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Contents

ACRONYMS AND GLOSSARY4

EXECUTIVE SUMMARY13

1. INTRODUCTION14

1.1 WHAT IS BIODIVERSITY? 14

1.2 GOULBURN MULWAREE COUNCIL AREA..... 15

1.3 AIM OF THE STRATEGY 17

1.4 OUTCOMES OF THE STRATEGY 17

1.5 HOW TO USE THIS STRATEGY 18

1.6 WHAT IS NOT IN THIS STRATEGY? 19

2. STATUTORY FRAMEWORK20

2.1 COMMONWEALTH LEGISLATION20

2.1.1 *The Commonwealth Environment Protection and Biodiversity Conservation Act, 1999.*20

2.2 STATE LEGISLATION21

2.2.1 *Environmental Planning and Assessment Act 1979*21

2.2.2 *Threatened Species Conservation Act 1995*21

2.2.3 *Native Vegetation Act 2003*.....22

2.2.4 *Fisheries Management Act 1994*.....23

2.2.5 *Local Government Act 1993*23

2.2.6 *Catchment Management Act 2003*23

2.2.7 *Other relevant legislation*.....23

2.3 STATE AND REGIONAL POLICIES AND PLANS.....24

2.3.1 *SEPP No. 44 - Koala Habitat Protection*.....24

2.3.2 *Drinking Water Catchments Regional Environmental Plan No. 1*24

2.3.3 *Catchment Action Plans*.....25

2.4 LOCAL PLANNING INSTRUMENTS25

2.4.1 *New LEP guidelines*25

2.4.2 *Local Environmental Plan (LEP)*25

2.4.3 *Development Control Plans (DCPs)*.....25

2.4.4 *Biodiversity certification*26

2.5 OTHER POLICIES26

2.5.1 *National Strategy for the Conservation of Australia's Biological Diversity (1996)* 26

2.5.2 *National Objectives and Targets for Biodiversity Conservation*27

2.5.3 *National Forest Policy Statement*.....27

2.5.4 *Intergovernmental Agreement on the Environment (IGAE)*.....27

2.5.5 *International agreements and conventions*.....28

2.5.6 *State Biodiversity Strategy*.....28

2.5.7 *NSW State- Wide Targets for Natural Resource Management*28

2.5.8 *National Local Government Biodiversity Strategy (1998)*29

3. BIODIVERSITY IN GOULBURN MULWAREE31

3.2 ECOLOGICAL VALUE32

3.2.1 *International*32

3.2.3 *State*33

3.2.4 *Regional*33

3.2.5 *Local*.....33

4.	THREATS TO BIODIVERSITY IN GOULBURN MULWAREE	34
4.1	KEY THREATENING PROCESSES.....	34
4.1.1	<i>Commonwealth</i>	34
4.1.1	<i>NSW</i>	35
4.2	OTHER THREATS	36
4.2.1	<i>Noxious and environmental weeds</i>	36
4.2.2	<i>Feral animals</i>	37
4.2.3	<i>Land Clearing</i>	37
4.2.4	<i>Fire Regimes</i>	38
4.2.5	<i>Other threats</i>	38
5.	DATA AUDIT	39
6.	VEGETATION MAPPING	44
6.1	METHOD.....	44
6.2	LIMITATIONS	45
7.	CONSERVATION SIGNIFICANCE ASSESSMENT OF TERRESTRIAL VEGETATION	46
7.1	PRINCIPLES.....	46
7.2	METHODS	46
7.3	CONSERVATION CATEGORIES	47
7.4	LIMITATIONS OF THIS APPROACH	49
7.5	RESULTS.....	50
8.	TARGETS FOR GOULBURN MULWAREE	51
8.1	INTRODUCTION.....	51
8.1.1	<i>What is a Target?</i>	51
8.2	POLICY FRAMEWORK FOR BIODIVERSITY TARGETS	52
8.2.1	<i>Commonwealth</i>	52
8.2.2	<i>State</i>	54
8.2.3	<i>Regional</i>	55
8.2.4	<i>Local Catchment</i>	56
8.3	GOULBURN MULWAREE BIODIVERSITY STRATEGY TARGETS	59
9.	STRATEGIC PLANNING	61
9.1	ZONING.....	61
9.2	SPECIAL ASSESSMENT OF ECOLOGICALLY SENSITIVE LAND.....	63
9.2.1	<i>High Conservation Values (sensitive areas)</i>	64
9.2.2	<i>Medium Conservation Value</i>	65
9.2.3	<i>Low Conservation Value</i>	65
9.2.4	<i>Riparian Corridors and Wetland buffers</i>	66
9.2.5	<i>Regional Corridors</i>	68
9.3	CLARIFICATION OF TERMS	68
9.4	BIOCERTIFICATION	69
10.	INFORMATION AND RESEARCH	70
10.1	INFORMATION	70
	PRIORITIES.....	70
10.2	RESEARCH.....	71
	PRIORITIES.....	71
11.	COUNCIL MANAGEMENT	72

11.1	COUNCIL POLICES	72
11.2	DEVELOPMENT APPROVAL	73
11.3	COUNCIL OWNED LAND	74
11.4	COUNCIL PROGRAMS	75
11.5	PEST SPECIES	76
11.6	FIRE	77
12.	EDUCATION, COMMUNITY AND REGIONAL PARTNERSHIPS	78
12.1	EDUCATION (COUNCIL)	78
12.2	COMMUNITY AND REGIONAL PARTNERSHIPS	79
12.3	REVIEW OF COUNCIL FUNCTIONS AND RESPONSIBILITIES.....	80
12.4	PRIORITISATION OF STRATEGIES	80
13.	SUMMARY	81
14.	REFERENCES	82

APPENDICES (VOLUME 2)

Acronyms and Glossary**Acronyms**

AA	Activity Approval
APZ	Asset Protection Zone
CA	Conservation Agreement
CAMBA	China-Australia Migratory Bird Agreement
CAR	Comprehensive Adequate Representative, referring to criteria for reserve system under JANIS
CAP	Catchment Action Plan
CMA	Catchment Management Authority
CRA	Comprehensive Regional Assessment
CSIRO	Commonwealth Scientific & Industrial Research Organisation
DA	Development Approval
DCP	Development Control Plan
DECC	Department of Environment and Climate Change
DNR	Formerly the Department of Natural Resources
DIPNR	Department of Infrastructure, Planning and Natural Resources (replaced by DNR and Department of Planning in August 2005, replaced by DECC and DWS 2007)
EEC	Endangered Ecological Community listed under the NSW <i>TSC Act</i> or the Commonwealth <i>EPBC Act</i>
EPA	Environmental Protection Authority
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act, 1999</i>
EPI	Environmental Planning Instrument

ESD	Ecologically Sustainable Development
ESL	Environmentally Significant Lands
GIS	Geographic Information System
HCV	High Conservation Value
IBRA	Interim Biogeographic Regionalisation for Australia
JAMBA	Japan-Australia Migratory Bird Agreement
JANIS	Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee
LEP	Local Environment Plan
LCV	Low Conservation Value
LGA	Local Government Area
MCV	Medium Conservation Value
NES	(Matter of) National Environmental Significance
NPWS	New South Wales National Parks and Wildlife Service
NRC	Natural Resource Commission
NRM	Natural Resource Management
NV Act	NSW <i>Native Vegetation Act 2003</i>
P5MA	Priority 5 Mapping Area
POM	Plan of Management
RAMA	Routine Agricultural Management Activities
REF	Review of Environmental Factors
REP	Regional Environment Plan
RLPB	Rural Lands Protection Board
RTA	Roads and Traffic Authority
SEE	Statement of Environmental Effects
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
SOE	State of the Environment Report
TSC Act	NSW <i>Threatened Species Conservation Act, 1995</i>

Glossary

Baseline information is information relating to a specific time or defined place, from which trends or changes can be assessed or to which they can be related.

