was detected	2
No of DA's where Masked Owl was detected	2
No of DA's where <i>Asperula asthenes</i> was detected	1
No of DA's where Osprey was detected	1
No of DA's where Greater Broad-nosed Bat was detected	1

Source: Great Lakes Council

Clearing of Native Vegetation associated with DA Referrals

Spotted Gum/ Ironbark/ Grey Gum/ White Mahogany Open Forest	44.40ha
Red Bloodwood Open Woodland	27.00ha
Blackbutt/ Tallowwood Open Forest	4.50ha
Blackbutt/ Smooth-barked Apple/ Bloodwood Open Forest	3.70ha
Ironbark or Ironbark/ Spotted Gum Forest	3.00ha
Blackbutt Open Forest	2.40ha
Banksia	2.00ha
Swamp Oak/ Paperbark Swamp Forest	0.40ha
Forest Red Gum Forest	0.85ha
Broad-leaved Paperbark Swamp Forest	0.06ha
Swamp Mahogany/ Paperbark Swamp Forest	0.05ha
TOTAL	88.36ha

Source: Great Lakes Council

Numbers of Native Trees Cleared from DA Referrals in Hawks Nest/ Tea Gardens (of significance due to the endangered Koala population)

Blackbutt	34
Red Mahogany	6
Smooth-barked Apple	6
Red Bloodwood	6
Swamp Mahogany	4
Bangalay	2
Flooded Gum	2
Spotted Gum	1
TOTAL	61

Source: Great Lakes Council

The number of trees removed as approved through Councils Tree Preservation Order (TPO) process has not been documented as a reporting procedure is yet to be established. Obviously, data outlining the number of TPO approvals and their locations is required within a standardised reporting format for subsequent SoE reports.

Summary

Significant and high quality data has been collated for the issue of native vegetation in the Great Lakes LGA in this and previous SoE. However, two key and fundamental actions remain a high priority for Council to address, namely:

- Mapping of the vegetation across the western half of the LGA such that a single picture of vegetation is compiled; and

- Development of resources and a protocol for monitoring vegetation change via analysis of imagery for each comprehensive SoE report.

It is important that such actions are addressed as a high priority.

Further, there will be continued analysis of the adequacy and appropriateness of Council decision-making as it pertains to native vegetation over the comprehensive SoE reporting timeframe.

4.2 Conserved Land

Introduction

Public and formal private conservation provides for the conservation of biodiversity, the recovery of threatened species, the protection of scenic amenity, as well as a range of social, recreational, economic and educational/ scientific outcomes. Council, amongst other relevant agencies, is required to strive towards the achievement of a comprehensive, adequate and representative reserve system, under the NSW Biodiversity Strategy and the Australian Natural Heritage Charter.

In this regard, there is a need to monitor the extent and guide the strategic additions of land to the public conservation estate as well as privately conserved lands. Council should do this through a strategic initiative such as a Great Lakes Protected Area Network (GLPAN).



Landowner, Bill Rice has placed a portion of his property under a permanent conservation agreement.

Monitoring

Great Lakes Council shall collate and maintain a map of conserved land throughout the LGA and differentiate between the conservation mechanisms that apply to such lands. Furthermore, Council shall review the additions of land to conservation during each reporting period. Such information shall contribute to strategic and targeted biodiversity conservation frameworks.

Local Council is an appropriate agency to manage and administer the concept of a Protected Area Network (GLPAN) for the LGA. Obviously, there are a range of other agencies and stakeholders also involved, including the Hunter/ Central Rivers CMA and DEC (who have responsibility for managing the public conservation estate). The GLPAN would enable wider data sharing and cooperation between these relevant conservation agencies. The terms of the GLPAN should be established as part of the development of the SoE reporting process.

There is a range of levels and security associated with the varying conservation instruments. This includes (at the most secure), the public conservation estate (National Park, Nature Reserves, State Conservation Areas) and binding private land conservation instruments that are on-title and operate in perpetuity (VCA, Registered Property Agreement, Conservation Trust Agreement). At the lowest level of security, there

are non-binding conservation agreements that apply to private landholdings. However, these can be altered or withdrawn at any time and provide no real security.

Results

Tables 14: Conserved Land in the Great Lakes LGA

Land Conserved in the Public Conservation Estate

<i>National Parks (5)</i>	<i>63,081ha</i>
Myall Lakes National Park	47,493ha
Wallingat National Park	6,557ha
Ghin-Doo-Ee National Park	4,819ha
Barrington Tops National Park (part)	2,645ha
Booti Booti National Park	1,567ha
<i>Nature Reserves (9)</i>	<i>4,408ha</i>
Karuah Nature Reserve	2,758ha
Darawank Nature Reserve	575ha
Coolongolook Nature Reserve	198ha
Corrie Island Nature Reserve	164ha
Island Reserves of Wallis Lake	
Wallis Island Nature Reserve	473ha
Regatta Island Nature Reserve	102ha
Mills Island Nature Reserve	61ha
Yahoo Island Nature Reserve	47ha
Bandicoot Island Nature Reserve	30ha
<i>State Conservation Areas (2)</i>	<i>1,835ha</i>
Black Bulga State Conservation Area	1,554ha
Karuah State Conservation Area	281ha
Marine Park (0)	0ha
Council Bushland Reserves for Nature Conservation (-)	No data
<i>Land Acquired for Conservation (not gazetted) (8)</i>	<i>774ha</i>
Lot 25 & 45 DP95429 Karuah (Karuah Mountain) (DEC)	407ha
Lot 5 DP250677 Darawank (GLC)	86ha
Lot 73 & 97 DP753207 Darawank (DEC)	85ha
Lot 21, 34 & 207 DP753207 Darawank (GLC/ DEC)	67ha
Lot 72 & 74 DP753207 Darawank (GLC/ DEC)	60ha
Lot 87 DP753207 Darawank (DEC/ CMA)	28ha
Lot 41 DP753207 Darawank (GLC)	25ha
Lot 44 DP753207 Darawank (GLC/ DEC)	16ha
TOTAL	70,098ha

Source: DEC/ Great Lakes Council

Land Conserved in Binding Private Land Covenants

<i>DEC Voluntary Conservation Agreements (VCA) (1)</i>	<i>40ha</i>
Mill Creek Road, Stroud Road	40ha
<i>CMA/ DIPNR Registered Property Agreements (14)</i>	<i>426ha</i>
Bungwahl	270ha
Nabiac (expires 2012)	70ha
Pacific Palms	26ha
Wootton	22ha
Coolongolook	15ha
Booral	13ha
Darawank	12ha
Girvan	12ha
Failford	12ha
Booral	10ha

Tarbuck	10ha
Wootton	10ha
The Branch	8ha
The Branch	4ha
Wootton	2ha
DEH Conservation Agreement (0)	-
Nature Conservation Trust Conservation Trust Agreement (0)	-
Acquisition by Conservancy Agencies (Australian Wildlife Conservancy, Bush Heritage Trust, Earth Sanctuaries, Birds Australia, etc) (0)	-
<i>Community Title Conservation Lots (-)</i>	<i>342ha</i>
Riverlands Neighbourhood Lot, Coolongolook	230ha
Tipton Community Property, Failford	55ha
Listening Hill Neighbourhood Lot, Stroud	40ha
Green Glades Habitat Conservation Area, Failford	17ha
S88B or s88E Instruments/ Covenants over Private Land for Conservation (-)	No data
TOTAL	878ha

Source: DEC/ Great Lakes Council

Land Conserved in Non-binding Private Land Covenants

<i>DEC Wildlife Refuge (6)</i>	<i>7,203ha</i>
Gorton Wildlife Refuge, Stroud	3,972ha
Terreel Wildlife Refuge, Terreel	2,994ha
Huntley Wildlife Refuge, Bungwahl	95ha
Rose Point Wildlife Refuge, Coomba	85ha
Eden Garden Wildlife Refuge, Coomba	42ha
Leyton Wildlife Refuge, Booral	13ha
Talimbah Point Wildlife Refuge, Pacific Palms	2ha
DEC Management Contract (0)	-
DEC Land for Wildlife (0)	-
CMA Management Contract (0)	-
TOTAL	7,203ha

Source: DEC

Other Conservation

Critical Habitat Declarations (0)	0ha
SEPP14 Coastal Wetlands	12,999ha
SEPP26 Littoral Rainforest	167ha
Environmental Protection Zones (Great Lakes LEP)	No data

Source: DEC

Summary of Conserved Lands

Conservation Category	Area	%age LGA
Binding Conservation (Public and private)	70,976ha	21.3%
Non-binding conservation	7,203ha	2.2%

There is a very incomplete picture of the biodiversity that is present within the formal conservation areas of the LGA, which hinders the local analysis of the reservation status of individual species, vegetation communities and ecosystem types across the Council area.

Summary

This SoE report has established the need for a Great Lakes Protected Area Network to be established to guide and report on additions to the conserved land estate over time and provide input to the wider Biodiversity Conservation Framework. Details of this group should be developed and reported in next year's SoE report.

4.3 Corridors

Introduction

Land use for the purpose of agriculture, urban development and many other changes to the natural environment have greatly reduced the amount of habitat available to wildlife. The fragments of natural vegetation that remain are often small and isolated from one another by open pasture or urban development. Such fragmentation can act as significant barriers to wildlife movement. As most wildlife need to traverse the landscape when foraging, dispersing, recolonising or migrating, the availability of secure movement avenues of vegetation cover is very important. It is widely recognised that wildlife in a habitat 'island' may have insufficient area of adjacent habitat to forage in, or disperse along. This can lead to the vulnerability of some species to catastrophes such as disease and bushfire, and to gradual changes like inbreeding and variations in climate.

Habitat corridors, or strips of natural vegetation connecting 'island' habitats, have been identified as a means of re-connecting isolated populations. A system of corridor links is more likely to sustain wildlife populations throughout the fluctuations and catastrophes that they inevitably undergo. Thus, habitat corridors can increase the value of existing isolated habitats. Further, habitat

corridors have a range of social and economic benefits.



Riparian wildlife corridor at Bunyah – important for fauna movement in cleared landscape.

Monitoring

The Department of Environment and Conservation (DEC) has modelled fauna corridors across the north coast of NSW, including the Great Lakes LGA. This modelling provides the only data pertaining to the identification and mapping of fauna corridors strategically across the LGA. As it has not been confirmed through detailed local analysis and refined, such data cannot realistically be adopted in its present form, but does constitute an important resource on which to base local or LGA wide corridor strategies and contribute to DA and strategic planning. For SoE however, until local scale studies are complete, the 70 modelled corridors across the LGA will be considered. There is a need for Council, in combination with relevant agencies to implement the appropriate scale revision of these and commence to implement a proactive, integrated corridor strategy. This might include refinement and mapping and ultimately involve restoration/ revegetation and private land conservation through incentives.

The SoE process is important to monitor the progress in identifying, mapping and conserving/ restoring fauna corridors in a strategic and targeted manner across the LGA.

Results

The names of the 70 modelled corridors of the LGA that have been identified by DEC have been published in the previous SoE. There has been no further refinement or development of wildlife corridor knowledge, conservation or planning in the LGA since the publishing of the key regional corridors project. Consequently, no additional results can be provided for this SoE. It is hoped that works to refine and update this mapping for the highest priority corridors can be strategically commenced in the near future.

Summary

Until such time as the key habitats and corridors program is refined and updated with a local emphasis and included in statutory plans, the information referred to in this indicator would remain advisory only. There is a clear need to resolve and consider local corridor planning programs across key areas of the LGA and for the highest priority corridor links, such as the Myall Lakes to Wallingat link.

4.4 Noxious & Environmental Weeds

Introduction

Land invasion by weeds is one of Australia's most serious and expensive land degradation problems. Weeds are generally characterised as a plant growing where it is not wanted or where it was not originally present. The more serious weeds in the Great Lakes LGA are considered as either an environmental or a noxious weed. The term environmental weed refers to weeds that have the potential to effect the integrity of local bushland whereas noxious weeds are declared under the *Noxious Weeds Act 1993*, as any plant which causes serious economic loss to

agriculture, or has a detrimental affect on humans, animals or the environment.

Within the Great Lakes LGA, a total of two hundred and fifty nine (259) introduced weed species have been identified to date. Of these, 43 have been classified as noxious (appendix 1) and Council is required to monitor and manage these species in accordance with pertinent legislation.



Lantana (Lantana camara) – a prevalent weed species within the Great Lakes region.

Monitoring

Weed management is the responsibility of Council's Parks and Recreation section. Until recently there has been no mechanism for the specific survey or mapping of the distribution of noxious and environmental weed species. However, Council has recently invested in a laptop, GPS and weed mapping software for the tracking of weeds throughout the LGA. This GIS-based program, Weed Mapper, has the ability to record the location and distribution of weed infestations. It is anticipated that the recording capabilities of this program will improve strategic weed management in the future.

Results

For the 2004/05 reporting period, data on the distribution of weeds throughout the LGA is not available. It is envisaged this will be addressed and data provided for the next supplementary SoE report.

Summary

Unfortunately of this reporting period data in relation to the distribution of weeds throughout the Great Lakes LGA is unavailable to a number of glitches in the relatively new software. It is envisaged that this problem will be rectified in time for next years supplementary SoE report.