BioBanking Biodiversity Banking and Offsets Scheme under the *Threatened Species Conservation Amendment (Biodiversity Banking) Act 2006*. Allows 'biodiversity credits' to be generated by landowners. Developers can buy these credits and use them to counterbalance (offset) the impacts on biodiversity values that are likely to occur as a result of development. The scheme is currently under development with implementation expected in mid 2007.

Biodiversity (biological diversity) is the variety of life: the different plants, animals and microorganisms, the genes they contain and the ecosystem of which they form a part. The concept is often considered at genetic, species and ecosystem levels. It is a reflection and essential part of the operation of ecological processes. Whilst some ecosystems are naturally more diverse than others, the amount of diversity does not necessarily directly relate to conservation value or management. Conservation of

biodiversity is a fundamental principle of ecologically sustainable development.
Bioregion (or biogeographic region) is a region in which the boundaries are primarily determined by (or reflect) similarities in geology, climate and vegetation.
Bush regeneration means the rehabilitation of bushland from a weed-infested or otherwise degraded plant community to a healthy community composed of native species. Natural regeneration relies on natural germination and resprouting of plants, and focuses on weed removal, management of disturbance and the maintenance of natural processes. It does not normally include replanting of vegetation. Assisted regeneration uses natural regeneration, but also includes intervention actions such as site replanting with locally indigenous seed or plant material derived from the locality (or other similar plant communities to that occurring on the site), or controlled management of disturbance.
Bushland is land on which there is vegetation which is either a remainder of the natural vegetation of the land, or, if altered, is still representative of the structure and floristics of the natural vegetation. Bushland may include regrowth. At any one time some species may only be present as seeds in the soil.
Catchment is the entire area of land drained by a river and its tributaries.
Communities An integrated group of species inhabiting a given area; the organisms within a community influence one another's distribution, abundance, and evolution.
Clearing native vegetation has the same meaning as in the <i>Native Vegetation Act 2003</i> and means any one or more of the following: (a) cutting down, felling, thinning, logging or removing native vegetation, (b) killing, destroying, poisoning, ringbarking, uprooting or burning native vegetation. (See Division 3 of Part 3 of the Native Vegetation Act 2003 for the exclusion of routine agricultural management activities (RAMAs) from constituting the clearing of native vegetation if the landholder can establish that any clearing was carried out for the purpose of those activities.)
Connectivity is a measure of the degree of interconnection of habitat for a particular species.
Conservation is one of the approaches to ecosystem management. It aims to maintain the continuity of a system, with or without change and refers to the process and actions of looking after a place so as to retain its natural significance. Conservation includes protection, maintenance and monitoring.
Corridors are linear landscape features that connect two or more, larger habitat patches, allowing either movement of individuals, or gene-flow among native fauna and flora.
Covenant is a restriction on the use of land recorded on the property title and binding on successive owners. Covenants may be 'negative' (imposing restrictions) or 'positive' (imposing positive obligations).

<p>Critical habitat refers to habitat that is critical to the survival of endangered species, populations or ecological communities. Part 3 of the <i>Threatened Species Conservation Act 1995</i> and Part 7A of the <i>Fisheries Management Act 1994</i> provides for areas of critical habitat to be formally declared.</p>
<p>Cumulative impacts refers to impacts resulting from a multitude of developments or activities, and their interactions in space and time.</p>
<p>Data are raw numbers or other uninterpreted descriptive material.</p>
<p>Database is a collection of data or information. The term is often used to refer to data or information held in a computer.</p>
<p>Design means responding to a set of criteria, constraints and opportunities and achieving a desired outcome. It is a futures-oriented process for making meaningful order.</p>
<p>Development is defined by the Environmental Planning and Assessment Act 1979. It means the use of land, the subdivision of land, the erection of a building, the carrying out of a work, the demolition of a building or work, or any other act, matter or thing controlled by an environmental planning instrument.</p>
<p>Ecological community (or community) is an assemblage of species occupying a particular area. 'Endangered ecological community' is defined under the NSW <i>Threatened Species Conservation Act 1995</i> and the Commonwealth <i>Environment Protection and Biodiversity Conservation Act, 1999</i>.</p>
<p>Ecological processes are processes that play an essential role in maintaining the integrity and continuity of an ecosystem. Important ecological processes are water and nutrient cycling, the flow of energy, and evolution by natural selection.</p>
<p>Ecologically sustainable development (ESD) refers to development that uses, conserves and enhances 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. It is defined in NSW legislation in terms of the application of principles adopted by the Intergovernmental Agreement on the Environment. These principles relate to precautionary decision-making, intergenerational equity, conservation of biodiversity and valuation of resources.</p>
<p>Ecosystem is a dynamic complex of plant, animal, fungal and microorganism communities and associated non-living environment interacting as an ecological unit.</p>
<p>Endangered Ecological Communities An ecological community (made up of a group of living organisms) listed in Schedule 1 of the NSW TSC Act 1995.</p>
<p>Endemic species Those species that are native to a certain region with restricted distributions and within in restricted range. Outside that restricted range (such as an ecosystem island, or within country boundaries) an endemic species is found nowhere else on earth</p>
<p>Environment The combination of external conditions (both natural and non natural)</p>

that influence the life of individual organisms.
Environmental weed is a plant that spreads and invades native vegetation.
Environmentally sensitive lands that have been marked on a layer of the draft Goulburn Mulwaree Council LEP as High Conservation Value.
Escarpment refers to a steep slope or long cliff that results from erosion or faulting and separates two relatively level areas of differing elevations.
Fauna means animals (including both vertebrates and invertebrates).
Fire regime refers to the history of fire at a particular place, referring to frequency, intensity and season of burning.
Fragmentation is the process of progressive loss and isolation of habitat.
Goal is a statement of value to be pursued. It is usually stated in a general (and unmeasurable) form. Goals are sometimes referred to as aims.
Habitat corridor is an area of habitat that enables migration, colonisation and interbreeding of plants and animals between two or more larger areas of habitat. Habitat corridors may be continuous, and may also consist in whole or part of a sequence of discontinuous areas of habitat (such as feeding trees, caves, wetlands and roadside vegetation).
Habitat means the structural environments where an organism lives for all or part of its life, including environments once occupied (continuously, periodically or occasionally) by an organism or group of organisms, and into which organisms of that kind have the potential to be reinstated.
Habitat loss is the removal of vegetation (as opposed to logging, etc).
Habitat value refers to the extent to which an area is capable of supporting large numbers of a range of species. Habitat value is related to the extent of vegetation diversity (both species and structure), and the availability of resources such as nesting places, food and protection from predators, as required by each species present.
High Conservation Value (HCV) Land that has high biodiversity significance (also known as environmentally sensitive land meeting any of the specified HCV criteria listed for Goulburn Mulwaree LGA in Table 6 of this report.
Infiltration the process of water entering a hard surface through openings or pores.
Introduced species is a species that is not locally indigenous.
Issue is a point in question or dispute. It is an expression of public importance, concern or contention. Identification of issues is used as a way of focusing and prioritising attention.
Land use refers to the spatial expression of the aggregation of purposes for which