Councils Noxious and Environmental Weeds Officer has provided an update of activities in relation to weed removal occurring within the Great Lakes LGA.

Noxious Weeds Officer Report

It has been noted that private property, roadsides, parks and other public places have been mapped for the presence of Noxious Weeds, Weeds of National Significance and some environmental weeds. Aquatic weeds have been a key focus in the past twelve months due to their aggressive nature and the relative importance of our local waterways.

Weed species have generally (but not always) been mapped in conjunction with projects of the mid north coast weeds advisory committee as part of the development and implementation of regional control plans.

Great Lakes Council only has one weed officer, who is responsible for all control, administration and mapping duties. The LGA contains weed inclusions that are generally not found in many adjoining areas (Cabomba, Alligator Weed and African Boxthorn to mention a few) and a variety of weed species to map and control.

4.5 Seagrass

Introduction

Seagrass beds are a fragile and intricate component of our estuaries and play an important

role in the healthy functioning of our waterways. Seagrass provides essential habitat for a variety of aquatic species and protecting our shoreline by stabilising sediments such as sand and clay. Although important, the extent of seagrass beds throughout NSW are in decline with more than two thirds of seagrass beds destroyed over the past 30-years. This decline has been attributed to human impacts including pollution, development, dredging, recreational activities and poor land management. It is this susceptibility leading to dieback and decreased density that makes seagrass beds an ideal indicator for monitoring the health of our waterways.

Seagrass beds are sensitive to many factors including turbidity, pH, nutrient levels, temperature and physical disturbance. Resilience of seagrass differs for individual species, as some are more sensitive to disturbance and stress than others.

The local lake systems comprising Wallis, Smith and Myall Lakes support some of the most extensive seagrass communities within NSW. Wallis Lake alone is well known for the most northern population of Strapweed (*Posidonia australis*) within Australia. Three additional native species of seagrass including Eelgrass (*Zostera capricorni*), Paddleweed (*Halophila ovalis*) and Sea Tassel (*Ruppia megacarpa*) are also found within Wallis Lake.



Community seagrass monitoring volunteers identifying seagrass species within the Green point area.

Monitoring

In 2002, Council developed a community seagrass-monitoring program to assess small-scale seasonal variability in seagrass beds within Wallis Lake. Utilising community volunteers this program has been used to determine the health of Wallis Lake and its catchment and to monitor the effectiveness of environmental management within the region.

Seagrass monitoring is currently being conducted at 11 sites representatively selected within Wallis Lake. Transects have been established at each site with volunteers measuring parameters including the presence and density of seagrass, macroalgae and epiphytes species as well as the turbidity, depth and general observations.

Results

Unfortunately data collected through Councils Community Seagrass Monitoring Program is unavailable for the 2004/05 reporting period as no collation or analysis has been conducted on the data collected. In addition data from several monitoring site is not available. The sheer quantity of data collected and the qualitative nature of the results has proved difficult to analyse in an accurate and meaningful format. Therefore, changes to the seagrass monitoring program are urgently required.

Summary

Council's Community Seagrass Monitoring Program has encountered a number of difficulties over the past 3-years which are yet to be resolved. It is expected that the program will undergo an overhaul in time for use in subsequent SoE reports. This will take place in conjunction with the Central Coast Community Environment Network (CCCEN) Community Seagrass Monitoring initiative, which commenced early 2005.

4.6 Recovery Plans and Threat Abatement Plans

Introduction

In New South Wales, threatened native plants and animals are listed on the *Threatened Species Conservation Act 1995* (with the exception fish and marine plants). The Act provides for the identification, conservation and recovery of threatened species, populations and communities. It also aims to reduce the threats faced by those species.

Once a species, population or ecological community has been listed as threatened, the TSC Act currently requires DEC to produce a Recovery Plan. This plan is typically designed to return the species, population or ecological community to a point where their survival is viable in nature. Among other things, recovery plans outline the actions that government and other organisations are bound to undertake to help the recovery of the species.

It is a legislative requirement of the SoE process that actions within approved threatened species, population and community recovery plans are reported on annually.

An analysis of recorded sightings of threatened species indicates that the Great Lakes LGA contains:

Table 15: Number of known threatened and endangered groups within the Great Lakes LGA.

Group	No. known from the Great Lakes LGA
Endangered populations	2
Endangered ecological communities	9
Threatened flora	21
Threatened mammals	25
Threatened frogs	6
Threatened reptiles	1
Threatened birds	36

Source: Great Lakes Council

To date, within the Great Lakes LGA, the following Approved Recovery Plans are currently operational:

- State Recovery Plan for the Endangered Koala Population of Hawks Nest/ Tea Gardens
- State Recovery Plan for the Yellow-bellied Glider
- State Recovery Plan for the Red Goshawk
- State Recovery Plan for the Little Tern
- National Recovery Plan for the Swift Parrot



A Hawks Nest Koala

Monitoring

For each SoE, there will be an appraisal of the on-ground works achieved in response to Approved Recovery Plans and Threat Abatement Plans, where Council is a leading or supporting agency. Further, there will be an annual summary of the actions listed for each approved plan and the progress towards the achievement of such. This will be prepared with assistance from DEC, which is the agency that is principally responsible for recovery and threat abatement planning.

There has been an attempt to derive a method for comparing and analysing community Koala sighting data as an Indicator in this SoE. The Myall Koala and Environment Support Group currently collate this information. However, the nature of this reporting precludes any formal use of such as an SoE Indicator at the present time.

Results

To date, Council has not been consulted or engaged to assist with the implementation of the Approved Recovery Plans for the Yellow-bellied Glider, Red Goshawk, Little Tern or Swift Parrot. Council is however a very active partner in the implementation of the Approved Recovery Plan for the endangered Koala population of Hawks Nest/ Tea Gardens. This Plan was prepared in 2003, but approved in 2004, at which time, the implementation of the Plan officially commenced. The outcomes of the implementation of this Plan achieved to date have been summarised below.

Table 16: Hawks Nest and Tea Gardens Endangered Koala Population Recovery Plan Implementation outcomes achieved to date.

Action	Commenced	Completed
1.1 Plan coordination	✓	-
1.2 Develop working group	✓	✓
1.3 Monitoring program	✓	-
2.1 Mapping and reporting	✓	-
3.1 Prioritise management areas	-	-
3.2 Survey habitat links	-	-
3.3 Survey/ assessment guidelines	-	-
3.4 Blackspot identification	-	-
3.5 Strategic streetscaping	-	-
3.6 Companion animal policy	-	-
3.7 Coordination of dog control	✓	-
4.1 Habitat zoning	-	-
4.2 Awareness of long term protection measures	-	-
4.3 Support BFMC	-	-
4.4 GLC Plans of Management	-	-
4.5 NPWS Plans of Management	-	-
5.1 Rehabilitation/ replanting advice	✓	-
6.1 Establishment of database	✓	-
6.2 Education and awareness	✓	-
7.1 Information exchange	✓	-
7.2 Identification of release sites	✓	-

Further, the following Threat Abatement Plans have been finalised:

- Predation by the Plague Minnow
- Predation by the Red Fox

Council, to our knowledge, has not been consulted to assist in the implementation of these Threat Abatement Plans to date.

Summary

Council has been a key and active player in the assistance of recovery efforts for the endangered Hawks Nest/ Tea Gardens Koala population and significant momentum and partnerships has been

achieved to date. Continued refinement of Council's involvement in the recovery planning processes for threatened species is beneficial and should be reflected in work programming and resourcing.

5 Waste & Toxic Hazards

Many of the substances we use can have a devastating effect if released into the environment. Unfortunately, waste and toxic materials are released into our environment both deliberately and by accident, which can result in a variety of environmental issues. Water, air and land pollution results from the release of waste and toxic hazards into our environment and can lead to significant site contamination issues. Legislation relating to a number of dangerous chemicals and waste products has been gazetted to reduce the impact of these substances on human health and the environment. However we still have a long way to go in reducing the potential of waste and toxic hazards seriously affecting our natural environment.



Great Lakes Councils Tuncurry waste management centre.

reduce waste, opportunities to reuse, recover or recycle materials and ways to efficiently dispose of the residual waste in a satisfactory manner. As such a move from landfill to integrated waste management centres has been adopted. This move has occurred in line with waste management reforms with the introduction of the *Waste Avoidance and Resource Recovery Act 2000*.

Councils Waste Management Services section is responsible for managing four (4) waste management centres in the LGA at Tuncurry, Tea Gardens, Bulahdelah and Stroud. Licensing under the *POEO Act (1997)* has been issued for these operations and as such Council has a legal responsibility to fulfil monitoring obligations.



Concrete crushing (recycling into roadbase) – Tuncurry waste management centre

5.1 Waste

Introduction

Waste management is an issue for Local Government in relation to both human and environmental health. Waste disposal methods have been based on engineered landfill methods, which have been the accepted standard for waste disposal. However, there has been a shift towards providing a more sustainable waste management system that provides incentives to

Monitoring

At each centre the quantity of total waste is monitored as well as the breakdown of each waste component including total waste to landfill, recycling, green waste, kerb-side recycling and chemical/ hazardous waste. However, as different units of measure have been used, there are issues with the compatibility of such data. Subsequently, for the purpose of this report, data measured by volume is converted into weight as per acceptable methods of calculation (EPA land

filling guidelines). Furthermore the total weight of waste per capita is based on the predicted population as derived by the most recent census. This figure provides an accurate representation of waste volumes for that year.

Results

Through the process of routine garbage collection, recycling initiatives and public use of Councils Waste Management Centres 51,275 tonnes of waste was collected during the 2004/05 reporting period. This is the equivalent of 1.55 tonnes for each person living within the Great Lakes LGA. A proportion, approximately 72.6 tonnes, goes to landfill with the remaining waste distributed among Councils recycling initiatives. This includes green waste, scrap metal, general recycling material including plastic, paper, metal and materials collected through the kerb-side recycling program.

Table 17: The total amount of waste collected including a break down of components for recycling.

Year	2004/05	
Total Waste (Tonnes)	51,275	
Total Waste Per Capita (Tonnes)	1.55	
Total Waste Landfilled (Tonnes)	37,244	
Green Waste (Tonnes)	1,255	
Scrap Metal Recycling (Tonnes)	1,423	
General Recycling (Tonnes)	4,595	
Kerb Side Recycling (Tonnes)	1,602	
Clean Fill (Landfilled) (Tonnes)	5,000	
Reuse Items	115	
Chemical / Hazardous Waste (Tonnes)	Oil	7.8
	Batteries	32.24
	Chemicals	0.521

Source: Great Lakes Council

Summary

The disposal of waste is an ongoing issue that has long term implications for the health our natural environment. With ongoing development and increasing affluence, there will be greater pressure on our landfills and the natural environment. The implications of this has long been recognised with a move to developing more sustainable waste management practices to

minimise the quantity of rubbish entering landfills and inturn reducing the impact on the local environment.

To address waste issues the State Government has developed a Waste Avoidance and Resource Recovery Strategy to guide the efforts of State and Local government agencies, industry and the broader community in waste prevention and avoidance, reuse and recycling. With a strong focus on turning waste we can't avoid into a valuable resource, this strategy works within the boundaries of relevant legislation.

On the local level, Great Lakes Council is committed to reducing the quantity of waste that enters our landfill. Subsequently alternate waste management methods including recycling and reuse of many materials is encouraged. However this is a community wide issue, which requires the commitment and cooperation of all residents to ensure the impact we have on the local environment is minimised when it comes to the management of our waste.

It is therefore predicted that this indicator will show a decrease in the quantity of waste that is disposed of in landfill and a corresponding increase in the amount of material that is recycled and reused.

5.2 Sewage Treatment & Disposal

Introduction

Inadequate sewage treatment and disposal can pose a significant threat to public and environmental health. As such stringent regulations in the form of licensing have been imposed for all effluent management authorities. Within the Great Lakes, MidCoast Water administers the reticulated sewer system in line with licensing conditions issued by the DEC. To

date, generally only urban regions of the LGA are connected to the sewer network with the rural and village areas generally relying on on-site septic methods.

Effluent discharged into the sewer system is managed at one of five (5) sewage treatment plants located at Forster, Tuncurry, Stroud, Hawks Nest/ Tea Gardens or Bulahdelah. The Tuncurry plant is in the process of being decommissioned with waste transferred to Hallidays Point. Wastewater at each treatment plant is processed to a secondary or tertiary level through a range of methods. Following this process, treated water is discharged into the ocean, nearby waterways or filtered through sand dunes (groundwater disposal).

Dwellings outside the reticulated sewer network rely on septic systems as a means of wastewater treatment and disposal. Various appropriate septic systems are available. Great Lakes Council is responsible for managing septic systems, all of which are required by legislation to be registered with the Council. The registration process assists Council to assess and manage the impact of septic systems with regard to public and environmental health.

Environmentally, both septic and sewage systems work effectively if maintained and managed appropriately. As the sewer system is heavily regulated and bound by licensing agreements management is relatively effective. Nevertheless, there are serious risks associated with spills of untreated effluent or overflows of sewage from the sewer system. Septic systems on the other hand are privately managed and their regulation and management is difficult. Neglected septic systems may pose a threat to the local environment if effluent enters nearby waterways or seeps into the ground water. Faecal pollution has been detected during monitoring in drains and

creeks within village areas serviced by septic systems (eg. Coomba Park).

As an indicator of environmental health, the monitoring of the number of dwellings connected to reticulated sewer or septic systems provides an indication of pressure placed on the local environment.



Sewage treatment at MidCoast Waters Forster sewage treatment plant.

Monitoring

Council's Environmental Health section is able to provide information in relation to the number of properties serviced by septic systems, the type installed and the number of new septic system registered.

MidCoast Water is the regions sewage service provider and as such information will be sourced from this authority in regards to the number of properties serviced by sewage systems, the type of connection and the number of new connections approved in the reporting year.

MidCoast Water carries out a number of environmental testing programs to monitor the impact of treated effluent release on the receiving water environment. This includes the monitoring of Frys Creek and the Myall River, at Bulahdelah. The survey consists of quarterly water sampling covering chemical and physical parameters. Testing is carried out at three sites at Frys Creek and two sites at Myall River.

Results

In total there are currently 3,837 properties operating registered septic systems. A breakdown of these systems has been provided in the table below. For the 2004/05 reporting period 155 new systems have been installed. Overall 1,484 septic systems have been assessed and have been approved by Council.

Table 18: Number of properties operating septic systems and the type of systems installed.

System	Number of Systems
	2004/05
Aerated Wastewater Treatment Systems	820
On-site Disposal Systems	1,831
Pump-out Systems	536
Composting Toilets	34
Chemical Toilets	37
Sanitary Pans	21
Pit Toilets	54
Mound	38
Sand Filter	54
Reed Bed	26
Commercial Treatment Plant	7
Other Systems (Unknown)	379
TOTAL	3,837

Source: Great Lakes Council

For the 2004/05 reporting period 15,552 properties were connected to the sewage system. Of these 270 were new connections. The total volume of wastewater collected in Great Lakes sewerage system during 2004/05 was 4075 million litres. (Source: MidCoast Water).

Summary

Ideally in terms of environmental health all properties within the Great Lakes LGA would be connected to the reticulated sewer system. However the cost and time associated with the development of infrastructure to service all properties within the Great Lakes is currently unavailable. Therefore a proportion of all property owners have to utilise septic systems to treat their sewage on site. However septic systems are often difficult to regulate. Hopefully over-time SoE reporting will indicate an increase in the number of properties connected to the sewage network and

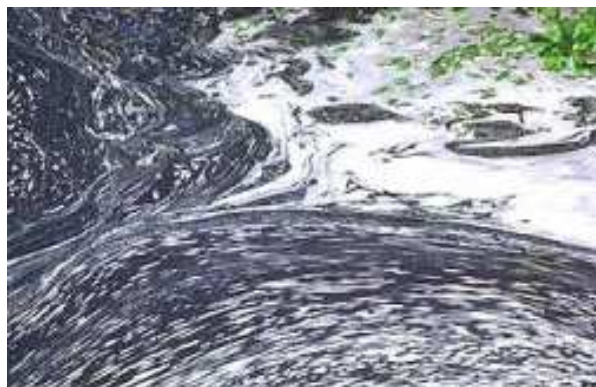
a reduction in the number of properties utilising on-site septic systems.

In providing a reticulated sewer system MidCoast Water must meet strict licensing agreements which requires the monitoring of the impact of treated effluent release on the receiving water environment. This data will be made available in subsequent SoE reports following the development of the water quality indicator (page 9).

5.3 Toxic Spills

Introduction

Toxic spills are usually random, one-off incidents that have the potential to cause great pressure on the Great Lakes environment. For example, toxic spills could result from sewage overflows, serious truck crashes or other contamination events. All toxic spills have an impact on the natural environment with the extent of this damaged determined by the substance(s) released, their amount and the location/ extent of the spill.



An oil spill such as this would have a devastating effect on the health of the regions environment.

Monitoring

The NSW Fire Brigade and Rural Fire Service usually responds to incident-based toxic spill events and this organisation maintains records on the incidents that they have responded to. Further, the DEC and Council's Environmental

Services section respond and manage toxic spill events in this LGA.

Therefore, it is important that all toxic spills are recorded and that Council is satisfied that all responses to such incidents are appropriate and effective. However, the details of the monitoring protocol have not been developed for this SoE. It is critically important that a standard method of reporting and describing such events be developed for subsequent reporting periods and that this protocol be implemented by the responsible agencies.

Results

The NSW Fire Brigade and Rural Fire Service are responsible for maintaining records on toxic spills. Despite numerous requests, no data was provided for the reporting period.

Summary

It is envisaged that a more formal protocol and working partnership be implemented for subsequent reporting periods to ensure that essential data is obtained in a timely, efficient and useful manner.

6 Land

The way we plan and construct our built landscape has a direct impact on the health and function of our natural environment. Development in response to the demands of the increasing population remains one of the largest impacts on the Great Lakes LGA. Unless this development is planned in an environmentally appropriate manner and which includes the provision for open space, nature reserves, biodiversity, etc the very aesthetics and charm of the Great Lakes will be lost.



An example of development within the Great Lakes region.

6.1 Development Pressures

Introduction

Development provides for much needed growth in urban populations and employment and provides for socio-economic growth over time. However, there is a clear need for development to be sustainable and within the thresholds imposed by physical and environmental conditions. *Bridgman et al (1995)* suggested that *“the growth and development of urban areas greatly affect the land, the waterways, the ecosystems, and the air quality in the vicinity. These impacts in turn affect the way people live their lives, through health, the engineering and management of systems, costs and standard of living, and the quality of the living*

environment. The significant environmental consequences of human activity need to be considered if the urban environment is not to experience steady decay to the point where the negative aspects are overwhelming.” Generally, communities of the Great Lakes LGA experience the opportunity to enjoy a high living standard. This is a consequence of many factors, not least which includes the quality of the local environment. Subsequently, there is a heavy pressure for increasing development to support an increasing population, particularly within the coastal strip. A community survey conducted for this SoE has identified that the community is significantly and overtly concerned that over-development will affect the environment and lead to declines in their standard of living. Consequently, Council has significant responsibilities to carefully manage and provide for growth and development in a sustainable and responsible manner.

This SoE recognises that development can impact on the environment negatively. While it is not a direct indication of specific and measurable environmental impact, the number of development applications approved within the LGA does provide a measure of the amount of the scale of development pressures with which the LGA is being subjected to. For example, heavy development pressures are associated with increased demand for urban land and subdivision, which may in turn increase clearing pressures and affects on waterways through increased pollution.

Consequently, describing the annual trends associated with the number of Development Approvals within the LGA is an important measure.



High rise developments within the Forster township.

Monitoring

This key indicator has been developed to:

- Specifically describe the main types of activities consented to within development approvals on an annual basis, including the number of new residential, rural residential and rural lots and structures established in urban, cleared, modified natural and natural landscapes; and
- Specifically describe the change to planning zones during the year in relation to area (ie. rural to environmental protection).

While this information is collected, it is not in a format that allows for expedient and rational documentation within this report. As a result, information pertaining to the number of lots approved for subdivision and the number of construction certificates issued, is all that is available at this time.

Results

For the 2004/05 reporting period Great Lakes Council approved 51 additional lots for subdivision and issued 178 construction certificates.

Table 19: number of lots approved for subdivision and construction certificates issued.

Year	Number of lots approved for subdivision	Number of construction certificates issued
2004/05	51	178

Source: Great Lakes Council

Summary

At this stage, this is the only information available for SoE reporting. As such there is an identified need to establish a small working group and reformulate internal Council reporting and data management procedures such that this information can be reported within the SoE process in an accurate manner.

Data on the area of land occupied by different planning zones is of particular future interest in this report.

6.2 Open Space

Introduction

As part of Councils community responsibility, adequate amenities and services are required under the *Environmental Planning and Assessment Act 1979*. As such, Council levies contributions for the acquisition of land for 'open space'. Open space is necessary for environmental and social wellbeing and includes drainage and service corridors, general land, natural areas (foreshore, bushland, and beach), parks and sporting grounds.

Environmentally, drainage and natural open space are of significance as they provide opportunity for conserving and protecting biodiversity as well as managing and treating run-off through constructed wetlands and drainage reserves. Council reserves provide habitat for threatened species and facilitate active and passive recreation as well as scientific and educational activities. Hence open space is a very important local resource.



Tuncurry rock pool is a popular community picnic and recreational area.

Monitoring

Councils Parks and Recreation section is in the process of developing its Recreation and Open Space Strategy. Following the completion of this Strategy, an effective protocol shall be developed to routinely monitor the changes and extent of open space (including the consideration of different types of open space) in a rational and effective manner. Until this has been developed the Parks and Recreation section can only provide information in relation to the total area of open space across the LGA.

Results

Based on the population estimate of 34,000 each resident within the Great Lakes region has the equivalent of 0.022 hectares of open space.

Table 20: Area of open space per capita.

Year	Area of open space per capita (ha)
2004/05	0.022

Source: Great Lakes Council

Summary

Until data is provided in subsequent SoE reports it is difficult to determine a trend in the area of open space available per capita. This information will be made available in the 2005/06 report late next year. In general it would be beneficial to see an increase in the area of open space per capita however given the current requirements for estate development and increasing population is more that likely this trend will not occur. Instead the

Great Lakes is more likely to experience a reduction in the are of open space per capita.

6.3 Roads

Introduction

The construction and use of roads, even when sensitively designed, can significantly impact on the local environment. A number of issues which may arise due to road development include:

- Chemical and noise pollution
- Fragmentation of wildlife habitat
- The formation of barriers to wildlife movement and dispersal
- Mortality of wildlife through collisions with vehicles
- Impact on the aesthetic value of an area
- Pollution issues during construction and use
- Vegetation removal
- Degradation of natural patterns and processes eg. erosion
- The spread of weeds and feral pests

As such, where possible the construction of roads should be minimised and where road development is essential, that all of the above issues need to be considered and resolved to ensure minimal impact on the local environment.



The Pacific highway – the fragmentation of habitat is evident

Monitoring

Records are available within the Transport Assets section of Councils Engineering Division on an annual basis in relation to the total length of Council controlled roads in the LGA, the length of unsealed/ proportion of total roads, the length of unsealed roads subject to erosion and sediment control during the year and the length of road subject to erosion requiring curb and gutter. The intent of this indicator is to monitor the construction of roads within urban, rural and regional areas of the LGA, and where possible minimise the effect of existing and potential road development on the environment.

Results

In total the Great Lakes LGA contains 1,080km of roads equating to an area of 6,480km². Table 17 identifies the proportion of the road network that is unsealed.

Table 21: Total length of Council controlled roads and proportion of sealed and unsealed roads.

Year	2003/04
Sealed Length (% of total)	60
Unsealed Length (% of total)	40
Sealed Area (% of total)	60
Unsealed Area (% of total)	40
Total Road Length (km)	1,080
Total Road Area (km ²)	6,480

Source: Great Lakes Council

Summary

Sealed roads occupy the majority of the total Council controlled road network in relation to both total road length and total road area. However a significant length of unsealed roads is present in this LGA. Sections of these gravel roads have been subjected to best practice erosion control methods during the reporting period, including roads in the Karuah River and Wallis Lake catchment. Erosion sediment control is now a major factor in the design and construction of roads and streets. Despite this there has been only a minimal amount of bitumen sealing of gravel roads during the reporting period. Most

new roads in subdivisions are required to be bitumen sealed.

6.4 Strategic Planning

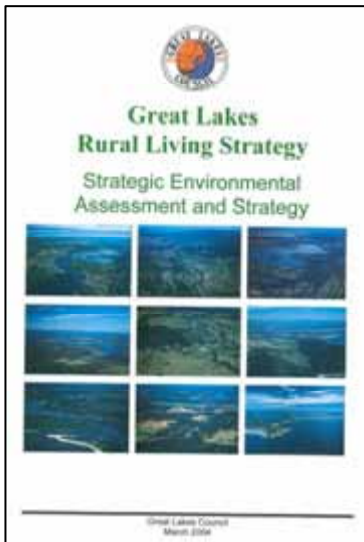
Introduction

Strategic landuse planning is the forward planning which provides an overall sense of direction and a context for detailed decisions that councils and state agencies make in relation to future land use and service provision. A strategic plan outlines a vision for the future development of a region or locality and a strategy to achieve it.

Strategic planning can be done for part of or the entire local government area (LGA). Strategic plans sit at the top of the planning hierarchy and set the overall "big-picture" with consistent aims, objectives and guiding principles. Local Environmental Plans (LEP) allows the strategic plans to be implemented by setting rules for the development of specified land. Finally, Development Control Plans (DCP) outline the detailed development outcomes of subject areas.

The Great Lakes Rural Living Strategy was completed in August 2004 and provides a future direction for the settlements and land within rural areas of the LGA. It does not address the future of Forster, Tuncurry, Hawks Nest, Tea Gardens, Pacific Palms or Smiths Lake. The future development of these towns is addressed in two other separate strategies: (i) the Forster Tuncurry Conservation & Development Strategy and (ii) the Tea Gardens Hawks Nest Conservation & Development Strategy.