land is occupied or employed, and the activities associated with those purposes.
Local refers to the geographical scale comprising a single local government area.
Locality , in relation to biodiversity survey work, generally refers to an area within a 10 km radius of a site. (See also Local).
Locally indigenous species is a species that occurs naturally within a local area and which has genetic material deriving from that local area.
Low Conservation Value Land that has low biodiversity significance (i.e. not an environmentally sensitive area) meeting the LCV criteria listed for Goulburn Mulwaree LGA in Table 6 of this report
Management plan is a plan that specifies a program of action for managing a particular area of land. Management plans may be: <ul style="list-style-type: none"> • generic documents that apply to a particular class of sites within a region, catchment or local government area • site-specific documents that apply to an individual property or reserve • statutory documents (such as a 'plan of management' for community land under Part 2 of Chapter 6 of the Local Government Act 1993) • legally binding on private landowners, such as a management plan referred to in a property agreement • advisory documents, such as a farm property plan.
Monitoring is a systematic process involving planned and repeated data collection, analysis, interpretation, reporting and acting on the data.
Medium Conservation Value Land that has medium biodiversity significance (i.e. not an environmentally sensitive area) meeting any of the specified MCV criteria listed for Goulburn Mulwaree LGA in Table 6 of this report.
Native species is normally used to refer to species indigenous to NSW, but is also sometimes used to imply a locally indigenous species.
Native vegetation has the same meaning as in the Native Vegetation Act 2003 and means: <ol style="list-style-type: none"> (1) Native vegetation means any of the following types of indigenous vegetation: <ol style="list-style-type: none"> (a) trees (including any sapling or shrub, or any scrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation), (d) plants occurring in a wetland. (2) Vegetation is indigenous if it is of a species of vegetation, or if it comprises species of vegetation, that existed in the State before European settlement. (3) Native vegetation does not include any mangroves, seagrasses or any other type of marine vegetation to which section 205 of the Fisheries Management Act 1994 applies.

<p>Natural area is a classification assigned to certain community land for the purposes of the Local Government Act 1993. Land should be categorised as a natural area if the land, whether or not in an undisturbed state, possesses a significant geological feature, geomorphological feature, landform, representative system or other natural feature or attribute that would be sufficient to further categorise the land as bushland, wetland, escarpment, watercourse or foreshore.</p>
<p>Noxious weeds are defined in terms of the Noxious Weeds Act 1993.</p>
<p>Objectives are similar to goals, but are expressed in measurable terms.</p>
<p>Offsetting An offset is an action taken away from the development site that seeks to compensate for the loss of vegetation caused by that development site. It may take the form of monetary compensation, revegetation/regeneration etc</p>
<p>Plan of management (community land) (PoM) is a management plan for community land prepared under Part 2 of Chapter 6 of the Local Government Act 1993.</p>
<p>Point sources the originating point of pollution, usually referred to in terms of water quality.</p>
<p>Policy is a statement of values that are to be satisfied when choosing amongst alternatives. It guides ongoing decision-making.</p>
<p>Population is a group of organisms, all of the same species, occupying a particular area.</p>
<p>Preservation is one of the approaches to ecosystem management. It aims to minimise change in a system.</p>
<p>Pre-1750 referring to the distribution of vegetation communities prior to European settlement.</p>
<p>Principle is a rule of conduct or action that is applied when implementing a policy.</p>
<p>Program is an action specification for implementing a policy. A program should include a timetable, specific actions and allocations of resources. It elaborates and implements policy.</p>
<p>Project is a set of tasks or activities undertaken in pursuit of a particular problem or issue.</p>
<p>Region is a concept used to group geographic areas having some common feature or relationship, generally for the purposes of administration or study. Regions may coincide with natural boundaries such as water catchments, bioregions or landscape units, or with socio economic or other boundaries. Some legislation allows regions to be determined for the purposes of administration.</p>
<p>Rehabilitation is a general concept referring to the restoration and repair of a degraded ecosystem system to a former condition. Rehabilitation may take several forms that, depending upon the degree of naturalness, range between regeneration, restoration, reconstruction, reclamation and stabilisation.</p>

Rehabilitation may require implementation of a range of techniques, such as revegetation and weed control.
Reinstatement means to introduce to a place one or more species or elements of habitat or geodiversity that are known to have existed there naturally at a previous time, but that can no longer be found at that place
Restoration capacity is a measure of the difficulty of undertaking ecological restoration at a site. It is based on an assessment of resilience and robustness. This will determine the type of restoration or rehabilitation that it is feasible to undertake.
Restoration is the process of (or end result of) reinstatement of the structure and dynamics of a preexisting community. It is a form of rehabilitation.
Revegetation see Reinstatement and Restoration
Riparian land means any land which adjoins, directly influences, or is influenced by a body of water. This includes land immediately adjacent to small creeks and rivers, river banks, intermittent streams or gullies, and areas surrounding lakes and wetlands on river floodplains which interact with the river during floods. The width of riparian land is largely determined by management objectives, and may need to be defined in terms of distances from water bodies or by mapping.
Sedimentation the process of subsidence and deposition by gravity of suspended matter carried in water; usually the result of the reduction of water velocity below the point at which it can transport the material in suspended form
Species impact statement (SIS) is a study that predicts the harmful effects of a proposed development or activity on threatened species, populations or communities or their habitats, and recommends measures to protect against those effects. It is prepared under Division 2 of Part 6 of the <i>Threatened Species Conservation Act 1995</i> or Division 6 of Part 7A of the <i>Fisheries Management Act 1994</i> . A species impact statement must be prepared in relation to certain development proposals and activities under the <i>Environmental Planning and Assessment Act 1979</i> .
Species is a group of organisms capable of interbreeding freely with each other but (usually) not with members of other species. It includes any recognised sub-species or other taxon below a sub-species, and any recognisable variant of a sub-species or taxon.
Strategies are the mechanisms for carrying of goals and objectives into effect. They are action statements explaining how something is to be achieved. Strategies lead to policies and programs.
Target is a more detailed example of an objective. It is expressed as the value of some indicator or other variable that should be achieved by a given date or other predefined circumstance. Targets are often confirmed by a political or community process.
Threatened species is a species considered to be at risk of becoming extinct, or of becoming endangered. Such species are listed in the <i>NSW Threatened Species Conservation Act 1995</i> or the <i>Commonwealth Environmental Protection and</i>

Biodiversity Conservation Act 1999.