It is important to note that these strategic plans do not rezone any land identified in them - it provides an indication on the future land use designations for the area.



The Great Lakes Rural Living Strategy – Strategic Environmental Assessment and Strategy. This document is vital to guiding the future direction for settlements and land within the rural regions of the LGA.

Monitoring

During 2004/05 Council continued implementing both the Forster Tuncurry Conservation & Development Strategy and Tea Gardens Hawks Nest Conservation & Development Strategy. Separate planning projects continued investigating specific areas for potential rezoning as identified within these strategies. Local environmental studies were continued and commenced for lands in South Forster, Smiths Lake and Hawks Nest and two Local Environmental Plans were exhibited.

The results below identify what areas are currently under investigation for potential rezoning. The zoning and area of land to be rezoned is also recorded in the table below for Local Environmental Plans that have been adopted by Council for exhibition.

Results

Council is currently in the process of investigating six (6) areas within the Great Lakes including two areas of South Forster, one area at Smiths Lake, Forster, Pacific Palms and Tea Gardens (refer to table 22).

Table 22: areas under investigation for potential rezoning.

Project	Location	Rezoning Environment Protection	Rezoning Residential	Status
LEP No. 27 & 50	North Hawks Nest	Not yet determined	Not yet determined	Draft LES / LEP being prepared
LEP No. 45	South Forster	Not yet determined	Not yet determined	Draft LES / LEP being prepared
LEP No. 46	South Forster	Not yet determined	Not yet determined	Draft LES / LEP being prepared
LEP No. 47	Smiths Lake	Not yet determined	Not yet determined	Draft LES / LEP being prepared
LEP No. 36	Forster	9 ha	19 ha	Draft LEP adopted 2002
LEP No. 13	Pacific Palms	250 ha	14 ha	Draft LEP Exhibition March 2005
LEP No. 44	Tea Gardens	110 ha	-	LEP adopted 26/04/05
Total Area	-	369 ha	33 ha	-

Source: Great Lakes Council

Summary

South Forster LEP No.45 - LEP No.46

Local Environmental Studies have commenced for the rezoning of lands at South Forster, namely the Seven Mile Beach (LEP No.45) and Folly Foot Farm (LEP No.46) properties, as identified in the Forster Tuncurry Conservation & Development Strategy (refer to maps A & B).

Smiths Lake (Macwood Road) – LEP No.47

Studies are also being prepared for lands at Smith Lake located at the southern end of Macwood Road, as also identified in this strategy (refer to map C, Appendix 3). The proposed landuse zoning changes for lands included in the above studies are yet to be determined.

Forster (The Southern Parkway) – LEP No.36

Council adopted draft LEP No. 36 for public exhibition in 2002. The LEP identifies approximately 19 hectares of land to be rezoned for residential use on the Southern Park Way Forster, adjoining the Palms estate to the south. The draft LEP also identifies 9 hectares of land to be rezoned for environmental protection purposes (refer to map D, Appendix 3).

Pacific Palms – LEP No.13

After extensive studies and reviews in the Pacific Palms area, Council exhibited draft LEP No. 13 in January 2005. The majority of the land within the subject area is currently zoned for urban investigation purposes. The draft LEP proposes to rezone approximately 14 hectares of land for residential purposes and around 12 hectares of land for other uses such as caravan parks, general business and open space & recreation. The outcomes of the Local Environmental Study adopted by Council in June 2004 identified numerous bushfire, ecological and flooding constraints over much of the lands currently zoned for urban investigation purposes. Consequently approximately 250 hectares of land has been proposed for rezoning for environmental protection purposes (refer to map E, Appendix 3).

Tea Gardens (Myall River Downs) – LEP No.44

At Myall River Downs Tea Gardens, Council resolved to adopt the final LEP No. 44 in April 2005 to rezone approximately 110 hectares of land for environmental protection purposes. Further LES investigations are currently being undertaken over the remainder of Myall River Downs to determine its suitable landuse and zones (refer to map F, Appendix 3).

North Hawks Nest – LEP No.27 and 50

Council has resolved to investigate the rezoning of all the land between the town of Hawks Nest and the Myall Lakes National Park. A Local Environmental Study is currently being prepared for this area. The LES will draw upon the findings of a Public Inquiry as well as the recommendations from a group of specialist ecological consultants appointed by Council. These consultants were appointed to address and recommendations from the Public Inquiry. New studies that are also being done will be used to prepare the LES.

It is possible that about 65-80 ha of land could be found to be suitable for urban development and the remainder is likely to be zoned for environmental protection (refer map G, Appendix 3).

7 Air

The quality of the air we breathe has always been a contentious issue in Australia. Through a deterioration of air quality, the health of the community can be compromised and the sustainability of our lifestyles and economies can be negatively impacted.

Air quality within the Great Lakes is comparatively good due to the areas low population base and minimal industrial operations. However on the whole residents of the Great Lakes contribute to the overall deterioration of the worlds atmosphere through the electricity we use, the cars we drive, the wood we burn in our heaters, etc. Of great concern is the impact these activities are having on the "Greenhouse Effect". As a coastal Council the future effects of the Greenhouse Effect may impact on infrastructure the environment and our lifestyles, largely as a consequence of global sea level rise and altered climate (increased storms, etc).



Car exhaust emits pollution into the atmosphere.

7.1 Electricity Usage

Introduction

Burning fossil fuels such as coal for the generation of electricity has been identified as a major contributor to global warming. During the generation process carbon dioxide, a greenhouse

gas, is emitted. Naturally, carbon dioxide is an essential part of the atmosphere. However in excessive amounts carbon dioxide can overheat the earth, with the potential of rising sea levels by melting the polar ice caps. In a coastal region such as the Great Lakes this phenomenon has the potential to significantly impact on a number of communities.

Due to the impact of energy generation on the environment and the unrenewable nature of fossil fuels, renewable sources of energy such as wind, tidal and solar power are being investigated. However fossil fuel generated electricity remains to be the cheapest alternative and as such few green sources are available to the general public. Until such time as alternate sources of energy become available it is essential energy use be kept to a minimum to reduce the effect of carbon dioxide on the environment.



Powerlines deliver fossil fuel generated energy to the Great Lakes region.

Monitoring

Overall greenhouse gas emission from electricity usage within the Great Lakes is relatively low due to our small population size. For the purpose of this report electricity consumption is measured on a per capita basis. Information in relation to energy sources, usage and emission of

greenhouse gas within domestic and commercial premises is available from the regional electricity authority, Country Energy.

Results

Country Energy is the responsible agency for maintaining records on electricity usage. However, no data was provided for the 2004/05 reporting period despite numerous requests for such information.

Summary

It is envisaged that a more formal protocol and working partnership be implemented for subsequent reporting periods to ensure that essential data is obtained in a timely, efficient and useful manner.

8 Noise

Noise pollution can disturb our work, concentration, relaxation and sleep. It can cause stress and create or worsen physical problems such as high blood pressure, chronic exhaustion and heart disease. A quieter environment is a restful place that promotes relaxation and a happier and healthier community.

Within the Great Lakes premises/ activities that create potential excessive noise are regulated through the DA process. Furthermore Council addresses separate noise complaints in accordance with the POEO Act. Therefore noise and its generation is not considered a viable indicator of environmental trends at this time. As such, no indicators for this theme are deemed relevant to Councils SoE process at this time.

9 Heritage

Whilst both aboriginal and non-aboriginal heritage are important issues it does not directly effect the environment. Indicators used in the past could be better utilised in a separate document and be referred to in future SoE reports or provided as an attachment. Council will endeavour to refer to such a report should it be developed in future SoE reports.

10 Community Involvement

Community involvement in SoE reporting is not legislatively required however Council has identified it as an essential component in the development of its SoE reports. There is significant value in addressing the community to gain an understanding of popular opinion on environmental issues. This process also provides an evaluation tool for Council's current environmental programs. Furthermore often Council due to the location of offices and limited number of staff, may not be fully aware of all environmental issues and their extent within the LGA. The community has the ability to provide information on issues, which may be unnoticed as well as providing an essential public perspective on how Council should go about addressing these issues.

Community involvement has been instrumental in the development of Great Lakes Council SoE reports since 2000. Historically Council has requested interested parties, individuals and groups provide a submission to be included and addressed through the SoE process. This process has since changed with the introduction of the "*Who Cares about the Great Lakes Environment?*" survey developed in 2004. Therefore, while submissions are also sourced, the survey provides for a greater cross-section of responses from all types of people living within the Great Lakes community and yields measurable changes in trends of environmental concern and awareness.

10.1 Community Survey

Methods

Two hundred (200) "*Who Cares about the Great Lakes Environment?*" surveys were distributed to

community groups and random community members within the Great Lakes LGA. One survey was distributed to a community member who expressed an interest in completing the survey. Of these forty-two (42) of the random surveys were returned, forty-three (43) were completed by general community groups and one (1) was requested and completed by a resident.

The survey (appendix 2) consisted of nine (9) questions:

- **Question 1:** In general, how concerned are you about environmental problems in the Great Lakes?
- **Question 2:** What would you say is the single most important environmental issue in the Great Lakes today?
- **Question 3:** And the second most important environmental issue in the Great Lakes?
- **Question 4:** How would you rate the following list of environmental issues in the Great Lakes?
- **Question 5:** What is your main source of information about environmental issues in the Great Lakes?
- **Question 6:** In the past twelve (12) months have you changed your behaviour in any way for environmental reasons and how?
- **Question 7:** Have you heard of any of a range of Great Lakes Council environmental initiatives?
- **Question 8:** What would you say is the single most important thing that Great Lakes Council could do to protect the environment over the next few years?
- **Question 9:** Please circle the following aspects which best describe your circumstances.

The analysis of these surveys requires the totalling of responses and where appropriate results are expressed as a percentage (questions 1-4 and 6-9). The results of this survey have been summarised below.

Results

In total eighty-six (86) surveys were completed and analysed. The responses to each question have been graphed (appendix 2) and a summary provided below.

Question 1: *In general, how concerned are you about environmental problems in the Great Lakes?*

Overall the Great Lakes community is genuinely concerned about the local environment with 55% stating they cared a great deal, 31% a fair amount and only 2% stating they were not concerned about the Great Lakes environment at all (figure ...).

Question 2: *What would you say is the single most important environmental issue in the Great Lakes today?*

36% of respondents listed water quality as the single most important environmental issue occurring within the Great Lakes area. This was followed by development at 26.5%, the loss of vegetation, habitat and biodiversity at approximately 7% and feral pests/weeds at 5% (figure ...).

Question 3: *And the second most important environmental issue in the Great Lakes?*

25.5% of respondents listed water quality as the second most important environmental issue occurring within the Great Lakes LGA. Again this was followed by development at 16.5%, loss of vegetation, habitat and biodiversity at almost

10.5% and waste management and sewage at 8%.

Question 4: *How would you rate the following list of environmental issues in the Great Lakes?*

The top three environmental issues from each category are as follows:

- **Very Important** – Water pollution 76.5%, development/ land pressures 68.5% and weeds/ feral animals 58%.
- **Important** – Noise 52.5%, water use 49% and air pollution/ quality 45.5%.
- **Not Important** – Noise 21%, air pollution 11.5% and over-population 9.5%.
- **Unsure** – Vegetation/ loss of habitat 3.5%, development/ land pressures 2.5% and weeds/ feral animals 2.5%.

Question 5: *What is your main source of information about environmental issues in the Great Lakes?*

The majority of respondents reported obtaining their environmental information from newspaper (73), television (33), friends/ family (29), radio (27), newsletters (23) and through general observation (11).

Question 6: *In the past twelve (12) months have you changed your behaviour in any way for environmental reasons and how?*

49% of respondents reported changing their behaviour for environmental issues. 36% have not changed their behaviour in any way and the remaining 15% did not answer this question.

Question 7: *Have you heard of any of a range of Great Lakes Council environmental initiatives?*

The Wallis Lake Catchment Management Plan (75.5%), Healthy Lakes Program (68.5%), Hawks

Nest and Tea Gardens Endangered Koala Population Recovery Plan (66.5%) and Wallis Lake Estuary Management Plan (65%) were the most widely known environmental projects conducted by Council. The least known Council environmental projects were the Biodiversity and Conservation Framework (18.5%), Darawakh Rehabilitation Project (33.5) and the Great Lakes Vegetation Strategy (37%).

Question 8: *What would you say is the single most important thing that Great Lakes Council could do to protect the environment over the next few years?*

27% of all respondents suggested Council provided tighter controls over the quantity and management of development within the Great Lakes region.

This was followed by the improvement of water quality (14%) and waste management / sewage infrastructure (6%) as well as an increase in enforcement (4.5%).

Question 9: *Please circle the following aspects which best describe your circumstances.*

Of the respondents who completed the questionnaire 45 were male, 40 female and 1 not recorded. 3 were between the age of 18-34, 18 between the age of 34-54, 64 respondents were 55 or over and 1 age was not documented. 19 were employed, 6 self employed, 56 retired, 3 other and 2 unknown.

Summary

The results indicated a high level of awareness and concern about the Great Lakes environment, with a range of issues identified. The residents generally felt a strong attachment to the local environment and were particularly concerned with ongoing environmental decline through pollution,

over-development and loss of biodiversity. The results also indicated a good awareness of Council environmental initiatives and demonstrated that education programs have been effective.

10.2 Community Submissions

To encourage feedback from the general community, Council sourced information from a number of community groups from throughout the LGA. Submissions were received from the Forster Tennis Club, Friends of Bennetts Head Reserve, Christian Patterson, and the Coomba Aquatic Club. A summary of these submissions has been provided below.

Forster Tennis Club

This club assists with and promotes the maintenance of a clean environment by:

- Recycling waste glass and aluminium cans
- Producing non-polluting wastes which are removed through Council's systems
- Maintaining a healthy vegetation cover in the environs of the courts minimising erosion and creating a haven for wildlife
- Not using fertilisers or other pollutants in its activities
- Producing clean surface water runoff
- Disposing of runoff water back into the sand strata in the surrounding grounds, thus replenishing the sub-surface water system
- Minimising the use of treated water in its activities
- Disposing negligible surface water runoff to constructed piped systems
- Maintaining playing surfaces in a clean condition so that surface water runoff is clean and wind borne erosion and dust does not occur
- Running activities so as to minimise noise pollution and light pollution.

Friends of Bennetts Head Reserve

This group has addressed environmental issues through the following activities:

- Voluntary maintenance of Bennetts head reserve
- Providing a tidy and well cared for area for the community and visitors
- Enhancement of a peaceful and greatly admired part of the Great Lakes environment.

Coomba Aquatic Club

Members of the Coomba Aquatic Club have undertaken activities to enhance the areas environment as outlined within the Coomba Foreshore Management Plan.

The Myall Koala & Environment Support Group

This association provided an overview of their environmentally related activities:

- Koala Recovery Plan – thankful for the resources Council have provided for the implementation of this plan.
- Koala Habitat Restoration – thankful for the resources allocated to providing and improving Koala habitat and the general biodiversity of the region. However it was stated that Council should communicate internally in a more adequate manner to better coordinate future planting. In addition it was suggested Council address the rabbit-problems that are impacting the success of tube stock planting.
- North Hawks Nest – generally pleased with the planning process for North Hawks Nest
- Hawks Nest Commercial Zone Investigation – reasonably pleased that Council has decided not to rezone parts of the existing Commercial Zone in Hawks Nest for residential development.
- Fame Cove Development – pleasantly surprised at the new landholders commitment to preserving the natural beauty of the area.

- Volunteer Group Liaison – impressed with Council support.
- DCP for Residential Development - concerned about the ongoing loss of vegetation due to development.
- Housing Strategy – Sees this as an opportunity to set the tone for housing within the area for years to come.
- Community values – disappointment in relation to the recent demolition approvals on a number of buildings listed in the Draft Heritage Study.

The Myall Koala & Environment Support Group also provided comments addressing the seven themes of SoE reporting. These points have been summarised below:

- Aquatic systems – very concerned with the Governments apparent strategy to foster aquaculture activities in Port Stephens prior to producing a Plan of Management for the waterway.
- Biodiversity – on the whole there are concerns over the loss of biodiversity to make way for development.
- Waste & Toxic Hazards – concerns surrounding the disposal of asbestos as a result of building demolition. Council do not adequately control asbestos disposal due to a shortage of inspection staff.
- Air Quality – no apparent issues of concern.
- Land Use – concern with regard to rezoning, clearing and development.
- Noise – no apparent issues of concern.
- Heritage – Concerns in relation to the demolition of Heritage items as outlined within Council's Draft Heritage list.

Christian Patterson

Christian has provided comment on a number of environmental issues. These have been outlined below:

- Recognised the progress is being made on the implementation of the Hawks Nest Endangered Koala Plan.
- Indicated that Council has made poor decisions in relation to environmental/development matters.
- Elected representatives have made inappropriate decisions in relation to the demolition of items of heritage significance.

The efforts of community groups within the Great Lakes LGA who conduct a number of environmental activities are of great benefit to the local environment. The dedication and involvement of these community group members is greatly appreciated.

11 Environmental Plans and Strategies

It is generally recognised that sound environmental management and the achievement of key environmental outcomes needs to be based on effective planning principles. Consequently, Great Lakes Council has developed a range of Plans and Strategies to guide natural resource management and identify/implement high priority actions across a range of natural resource management issues. This includes catchment and estuary management, urban stormwater management and threatened species recovery planning.

To date, there has been no effective mechanism with which to collate the actions identified within relevant plans and strategies and report on their achievement. This has hindered the integrated and strategic achievement of high priority actions and the means for the distribution and use of finite resources has not been based on standardised, rigorous or transparent procedures. This does not suggest that management programs have been flawed or that funds have been allocated without adequate justification, which is not the case. However, this SoE does recognise that an enhanced program can be implemented to prioritise natural resource management planning.

The State of the Environment reporting framework is an ideal vehicle in which to achieve enhanced and strategic natural resource management. One of its key aims is to report on environmental achievements, but also this revised SoE procedure is intended to formulate a holistic and strategic action plan that addresses priorities and which is incorporated in the Management Plan, budget and work plan program. These overt linkages have not been formally established within

SoE at Great Lakes Council to date. In this manner, the SoE can identify and describe the actions within relevant plans and strategies, report on achievements and outline and propose models to address priority actions within a strategic and holistic manner. In the absence of a detailed, strategic plan that summarises such actions and without a formal review and evaluation procedure, it is possible that some plans and strategies are ignored or inadequately referenced. This situation is not desirable and therefore a process to avoid the potential inability to maintain and adopt the priority actions within relevant plans and strategies is a key and over-riding objective of this State of the Environment report.

As a consequence, the relevant plans and strategies of Great Lakes Council that are active, operational and in the process of being implemented with Council as a lead agency or nominated partner include the following:

Table 23: Relevant active plans and strategies

Title of Plan/ Strategy	Author	Year	Planned Review
Wang Wauk River Catchment Land and Water Management Plan	Schneider, G	1999	-
Wallis Lake Stormwater Source Control Study	Jelliffe Environmental	1999	-
Tea Gardens, Hawks Nest and Bulahdelah Stormwater Management Plan	Jelliffe Environmental	2000	-
Port Stephens/ Myall Lakes Estuary Management Plan	Umwelt (Australia)	2000	-
Myall Catchment: Community Catchment Management Plan	Smith, P	2001	-
Smiths Lake Estuary Management Study and Management Plan	Webb McKeown & Associates	2001	-
Wallis Lake Catchment Management Plan	Great Lakes Council	2003	2006

Title of Plan/ Strategy	Author	Year	Planned Review
Lower Wallamba River Rivercare Plan	Skelton, S	2003	-
Wallis Lake Estuary Management Plan	Great Lakes Council	2004	-
Darawakh Creek and Froggalla Swamp Wetland Management Plan	WetlandCare Australia	2004	-
Approved Recovery Plan – Hawks Nest and Tea Gardens Endangered Koala Population	NSW DEC	2004	2006
Mid Wallamba River Rivercare Plan	Schneider, G	2005	-

Each identified action from the above plans and strategies has been summarised within a spreadsheet for the previous SoE. This previous review identified an extraordinary number of actions that are listed within operational plans and strategies within the Great Lakes LGA. Some of these actions have been completed and others have been commenced. Other actions remain outstanding, even though the scheduled timeframe from the original report has lapsed.

This SoE report recognises that considerable achievements and progress with regards to specific and general natural resource management has been achieved by Great Lakes Council since 1997 and particularly since the establishment of the Environmental Special Rate. Such achievements have included the preparation and adoption of key environmental plans and strategies that aim to address key issues and guide strategic and prioritised management. However, there is a clear need to capitalise on these achievements and re-evaluate the overall natural resource management systems and strategies to identify gaps and priorities. Furthermore, there is need to consider the management systems for natural resource management and the key strategic alliances and determine areas of improvement such that an effective and constantly evolving program is implemented.

Consequently, with regard to relevant plans and actions specifically, and natural resource management systems generally, this SoE makes the following key recommendations:

Relevant working groups should be convened as a matter of priority to evaluate the actions within each of the operational plans and strategies of Council. The group(s) should identify those actions that have been successfully commenced or completed and subsequently attempt to re-prioritise the outstanding actions, with revised schedules of implementation. In this manner, the plans shall remain applicable and current. Further, at a higher level, the groups should evaluate the currency of each plan and determine whether wider-scale revision, re-evaluation or complete updating of plans is required. This would be particularly relevant for the plans that pre-date 2002.

The SoE report should clearly identify those actions commenced or completed from operational plans and strategies during the reporting period on an annual basis. Consequently, each SoE report would indicate and describe the progress of action plans and delivery of environmental programs and projects.

The SoE recognises that it is time for substantial evaluation and reflection on the natural resource management systems generally. Consequently, it recognises that a separate working group should be convened, comprising relevant Council staff and councillors along with representatives of relevant agencies and the community. This working group should review Council's natural resource management systems generally and provide recommendations in relation to gaps, priorities, future directions and key achievements. The group should provide for the consolidation of past programs and provide a series of

recommendations for future management systems and priorities such that holistic, targeted, innovative and best practice environmental management solutions can be adopted at Great Lakes Council. Such a review and overhaul would maintain the freshness and vigour of Council's programs and processes and ensure continual improvement. Without such a review and analysis, programs may stagnate or be diverted away from key, identified priorities. Obviously, this review should be based on the findings and outcomes of this SoE report, with specific reference to the outcomes of the key environmental indicators. Further, the results of the community survey should be considered as this outlines those key aspects of environmental management that are important to the Great Lakes community. The outcomes of this working group should be reflected in the management systems of Great Lakes Council and be reported in subsequent SoE reports.

The collation of the original actions within relevant and operational plans and strategies in the previous SoE was a rewarding and effective process. The adoption of the recommendations above would ensure that integrated, proactive and holistic responses to key environmental issues are adopted and that overall natural resource management remains responsive, appropriate and meaningful. It also considers and incorporates scientific and community perspective's within the adoption of priorities and programs across the LGA. For this reason, a high priority should be given to the implementation of the recommendations arising from this analysis during the subsequent reporting period.

12 Acronyms & Abbreviations

DEC	Department of Environment and Conservation
GLC	Great Lakes Council
NPWS	National Park and Wildlife Service
GIS	Geographic Information System
DIPNR	Department of Infrastructure Planning and Natural Resources
SoE	State of the Environment
LGA	Local Government Area
DPI	Department of Primary Industries
NSW	New South Wales
ESD	Ecologically Sustainable Development
HRC	Healthy Rivers Commission
POEO Act	Protection of the Environment Operations Act
GLWQMS	Great Lakes Water Quality Monitoring
NSWSP	NSW Shellfish Program
GPT	Gross Pollutant Trap
PSR	Pressure – State – Response
OECD	Organisation for Economic Corporation and Development
GTCC	Greater Taree City Council
DNR	Department of Natural Resources
MCW	MidCoast Water
LEP	Local Environment Plan