Threatening process is a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities.

Understorey any plants growing under the canopy formed by other plants, particularly herbaceous and shrub vegetation under a tree canopy.

Wetland means land periodically or permanently inundated with water, comprising emergent aquatic vegetation dominated by characteristic wetland species. Wetlands include areas commonly described as swamps, mangroves, ponds, lagoons, and the like. The majority of plant species present normally comprise sedges and rushes. Two general types of wetlands are normally recognised, namely freshwater wetlands and saltwater (or estuarine) wetlands.

Or

Wetland means:

(a) natural wetland, including marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands that form a shallow waterbody (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with fresh, brackish or salt water, and where the inundation determines the type and productivity of the soils and the plant and animal communities, or

(b) artificial wetland, including marshes, swamps, wet meadows, sedgelands or wet heathlands that form a shallow water body (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with water, and are constructed and vegetated with wetland plant communities.

Executive Summary

This report recommends strategic measures to protect and enhance the biodiversity within Goulburn Mulwaree Shire Local Government Area. The report presents conservation values of native vegetation the LGA resulting from a conservation significance assessment (CSA). Areas in the LGA are categorised into high, medium and low conservation values by a set of criteria based on best available environmental data and advice. The report presents how the CSA results can be used in the context of biodiversity targets at a regional, state and commonwealth level. Recommendations for strategic planning are provided in the form LEP zoning recommendations and the provision of objectives for environmentally sensitive land, including land in riparian and regional corridors. The report outlines further data and research needed to improve the information base for the CSA. A set of council management actions are prioritised for revision and implementation, and education and community partnership actions are also recommended.

1. Introduction

This Biodiversity Strategy presents an outline of biodiversity values within Goulburn Mulwaree Council Local Government Area (LGA) and provides an LGA-wide overview of areas of high conservation value. The report suggests strategies and actions for maintaining or improving the biodiversity within the LGA (Part B).

The natural ecosystems of Goulburn Mulwaree LGA have been extensively modified since European settlement and vegetation cover has been reduced by more than half (54%). Clearing has occurred predominately in the more fertile lands and along riparian zones. Only a small portion of the LGA (8%) is part of formal reserves and the vegetation is only representative of a small proportion of the pre-European vegetation. The main threat to remaining vegetation and to important ecosystem functions carried out by riparian zones and wetlands is posed by further clearing associated with agricultural practises and rural-residential development in agricultural areas.

The biodiversity strategy offers an opportunity to improve and maintain biodiversity. It is also recognised that in improving biodiversity, there will be associated positive outcomes for issues such as water quality and quantity, salinity, erosion, air quality and noxious weeds. Appropriate management will help to ensure that rural landuses are carried out without compromising the ability of current and future generations to benefit from the advantages of a functioning landscape and ecosystem.

1.1 What is biodiversity?

The word biodiversity is derived from the phrase biological diversity. It has been in common use since the 1980s.

The *National Strategy for the Conservation of Australia's Biological Diversity* (DEST 1996) defines biodiversity (or biological diversity) as:

The variety of all living things, including plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part. It is not static, but is constantly changing: it is increased by genetic change and evolutionary processes and reduced by processes such as habitat degradation, population decline, and extinction.

This is the definition adopted for this biodiversity strategy.

The concept of biodiversity emphasises the interconnectedness and interdependence of all life on earth and can be considered at three levels; species diversity, ecosystem diversity and genetic diversity. These are explained in brief below:

- **Genetic Diversity:** A range of genetic differences within a species is referred to as genetic diversity - the variety of genetic information contained in all of the individual plants, animals and micro-organisms that inhabit the earth. Individual genes are the basic unit of biodiversity, and are the reason why there is so much variation amongst individuals of a particular species. It explains, for example, why some people have brown eyes and others have blue eyes.
- **Species Diversity** – This refers to the number of different types of species on earth. It is the most common way people think about biodiversity. So far, only about 1.7 million species have been classified, however there are believed to be many times more species in existence.
- **Ecosystem diversity** - The variety of ecosystems in an area, including the variety of habitats, biotic communities and ecological processes make up the Ecosystem diversity. Australia has a broad range of ecosystem types ranging from the Snowy Mountain grassy meadows and Wet Tropic rainforests, to the sea grass beds found in many of our coastal waters (DEST, 1996).

This biodiversity strategy is primarily concerned with the biodiversity (native plants and animals, genetic variations, populations, ecosystems and ecological processes) found within or dependent on the Goulburn Mulwaree LGA. It does however recognise that there are factors and forces that influence the biodiversity in this area that are outside the geographic area of the LGA. Likewise it recognises that the biodiversity of the LGA contributes to and influences the biodiversity of surrounding regions, the State and in some cases the nation.

1.2 Goulburn Mulwaree Council Area

Goulburn Mulwaree LGA covers an area of 322 238 hectares to the west of Nowra and north of the ACT. It is bordered by Shoalhaven LGA to the east, Palerang LGA to the south, the Upper Lachlan LGA to the north-west and Wingecarribee to the north-east. The LGA occurs in the Southern Tablelands within an elevation range of 500m - 700m.

Approximately half of the Goulburn Mulwaree LGA area is within the Hawkesbury Nepean Catchment Management Area (CMA), the other half is within Southern Rivers CMA and a small area in the west crosses into Lachlan CMA. A high percentage of the LGA also falls within the Sydney Catchment Authority (SCA) boundary. The CMAs work in partnership with the community, government agencies and industry to coordinate natural resource management in each catchment whereas the main objectives of the SCA are to ensure that the catchment area is managed to promote water quality, public health and safety and to protect the environment.

Goulburn Mulwaree LGA is covered by landscapes such as tablelands and associated grassy woodlands, alluvial flats, dissected plateaus, escarpment country and porphyrys. The LGA is underlain by rocks of a Palaeozoic age including basement sediments of Ordovician age and a sequence of volcanics and sediments, with an overlying sequence of sediments and volcanics forming the Cookbundoon Syncline. Rainfall within the LGA is variable with the wettest year on record being 1949 (1183 mm); the driest year was 1896 (346 mm). The average annual rainfall is 616.5 mm. Mean summer temperature is 27.00 degrees Celsius (Goulburn Mulwaree Council website, 2007).

The main rivers within the LGA boundaries are the Mulwaree River, Shoalhaven River, Wollondilly River, Lachlan River, Tarlo River, Nerrimunga Creek, Boro Creek, and Bungonia Creek.

Figure 1 below shows Goulburn Mulwaree LGA's location.