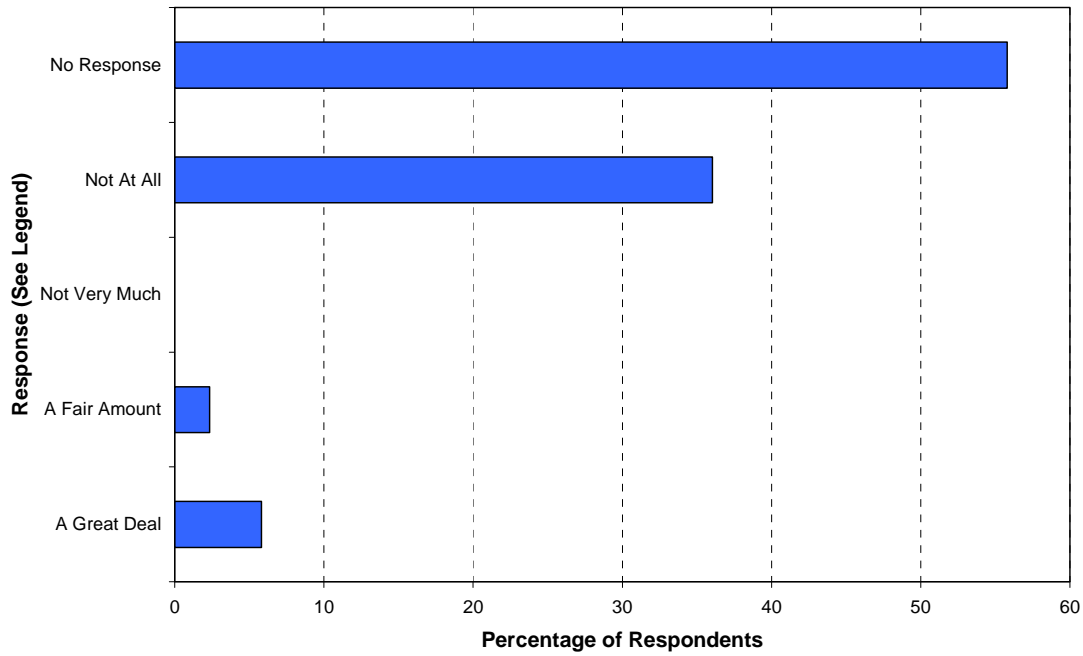
13 Appendix

Appendix 1: Noxious Weed List

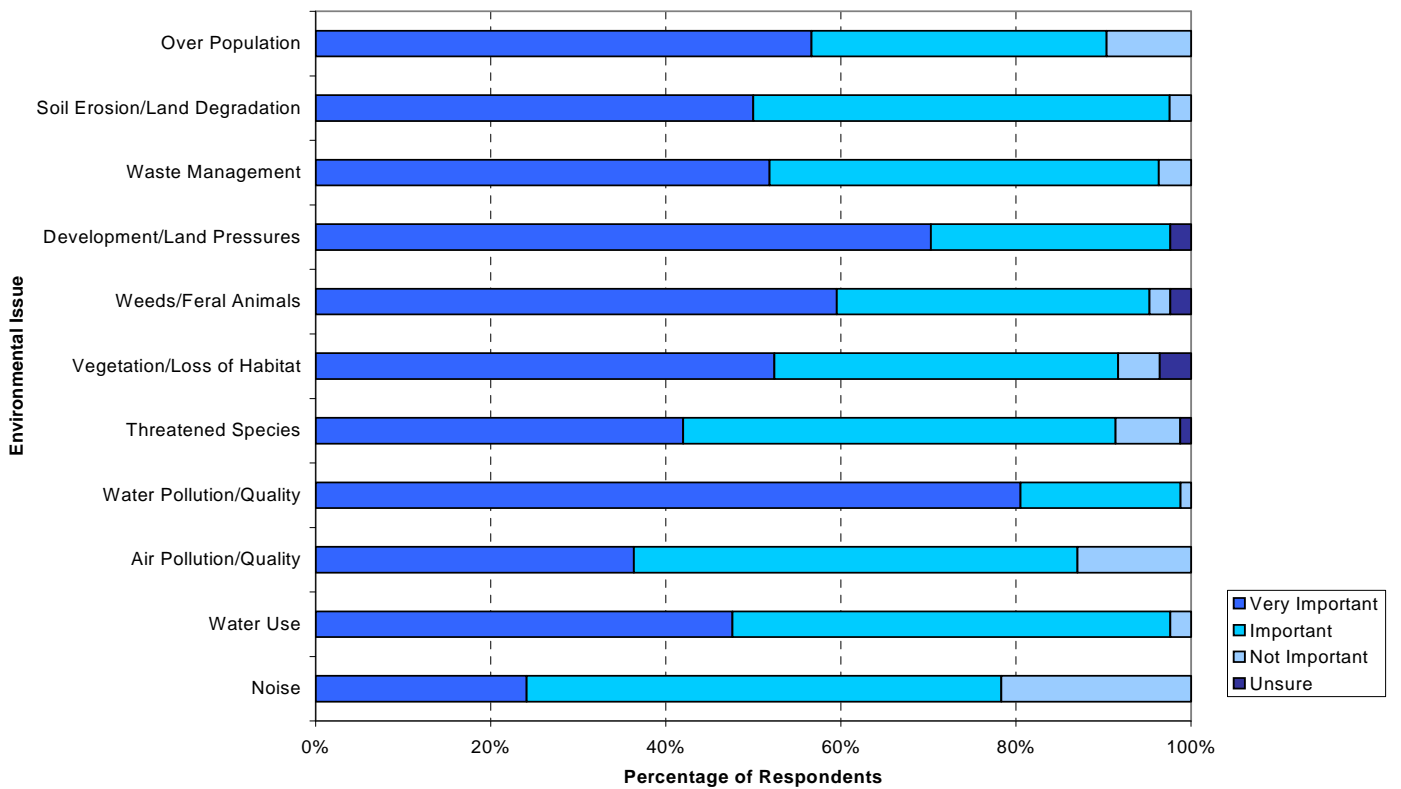
Common Name	Botanical Name
Aquatic Weeds	
Alligator weed	<i>Alternanthera philoxeroides</i>
Cabomba (except pink Cabomba)	<i>Cabomba</i> spp. except <i>Cabomba furcata</i>
Lagarosiphon	<i>Lagarosiphon major</i>
Salvinia	<i>Salvinia molesta</i>
Water hyacinth	<i>Eichornia crassipes</i>
Water lettuce	<i>Pistia stratiotes</i>
Terrestrial Weeds	
African boxthorn	<i>Lycium ferocissimum</i>
*Bathurst/Noogora/Californian/Cockle burrs	<i>Xanthium</i> spp.
Bitou bush/Boneseed	<i>Chrysanthemoides monilifera</i>
Blackberry	<i>Rubus fruticosus</i> (agg sup)
*Cape tulips	<i>Homeria</i> spp.
*Columbus grass	<i>Sorghum x almum</i>
*Crofton weed	<i>Ageratina adenophora</i>
Dodder	<i>Cuscuta campestris</i>
Giant Parramatta grass	<i>Sporobolus indicus</i> var. <i>major</i>
Giant rats tail grass	<i>Sporobolus pyramidalis</i>
*Green cestrum	<i>Cestrum parqui</i>
Groundsel bush	<i>Baccharis halimifolia</i>
Harrisia cactus	<i>Harrisia</i> spp.
Hawk weeds	<i>Hieracium</i> spp.
Horsetail	<i>Equisetum</i> spp.
*Johnson grass	<i>Sorghum halepense</i>
Karoo Thorn	<i>Acacia Karoo</i>
Kochia	<i>Kochia scoparia</i>
*Lantana (red flowered)	<i>Lantana camara</i>
*Mintweed	<i>Salvia reflexa</i>
Mistflower	<i>Ageratina riparia</i>
*Mother-of-millions	<i>Bryophyllum delagoense</i>
Nodding thistle	<i>Carduus nutans</i>
Pampas grass	<i>Cortaderia</i> spp.
*Parthenium weed	<i>Parthenium hysterophorus</i>
*Paterson's curse, Vipers/Italian bugloss	<i>Echium</i> spp.
Prickly pears	<i>Opuntia</i> spp. Except <i>O. ficus indica</i>
*Rhus tree	<i>Toxicodendron succedaneum</i>
Scotch/English broom	<i>Cytisus scoparius</i>
Senegal Tea Plant	<i>Gymnocoronis spilanthoides</i>
Serrated tussock	<i>Nassella trichotoma</i>
Siam weed	<i>Chromolaena odorata</i>
Spiny burgrass	<i>Cenchrus incertus</i>
Spiny emex	<i>Emex australis</i>
*St Johns wort	<i>Hypericum perforatum</i>
Tree of heaven	<i>Ailanthus altissima</i>
Willows	<i>Salix</i> spp. Exe <i>S. babylonica</i> , <i>S. reichardtii</i> and <i>S. calodendron</i>

Appendix 2: Community Survey, “Who Cares About the Great Lakes Environment” Results

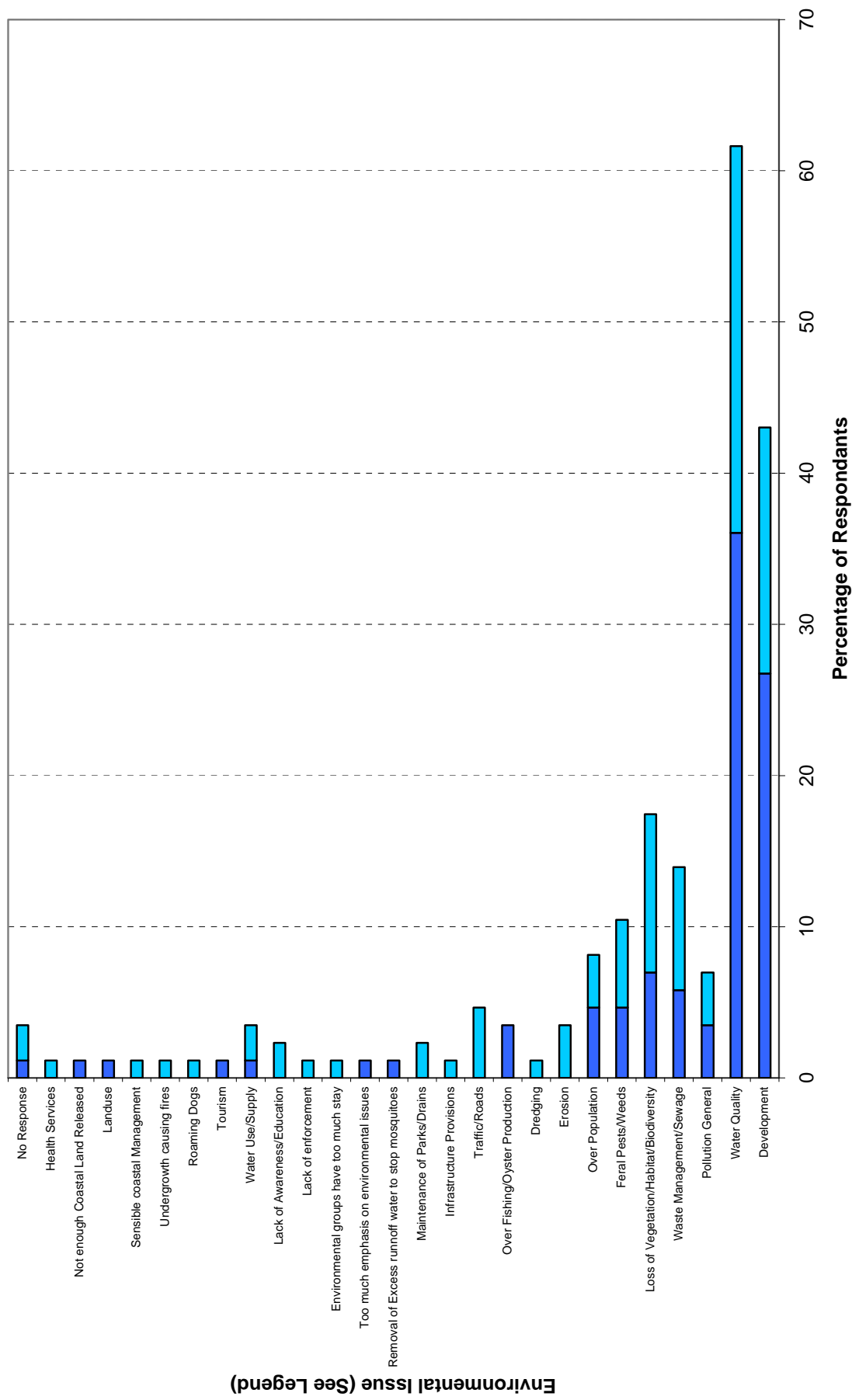
Question 1: In general, how concerned are you about environmental problems in the Great Lakes?



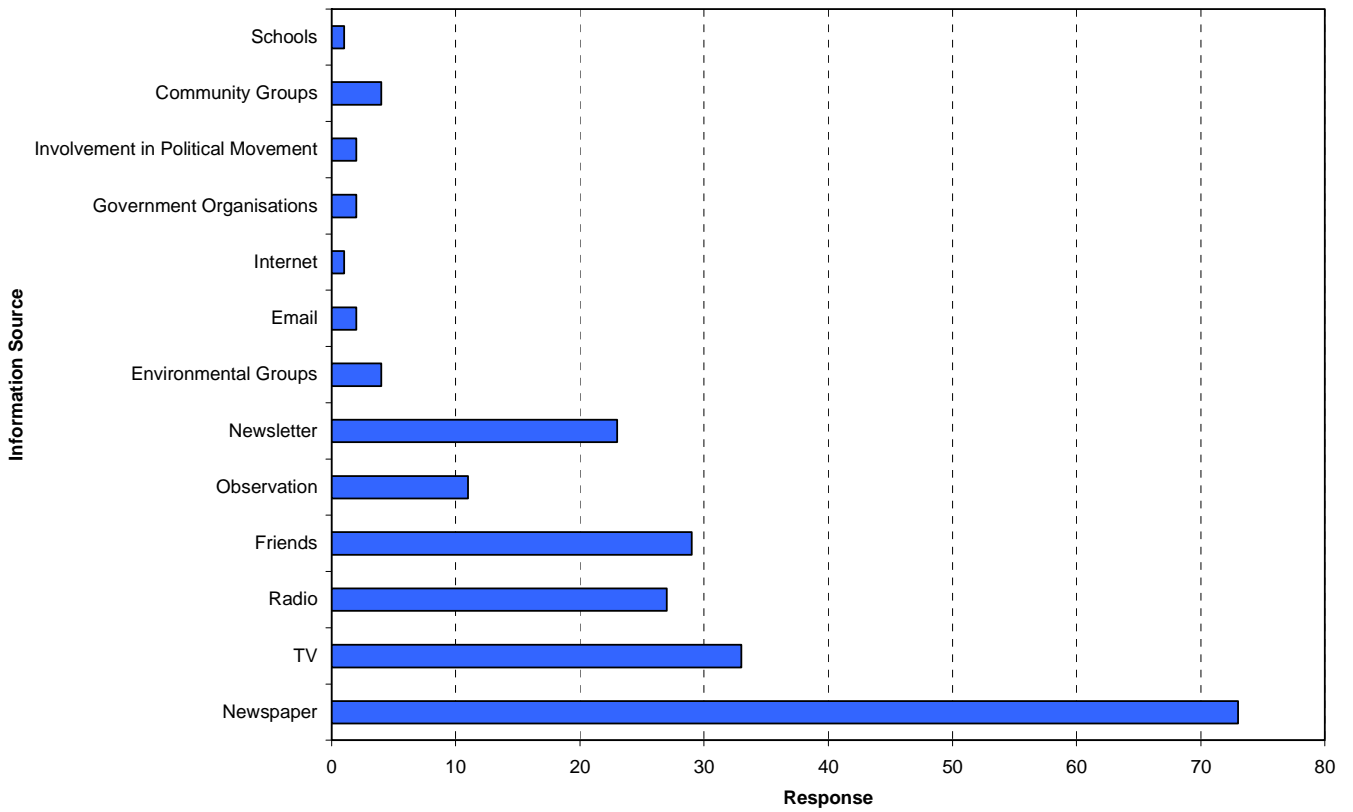
Question 4: How would you rate the following list of environmental issues in the Great Lakes?



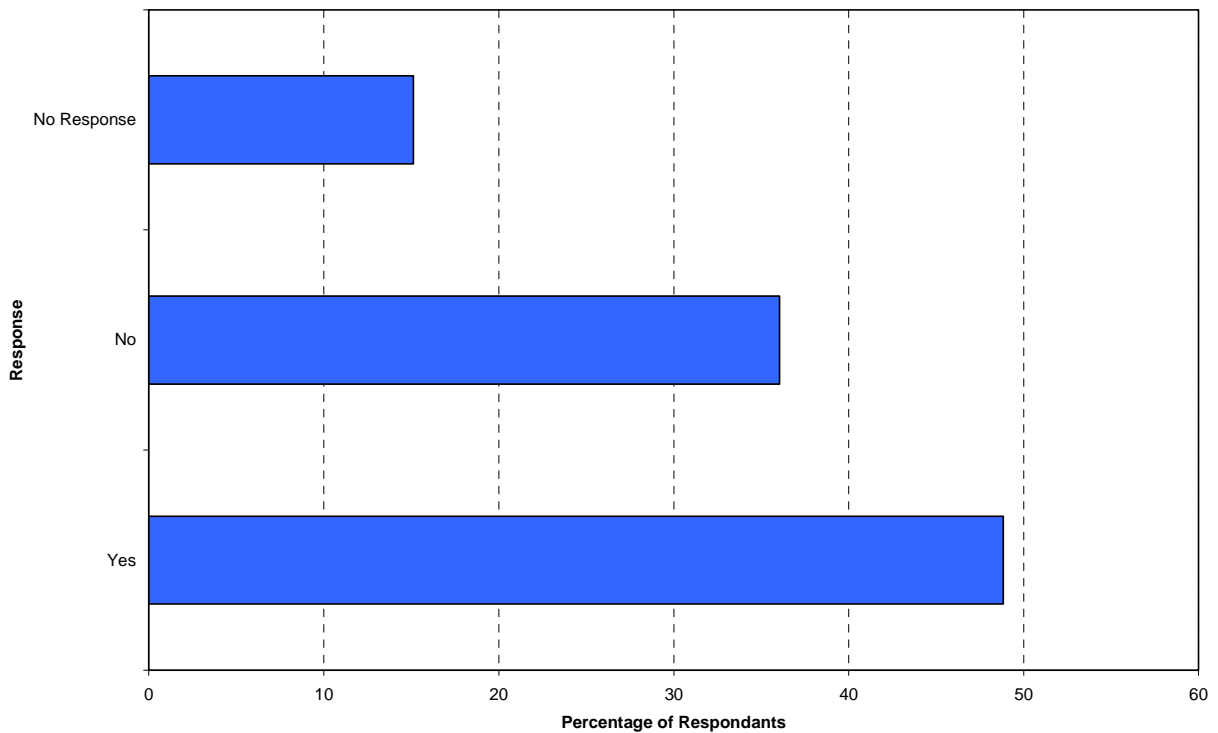
Question 2 and 3: What would you say is the single most important environmental issue within the Great Lakes today? And the second most important environmental issue in the Great Lakes?



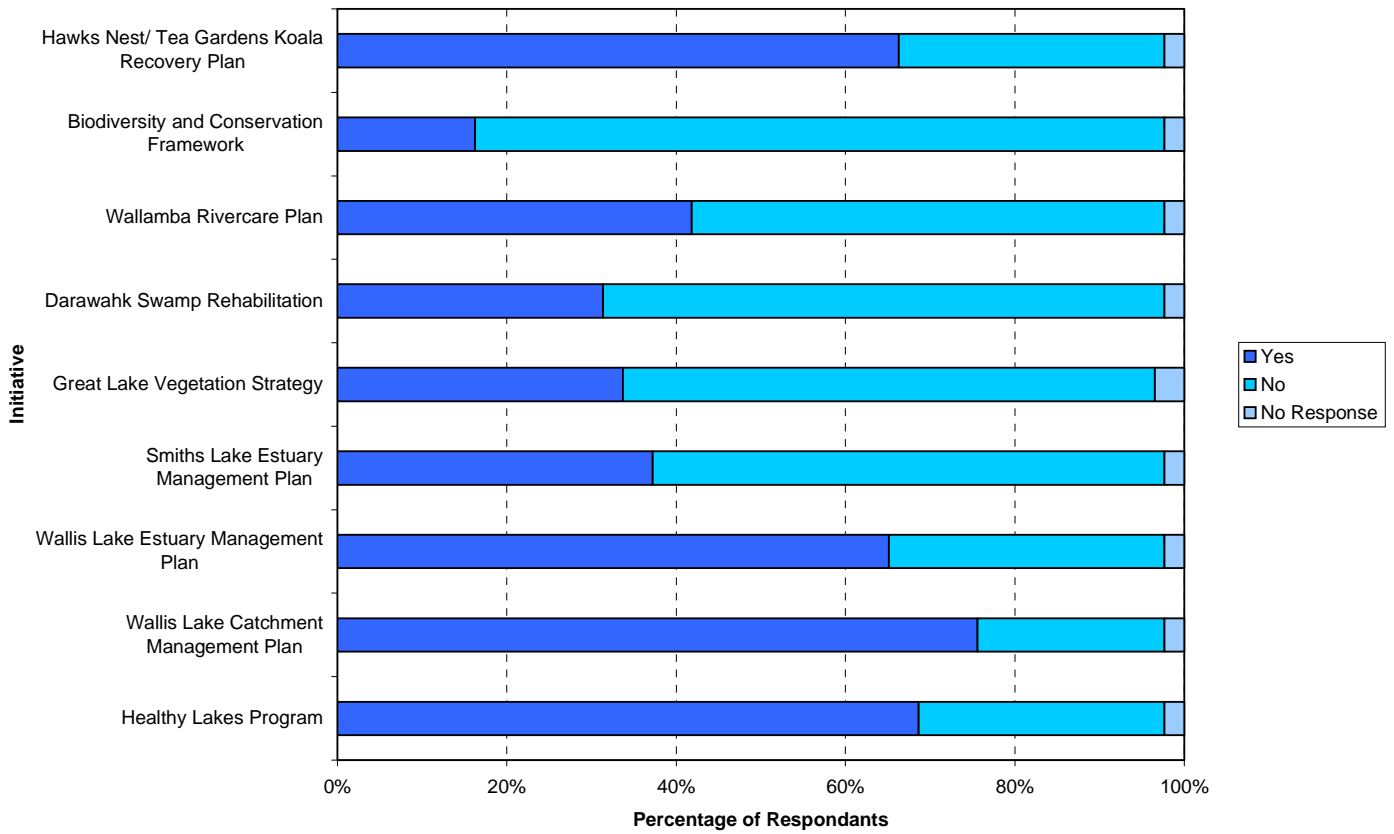
Question 5: What is your main source of information about environmental issues in the Great Lakes?



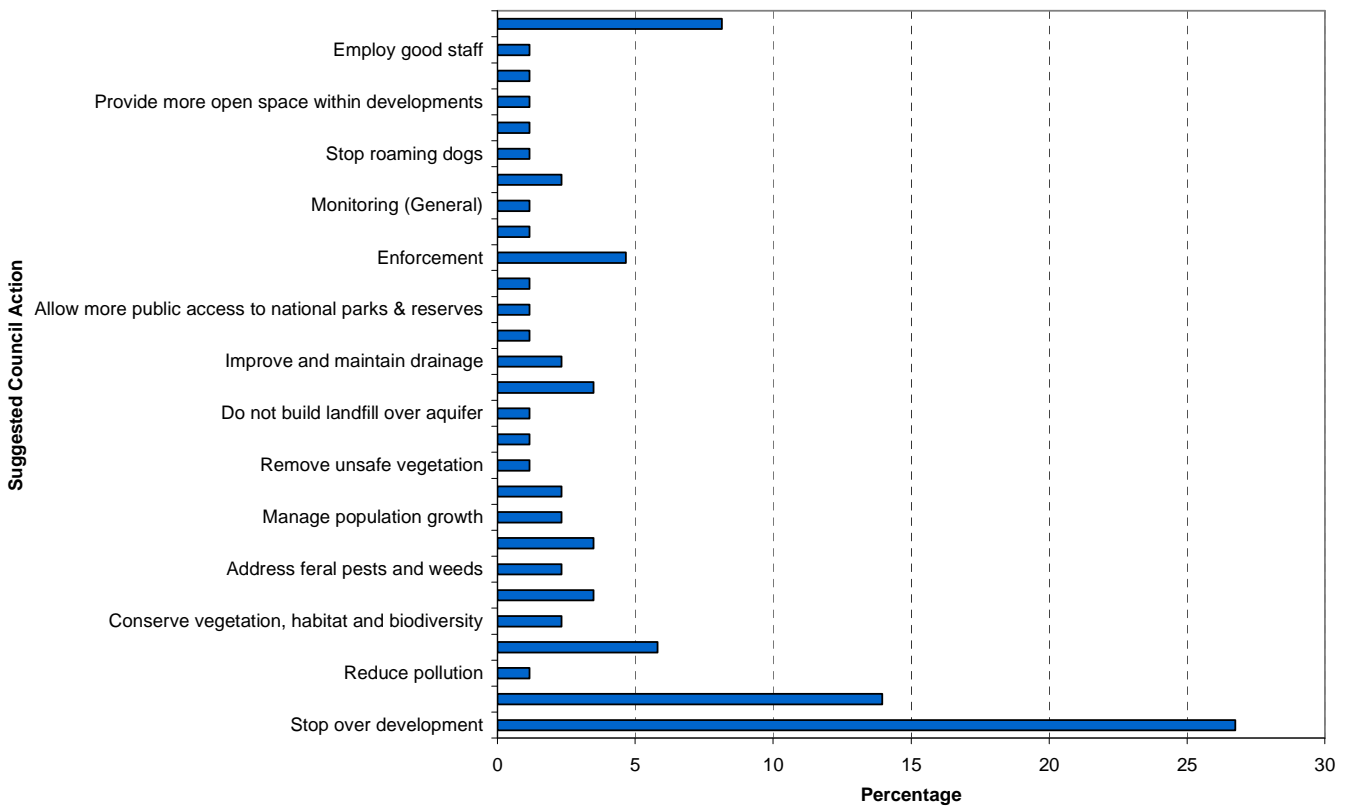
Question 6: In the past twelve (12) months have you changed your behaviour in any way for environmental reasons and how?



Question 7: Have you heard of any of a range of Great Lakes Council environmental initiatives?



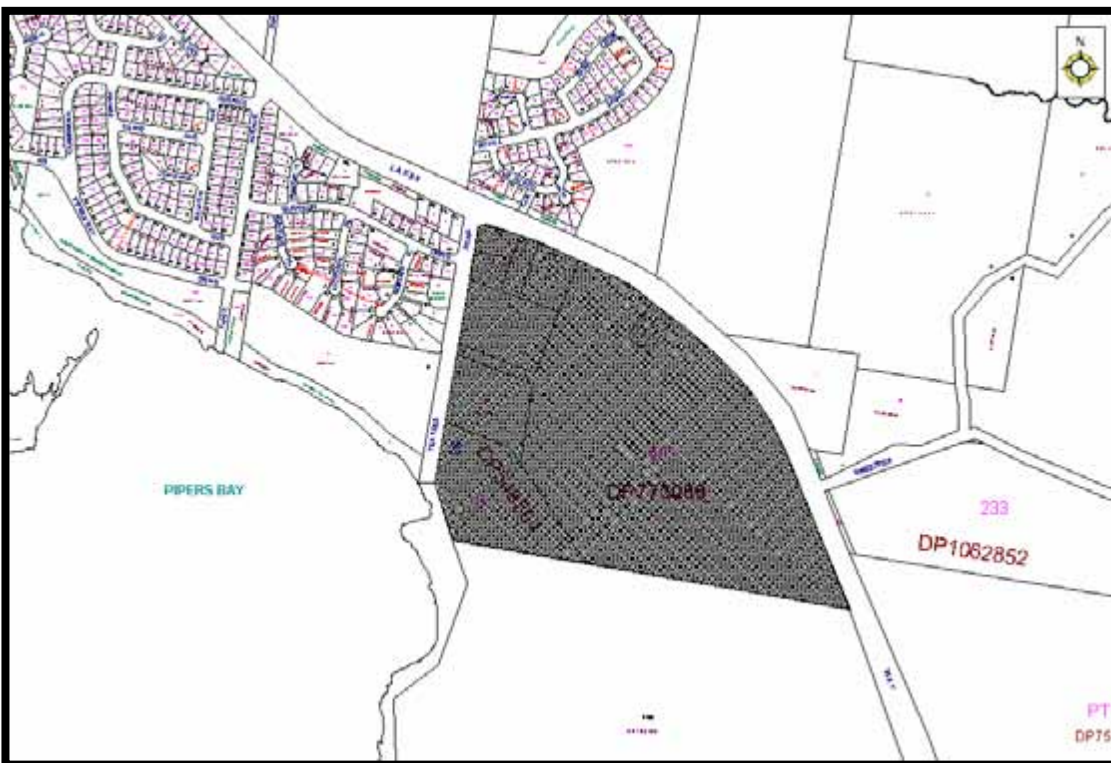
Question 8: What would you say is the single most important thing that Great Lakes Council could do to protect the environment over the next few years?