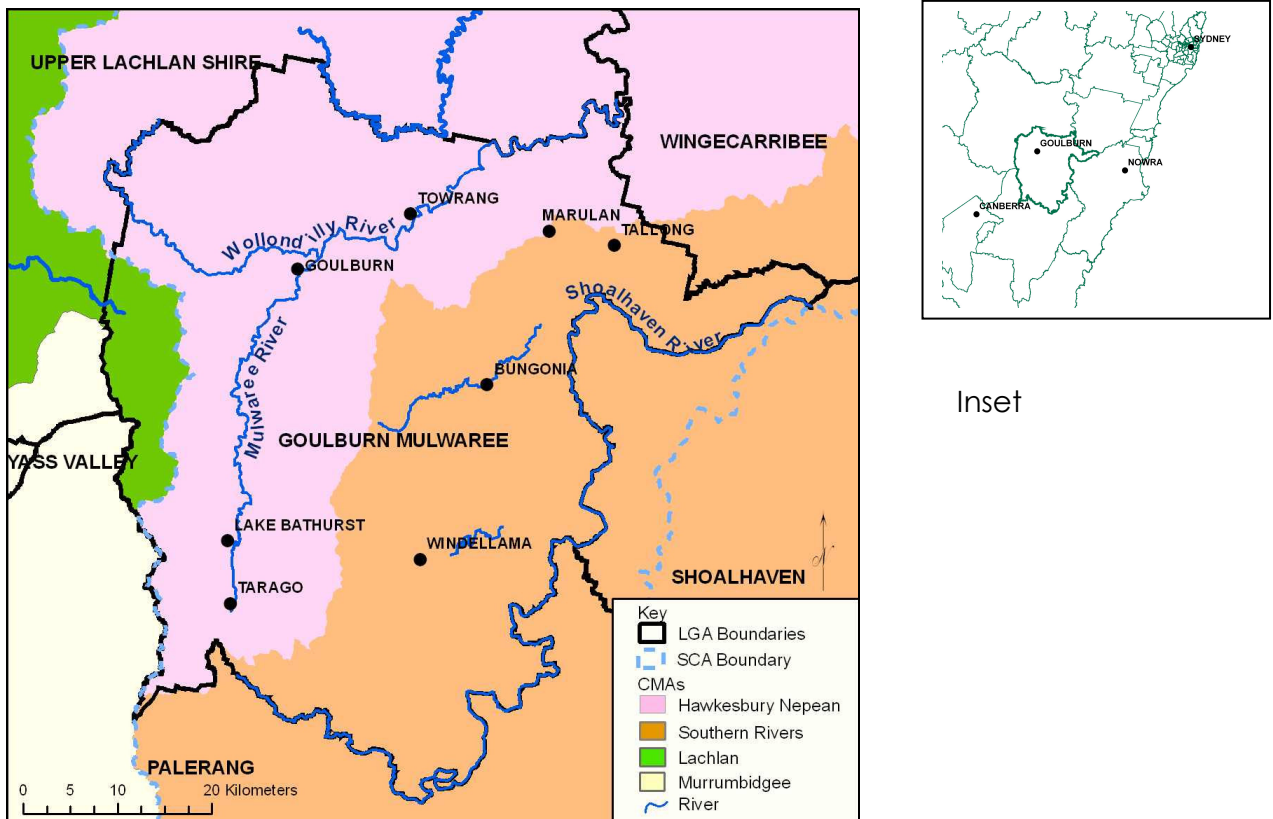


Figure 1. Location of Goulburn Mulwaree Council local government area.

The strategy recognises that Aboriginal people have traditionally had responsibility for custodianship of their country. Traditional custodianship acknowledged the spiritual and physical values of natural ecosystems of the region. The strategy acknowledges the continuation of these responsibilities and supports partnerships in the planning and management of the natural ecosystems of the region.

1.3 Aim of the Strategy

This project covers those aspects of biodiversity conservation which are within Council's ability to influence either directly or indirectly. The project collates existing information, analyses it and then formulates recommendations which will improve Council's capacity to improve biodiversity conservation across the LGA.

The primary aim of the project is to produce a product that is useable by Council staff as a planning tool at a strategic level. In addition, it can be used to aid decision making for Development Application assessments and management of Council owned and controlled lands and as a tool to prioritise incentives funding for the CMAs.

This project aims to:

- Analyse natural resource information to identify areas of high conservation value (HCV), and where the presence of biodiversity values will be a constraint for development.
- Develop strategies for managing the impact of development on biodiversity within mechanisms available to Council (i.e. LEP zoning, development controls and guidelines).
- Align Council assessment processes so that they consider and accommodate natural resource information.
- Package biodiversity information so that it matches Council staff needs, and those of other land managers and developers.

1.4 Outcomes of the Strategy

The specific outcomes of this project are:

- a. Collated data layers and information on the biodiversity of the LGA and the threats to it
- b. Identification of criteria for High Conservation Value (HCV), Medium Conservation value (MCV), and Low Conservation Value (LCV), based on available vegetation mapping and other biodiversity data.
- c. Maps showing location of conservation values to inform LEP Zoning in the draft LEP
- d. Recommendation for principles/objective/clauses to be included in the draft LEP, relating to ecologically sensitive areas (defined as High Conservation Value (HCV) areas).
- e. Strategies to improve planning processes
- f. Strategies to improve land management

- g. Decision support tools for development assessment - including a multi-attribute Conservation value GIS layer which can be used to trigger assessment (not to replace on-site assessment however).
- h. Identification of land management priorities

1.5 How to use this Strategy

Council sees the advantages of a Biodiversity Strategy (BS) as the following, in priority order:

- To inform preparation of the new Local Environmental Plan (LEP) currently underway
- To assist with any intent by Council to seek biodiversity certification
- To provide an information base for assessment of development applications
- To assist with management of Council owned or controlled land, including reserves and roadsides
- To assist other agencies with management of their land in Goulburn Mulwaree Local Government Area (LGA), including Travelling Stock Reserve (TSR)
- To assist in setting priorities when seeking funding, e.g. LGAG and Catchment Management Authority (CMA) processes (on public lands)

This Strategy is designed to complement and augment other strategies, plans and processes developed and delivered by state and federal government agencies and other organisations. It does not in anyway replace the need for other organisations and agencies to play a leading role in biodiversity conservation within the LGA.

To ensure that this document stays current and relevant Council should aim to review and update it every 3-5 years or as significant changes are made to legislation or policy, or natural resource data. Components of the strategy will need to be updated every five years in line with LEP amendments. Strategies and actions to develop the update and review process are presented in section 9, 'Strategic Planning'.

In addition to the above, the following occurrences should trigger a review of either all or parts of this strategy.

- Changes to relevant State legislation
- Introduction of new legislation relating to the role of local government in natural resource management
- Introduction of relevant new State or local government policies (REPs, SEPPs etc)
- The preparation of a new management plan for Goulburn Mulwaree Shire
- Availability of updated data on biodiversity.

1.6 What is not in this Strategy?

This Strategy and the project which informed it have been limited in scope by the information available at the time of writing. Many data sets were not available or were incomplete. Subsequently the strategy has a bias towards macro terrestrial biodiversity. There is virtually no information available on micro-organisms, fungi or invertebrates despite it being widely accepted that they comprise the largest component of biodiversity. There is also a lack of information on aquatic biodiversity. The strategy relies heavily on using vegetation communities as a surrogate for biodiversity and aims to protect and conserve biodiversity primarily through the management of vegetated habitat.

2. Statutory Framework

There are a number of relevant statutes, plans and policies which directly relate to biodiversity management in Goulburn Mulwaree Council. This section provides an overview of plans and policies, and relevant natural resource management legislation, including:

- Commonwealth legislation
- State legislation
- State planning instruments
- Regional planning instruments
- Local planning instruments
- Local plans and policies
- State and National strategies

It also identifies the key issues from the statutes and policies relating to Councils role and responsibilities in managing and protecting the biodiversity of Goulburn Mulwaree LGA.

2.1 Commonwealth legislation

2.1.1 *The Commonwealth Environment Protection and Biodiversity Conservation Act, 1999.*

The *Commonwealth Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act) provides a national scheme for environmental protection and biodiversity conservation. The Act lists matters of national environmental significance (NES). Matters of national environmental significance include:

- World Heritage properties
- National Heritage places
- Wetlands on international importance (Ramsar wetlands)
- Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas and
- Nuclear actions (including mining)

The Commonwealth signed a bilateral agreement with NSW in 2007 under section 45 of the EPBC Act amended which the Australian Government Minister for the Environment and Water Resources to rely on specified environmental impact assessment processes of the State of New South Wales in assessing actions under the *Environment Protection and Biodiversity Conservation Act 1999*.

NES matters relevant to Goulburn Mulwaree LGA include:

- Migratory Species
- Wetlands listed on the directory of important wetlands (Lake Bathurst)
- Species and Communities listed on the EPBC Act
- Threats listed in the EPBC Act

These are outlined in detail in Section 3 ('Biodiversity in Goulburn Mulwaree LGA').

2.2 State Legislation

2.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation in NSW. Part 3 of the EP&A Act sets the framework for preparation of environmental planning instruments such as Local Environmental Plans (LEPs).

Parts 3A, 4 and 5 of the EP&A Act indicate the decision making processes for assessment of proposed development and activities. When deciding if a proposal should be approved, the consent/determining authority (e.g. Council) must consider a range of environmental matters including maintenance of biodiversity and the likely impact on threatened species, populations or ecological communities. The Act is linked to the *Threatened Species Conservation Act 1995*.

Local councils have a range of development assessment and approval functions under the *Environmental Planning and Assessment Act 1979*, which includes in its objectives the proper management of natural resources, and the promotion of orderly and economic development of land.

In 2006 the government ordered that all LEPs be revised in keeping with a Standard Instrument. Section 3 outlines how this applies to Goulburn Mulwaree LGA.

2.2.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) and amendments in 2002, 2004 and 2006, identify threatened species, communities and populations, and provisions for managing and protecting them such as recovery plans, priority action statements and threat abatement plans. It also provides for the declaration of critical habitat.

The TSC Act indicates the assessment process for proposed development that is likely to have a significant effect on threatened species, populations, or ecological communities, or their habitats. Council is the primary agency for determining whether a significant effect is likely to occur, irrespective of whether a recovery plan exists or not. Council has a responsibility to ensure that it makes decisions relating to threatened species, communities and populations, on the best available information.

The *Threatened Species Legislation Amendment Act 2004* (TSLA Act) focuses on the protection and restoration of native vegetation and threatened species habitat at the landscape scale. This can be achieved by bio-certification of environmental planning instruments, including LEPs.

To certify the LEP the NSW Ministers for the Environment and Primary Industries need to be satisfied that the LEP is compatible with a regional conservation plan and will lead to the overall improvement or maintenance of biodiversity values in the study area (see Section 3 for more details below).

A 2006 amendment to the Act provides for BioBanking, which is a process and method for generating BioBanking credits through conservation works that can then be traded to offset, on a like-for-like basis, impacts occurring due to development in a particular location where impacts could not be avoided.

2.2.3 *Native Vegetation Act 2003*

The *Native Vegetation Act 2003* (NV Act) aims to end broad-scale clearing of native vegetation, improve the condition of existing vegetation, and encourage the revegetation of land with appropriate native vegetation.

A person seeking to clear native vegetation under the NV Act needs development consent or a property vegetation plan (PVP). A PVP is a negotiated, legally binding agreement between the landholder(s) and the local Catchment Management Authority (CMAs). Development consent or an approved PVP is required to clear remnant native vegetation and protected regrowth. Clearing of other regrowth (post 1 January 1990 for Goulburn Mulwaree LGA) does not require consent or a PVP. Approval of clearing will only be given if clearing of the vegetation will **improve or maintain environmental outcomes** as assessed by the PVP Developer (the decision support tool used by the CMAs).

The NV Act does not apply to national park estate, state forests, urban areas (residential, business, village and industrial), or where there is permitted clearing or excluded clearing. Furthermore, a range of Routine Agricultural Management Activities (RAMAs) and some other types of clearing are exempt from this Act. These activities could however potentially still require consent for clearing under a LEP. The Act does not apply to matters approved with under Part 5 of the EP&A Act.

There will be instances where development involving clearing of native vegetation requires approval from both CMAs under the *Native Vegetation Act* and from the local council under the *Environmental Planning and Assessment Act*.

2.2.4 *Fisheries Management Act 1994*

The *Fisheries Management Act 1994* (FM Act) aims to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. The Act protects both marine vegetation, fish habitat (freshwater and marine) and threatened species, including species and habitat found in inland rivers. The Act also provides for the identification of critical habitat and threatening processes.

Assessments may need to consider the Department of Primary Industries (Fisheries) policies that fish passage not be obstructed.

This Act also provides for the Minister of Primary Industries to grant biodiversity certification to Environmental Planning Instruments (EPIs) under the FM Act.

2.2.5 *Local Government Act 1993*

Section 8(1) of the *Local Government Act 1993* (LG Act) gives Council a charter to address biodiversity conservation. Under this legislation Council has the ability and responsibility to develop plans, strategies and procedures to improve biodiversity conservation within its area of jurisdiction.

2.2.6 *Catchment Management Act 2003*

The *Catchment Management Authority Act 2003* (CMA Act) established CMAs. The CMAs are responsible for administering the NV Act (see above).

The Goulburn Mulwaree LGA is within the Hawkesbury Nepean, Southern Rivers and Lachlan CMAs. Council will need to work with these CMAs to identify actions to manage biodiversity. Funds may be available to Council from the CMAs to implement actions for biodiversity management.

2.2.7 *Other relevant legislation*

- Rural Fires Act 1997
- NSW Rural Fires and Environmental Assessment Legislation Assessment Act 2002,
- Rivers and Foreshores Improvement Act 1948
- Water Management Act 2000
- Conveyancing Act 1919

- Noxious Weeds Act 1993
- Community Schemes Legislation
- Nature Conservation Trust Act, 2001
- National Parks and Wildlife Act, 1974
- Protection of the Environment Operations Act 1997
- Natural Resource Commission Act 2004
- Sydney Catchment Management Act 1998

2.3 State and Regional Policies and Plans

2.3.1 SEPP No. 44 - Koala Habitat Protection

Encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range. The policy applies to the Goulburn Mulwaree local government area. Local councils cannot approve development in an area affected by the policy without an investigation of core koala habitat. The policy provides the state-wide approach needed to enable appropriate development to continue, while ensuring there is ongoing protection of koalas and their habitat.