Appendix 3: LEP Amendment Maps



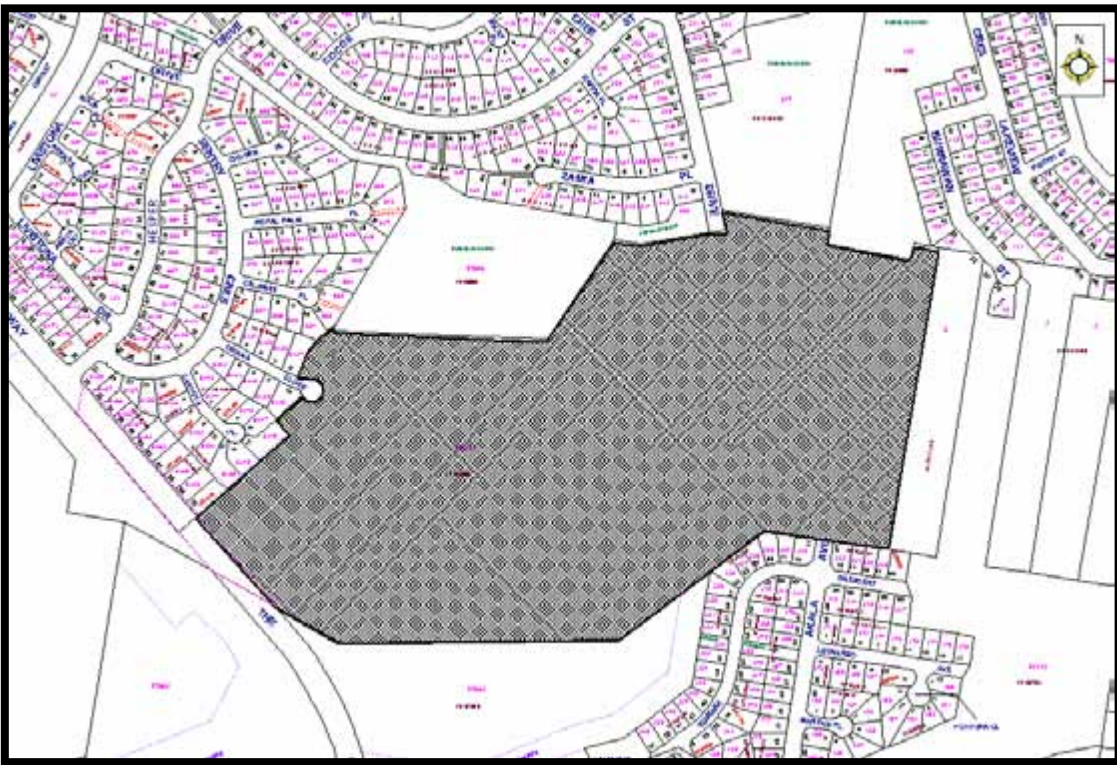
MAP A: LEP AMENDMENT NO. 45 -SOUTH FORSTER (SEVEN MILE BEACH)



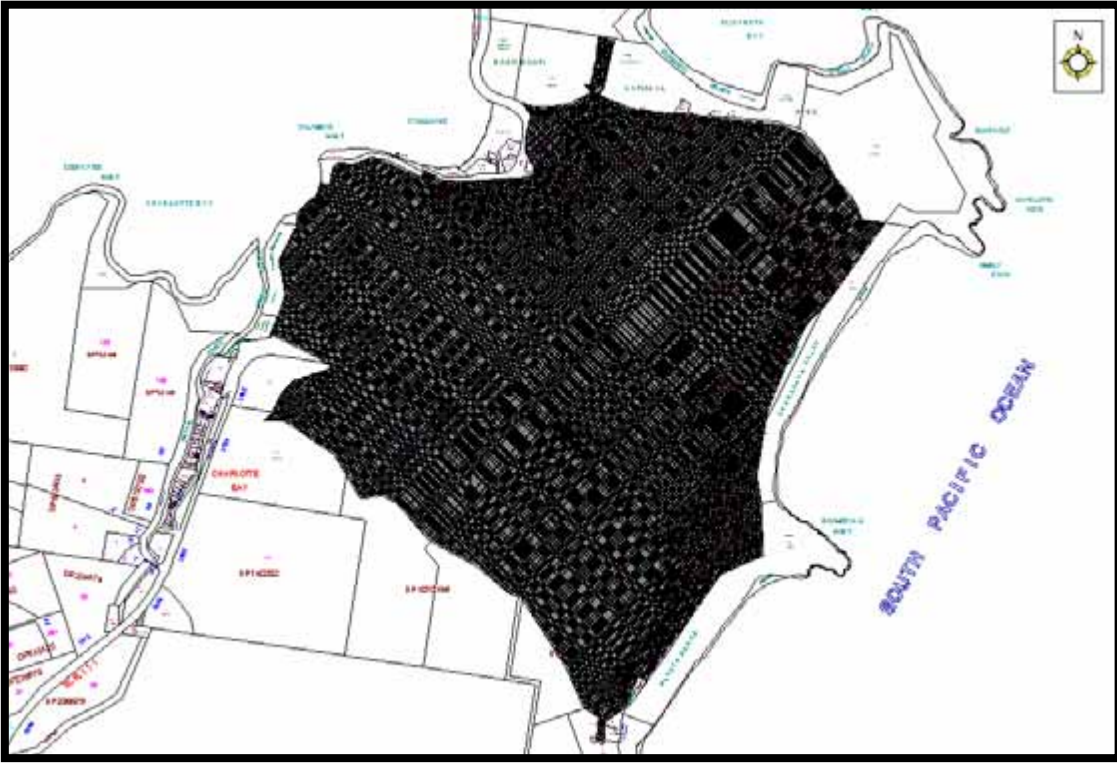
MAP B: LEP AMENDMENT NO. 46 -SOUTH FORSETR (FOLLY FOOT FARM)



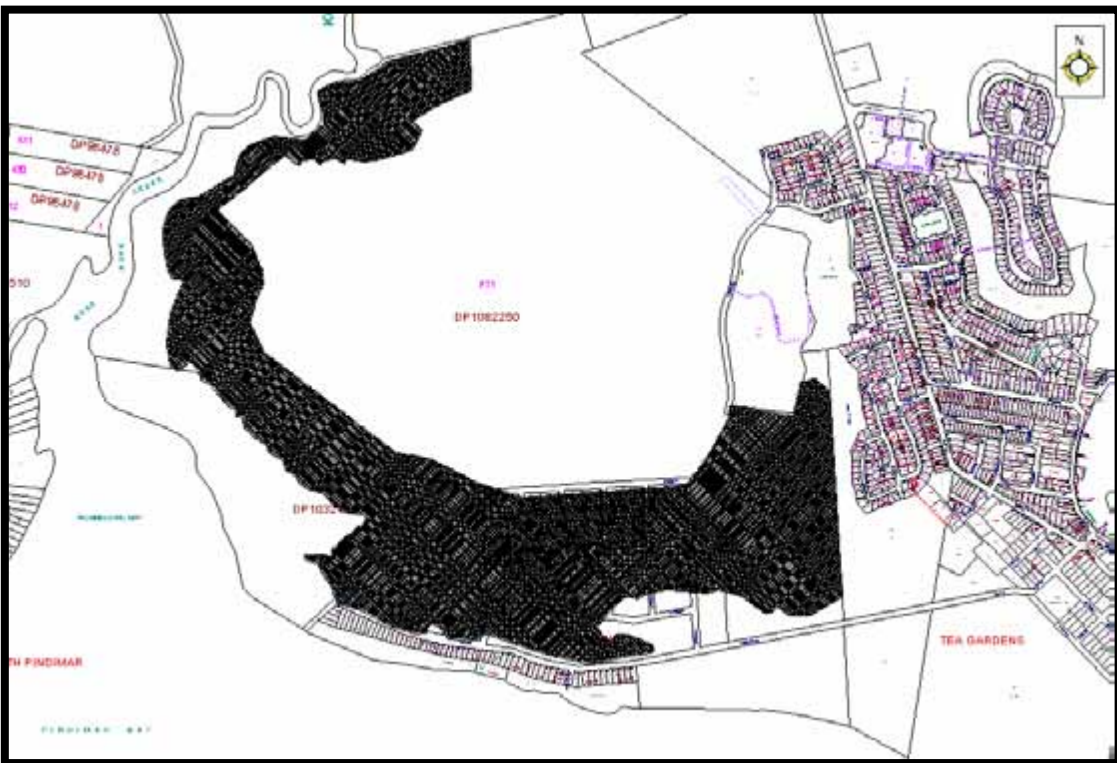
MAP C: LEP AMENDMENT NO. 47 -SMITH LAKE (MACWOOD ROAD)



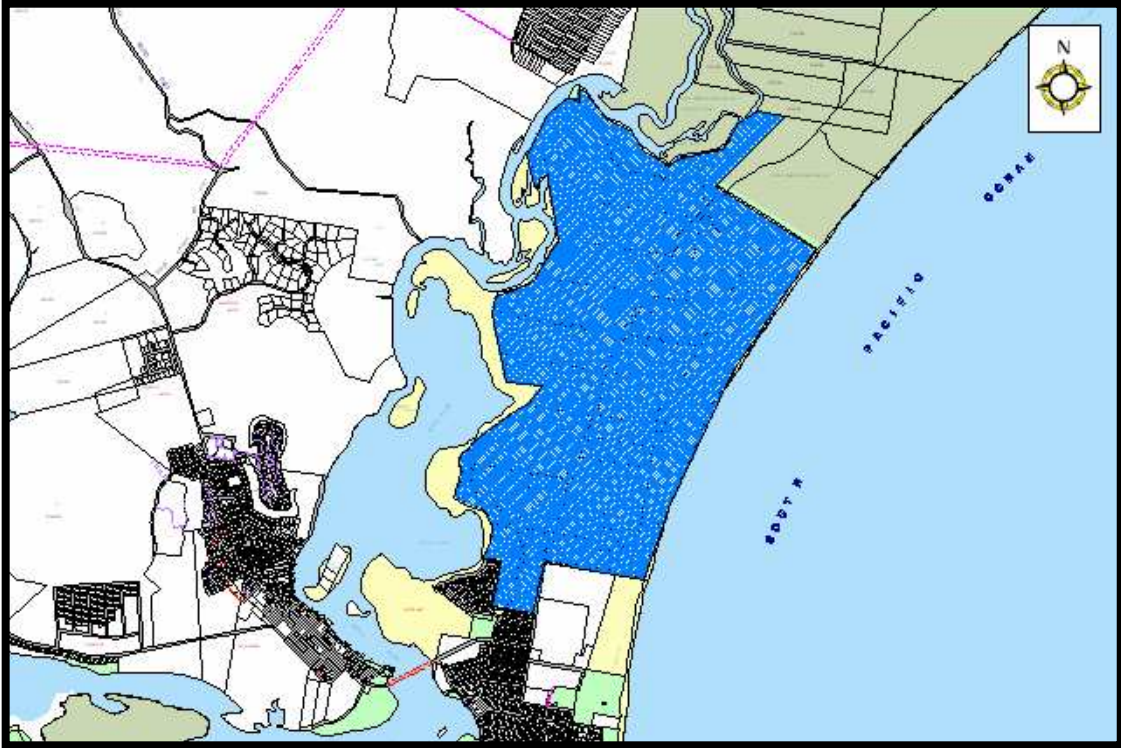
MAP D: LEP AMENDMENT NO. 36 -FORSTER (THE SOUTHERN PARKWAY)



MAP E: LEP AMENDMENT NO. 13 - PACIFIC PALMS



MAP F: LEP AMENDMENT NO. 44 - TEA GARDENS (MYALL RIVER DOWNS)



MAP G: LEP AMENDMENT NO. 27 & 50 - NORTH HAWKS NEST