2.3.2 Drinking Water Catchments Regional Environmental Plan No. 1

This REP replaced SEPP No. 58 - Protecting Sydney's Water Supply on 1 January 2007.

REP 1 is a regional plan for the environmental, social and economic future of the catchments that supply drinking water to Sydney, Blue Mountains and the Illawarra. The catchments extend over 16 000 square kilometres - from the headwaters of the Cox's River north of Lithgow to the Shoalhaven River south of Braidwood. Sydney Catchment Authority is working with local communities and landholders to implement the plan.

This plan aims to achieve water quality management goals including:

- improving water quality in degraded areas and critical locations where water quality is not suitable for the relevant environmental values, and
- maintaining or improving water quality where it is currently suitable for the relevant environmental values.

A consent authority must not grant consent to the carrying out of development under Part 4 of the Act on land in the hydrological catchment unless it believes the development would have a neutral or beneficial effect on water quality.

Aquatic ecosystem health is one of the environmental values that the REP aims to improve and protect.

2.3.3 *Catchment Action Plans*

- Southern Rivers CMA, Catchment Action Plan (CAP)
(Currently in draft form only. Catchment Blueprints applies)
- Hawkesbury Nepean CMA Catchment Action Plan (CAP)
(Currently in draft form only)
- Lachlan CMA Catchment Action Plan (CAP)
(Currently in draft form only)

Although in draft form only there are expected to be a number of relevant targets and goals specifically for biodiversity protection within the CAPs. A matrix of the current draft targets and how they are can be translated into the Goulburn Mulwaree Biodiversity Strategy are contained in Section 3.

These plans are the result of extensive community consultation and Natural Resource Management (NRM) planning and develop and implement previous works such as catchment blueprints and regional vegetation plans.

2.4 Local Planning Instruments

2.4.1 *New LEP guidelines*

The Department of Planning has issued model provisions for the redrafting of all LEPs in NSW. These model provisions set out in an order under the Environmental Planning and Assessment Act, *Standard Instrument (Local Environmental Plans) Order 2006*, a consistent set of zone names and objectives and other matters that can be addressed in the relevant sections of the new LEP.

2.4.2 *Local Environmental Plan (LEP)*

Council is in the process of drafting a new LEP in keeping with the *Standard Instrument (Local Environmental Plans) Order 2006*.

One of the aims of this biodiversity strategy is to inform the development of the new LEP. Recommendations from this Biodiversity Strategy will need to be considered in adopting the new LEP.

2.4.3 *Development Control Plans (DCPs)*

Development Control Plans (DCPs) contain specific requirements for development. They should be read in conjunction with both the Goulburn Local Environmental Plan and the Mulwaree Local Environmental Plan. Council will be developing a new single DCP along with the new LEP.

Current DCPs in Goulburn Mulwaree Relevant to this Biodiversity Strategy may include:

DCP 2 Rural Subdivision for Dwelling Houses
DCP 3 Rural Dwelling Houses and Class 10 Buildings
DCP 4 Unserviced Village Areas
DCP 5 Poultry Farm Development
DCP 6 Residential Development Policy
DCP 7 Industrial Development Policy

Future planning reforms are expected to result in one DCP for the area.

2.4.4 Biodiversity certification

Biocertification can be granted to an Environmental Planning Instrument (EPI) by the relevant Minister under the *Threatened Species Conservation Act 1995* or the *Fisheries Management Act 2003*. Certification remains in force for a period determined by the Minister. If no period is specified then it will remain in force for ten years unless suspended or revoked.

The primary effect of granting certification is that it removes the need to undertake threatened species assessments or prepare species impact statements at the development application stage. Hence, if certification is granted to land this will mean that developments within those areas do not need to further assess the impacts on threatened species.

Before determining whether to grant biodiversity certification, the Minister for the Environment must be satisfied that the environmental planning instrument, and any associated planning package, will lead to an **overall improvement or maintenance** of biodiversity values. The Minister must also consider a range of other factors listed in the TSC Act prior to granting certification.

In certified areas BioBanking may be used to meet the 'improve or maintain' requirement for biodiversity certification. That is, council may require that all developments within specific land-use zones of a certified area participate in BioBanking. This will ensure that impacts to biodiversity are offset by positive management actions at another site. This scheme is currently being developed and trialed by DECC.

2.5 Other Policies

2.5.1 National Strategy for the Conservation of Australia's Biological Diversity (1996)

The National Strategy for the Conservation of Australia's Biological Diversity (1996) provides a definition for biodiversity and sets out goals and principles to underpin the management and conservation of biodiversity at a national scale.

The document addresses the need for integration of biodiversity conservation with natural resource management, and the need to manage threatening processes, improve knowledge and involve the community. It also provides a set of priorities for implementation and review.

2.5.2 *National Objectives and Targets for Biodiversity Conservation*

In June 2001 Environment Australia published a comprehensive set of *National Objectives and Targets for Biodiversity Conservation 2001* that was signed off by State and Territory Governments. The targets can be applied to any land management region and are built on the principle of protecting a sample of the variety of ecosystems present, to ensure their long-term survival.

The targets provided for native vegetation and terrestrial ecosystems state that by 2003 Australia will have:

“clearing controls in place that prevent clearance of ecological communities with an extant below 30% of that present pre-1750;”

and

“native vegetation restoration programs to recover ecological communities that are below 10% of that present pre-1750 or are nationally listed as critically endangered”.

This provides a clear and measurable target within a recognised policy position. The effectiveness of these targets is dependent on the approach used to control clearing and restore ecological communities.

2.5.3 *National Forest Policy Statement*

The Commonwealth Government, in their National Forest Policy Statement (NFPS, signed in 1992) provide an undertaking to manage Australia's forests to conserve biological diversity. In order to achieve this it was agreed that a comprehensive, adequate and representative (CAR) reserve system be created (JANIS, 1997, a Commonwealth-State committee addressing the implementation of the NFPS).

The JANIS criteria for a CAR reserve system included numerical targets. Relevant numerical targets for vegetation to be conserved include:

- 15% of pre-1750 distribution of forest ecosystems
- at least 60% of vulnerable ecosystems
- 100% of rare and endangered forest ecosystems

2.5.4 *Intergovernmental Agreement on the Environment (IGAE)*

On 31 October 1990, Heads of Government of the Commonwealth, States and Territories of Australia, and representatives of Local Government in Australia, meeting at a Special Premiers' Conference held in Brisbane, agreed to develop

and conclude an Intergovernmental Agreement on the Environment to provide a mechanism by which to facilitate:

- a cooperative national approach to the environment;
- a better definition of the roles of the respective governments;
- a reduction in the number of disputes between the Commonwealth and the States and Territories on environment issues;
- greater certainty of Government and business decision making; and
- better environment protection;

2.5.5 *International agreements and conventions*

- Japan–Australia Migratory Bird Agreement (JAMBA) and China–Australia Migratory Bird Agreement (CAMBA)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
- International Convention on Biological Diversity
- International Convention for the Protection of the World Cultural and Natural Heritage (1972)

2.5.6 *State Biodiversity Strategy*

The NSW Biodiversity Strategy recognises the collaborative responsibility of the community, local and state government and the importance of local planning in biodiversity conservation. It provides guidance for Councils to prepare and implement biodiversity plans. The strategy has several key goals which include:

- Identifying and tackling threats to biodiversity
- Improving knowledge of the state's biodiversity
- Involving landowners and communities in biodiversity conservation
- Managing natural resources better, for ecologically sustainable development
- Protecting native species and ecosystems

2.5.7 *NSW State- Wide Targets for Natural Resource Management*

The State Government has adopted seven macro environmental state-wide targets and six specific priority targets for natural resource management. These targets will guide investment and provide a means of recording change over time. Both CMAs and Councils will have some role in contributing to these targets being reached. The targets are set out in Table 1 below:

Table 1. State-wide Natural Resource Management (NRM) Targets

Biodiversity	
Macro-environmental	1. By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition 2. By 2015 there is an increase in the number of sustainable populations of a range of native fauna species
Specific priorities	3. By 2015 there is an increase in the recovery of threatened species, populations and ecological communities 4. By 2015 there is a reduction in the impact of invasive species
Water	
Macro-environmental	5. By 2015 there is an improvement in the condition of riverine ecosystems 6. By 2015 there is an improvement in the ability of groundwater systems to support groundwater dependent ecosystems and designated beneficial uses 7. By 2015 there is no decline in the condition of marine waters and ecosystems
Specific priorities	8. By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained 9. By 2015 there is an improvement in the condition of estuaries and coastal lake ecosystems
Land	
Macro-environmental	10. By 2015 there is an improvement in soil condition
Specific priorities	11. By 2015 there is an increase in the area of land that is managed within its capability
Community	
Macro-environmental	12. Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being
Specific priorities	13. There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management

(Natural Resources Commission (2006) Fact Sheet State-wide targets for natural resource management Natural Resources Commission, Sydney NSW)

The Catchment Action Plans (CAPs) of the CMAs feed directly into the statewide targets. The Natural Resource Commission has also developed a Natural Resource Management standard

2.5.8 National Local Government Biodiversity Strategy (1998)

The *National Local Government Biodiversity Strategy* presents an agreed local government position on the management of biodiversity. The strategy presents five key objectives.

- To develop a national awareness, training and education program, with a view to supporting local biodiversity programs
- To ensure resourcing for a greater role for councils in biodiversity management
- To encourage regional partnerships and planning along existing regional boundaries and acknowledge and work with catchment organisations

- To encourage State Government to review and amend local government role in managing biodiversity
- To provide a co-ordinated national information and monitoring system to provide councils with basic information on biodiversity in their area

The strategy provides an action plan which details specific actions required, responsibilities and estimated costs

3. Biodiversity in Goulburn Mulwaree

3.1 Ecological Processes (Aquatic and Terrestrial)

Ecological processes play a vital role in maintaining the integrity and continuity of ecosystems. Areas in Goulburn Mulwaree LGA that support important ecological processes include wetlands, riparian areas and areas covered by native vegetation.

Wetlands refer to land periodically or permanently inundated with water, comprising emergent aquatic vegetation dominated by characteristic wetland species. Goulburn Mulwaree LGA contains numerous wetlands including Lake Bathurst, The Morass, Rose Lagoon, Wet Lagoon, Wollogorang Lagoon, Narrambulla Creek, and Breadalbane Plains. Lake Bathurst (including the associated wetlands The Morass) is listed on the directory of important wetlands of Australia (EA, 2001) (see Appendix 1 for further detail). The ecological processes likely to take place in the wetlands of Goulburn Mulwaree include:

- Water filtration
- Recycling of nutrients
- Hydrological functions
- Water quality
- Drought and other extreme weather phenomena
- Fauna habitat
- Drought refuge for fauna

Riparian zones refer to any land which adjoins, directly influences, or is influenced by a body of water. The width of riparian land is largely determined by management objectives, and may need to be defined in terms of distances from water bodies or by mapping. Riparian land in Goulburn Mulwaree is defined in this strategy by 40m and 20m buffers around streams identified as Riparian Corridor Objectives Categories 1 and 2 respectively (DNR, 2006). Riparian zones in the Goulburn Mulwaree LGA are important in supporting the following ecosystem processes:

- Species interactions (plant recruitment, animal community change)
- Nutrient cycling
- Hydrological
- Filter sediments, phosphorous and organic nitrogen; improving the quality of water entering watercourses.
- Drought and other extreme weather phenomena
- Erosion and sedimentation
- Corridors and corridor movement

Native vegetation refers to indigenous trees, shrubs and ground cover provided by native plants and includes corridors. Vegetation serves many ecological processes, such as riparian zones, wetlands and corridors such as road verges.

- Regulates the flow of water through photosynthesis.
- Regulates nutrient cycles in particular in regards to carbon and nitrogen
- Corridors and corridor movement for fauna and flora (including movement of genetic information)
- Species interactions (e.g. plant recruitment, animal community change)
- Climate (local and global energy balances).
- Erosion control
- Stabilises beds and banks of watercourses
- Fire regimes
- Effects of edge to area ratios on remnant vegetation
- Produces oxygen

3.2 Ecological Value

3.2.1 International

There are 25 migratory species either known or likely to occur in Goulburn Mulwaree LGA of international importance (see Appendix 2). These species are listed as Migratory under the EPBC Act, which refers in turn to species listed under the following International Conventions:

- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)
- Convention on the Conservation of Migratory Species of Wild Animals - (Bonn Convention)

3.2.2 National

There are 23 flora species, 22 fauna species and two fish species listed as threatened under the Commonwealth EPBC Act occurring in Goulburn Mulwaree LGA (see Appendix 3). Two endangered ecological communities are listed as threatened under the Commonwealth EPBC Act:

Critically endangered:

- White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland (formerly "Grassy Box Woodland"). This listing is slightly different from the NSW listing.

Endangered:

- Natural Temperate Grassland of the Southern tablelands (NSW and ACT).

The Register of the National Estate has three listings for Goulburn Mulwaree Shire

- Bungonia State Recreation Area
- Morton National Park
- Badgery's Lookout View, Tallong

All of the above are referred to in the EPBC Act as Matters of National Environmental Significance (NES).

3.2.3 State

There are 26 flora species (21 of which are also listed under the EPBC Act) and 35 fauna species (14 of which are also listed under the EPBC Act) listed as threatened under the *NSW Threatened Species Conservation Act 1995*. There are also two species listed under the *Fisheries Management Act (1994)* (see Appendix 3 for a list of the species). There are no endangered populations of fauna or flora listed for Goulburn Mulwaree LGA.

There are five vegetation communities within Goulburn Mulwaree LGA that are listed under Schedule 1 of the *NSW Threatened Species Conservation Act 1995* as Endangered Ecological Communities (EECs) or under the Commonwealth EPBC Act. The area that each of these communities covers in the LGA is shown in brackets.

- TSC EEC: Montane Peatland and Swamp of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions (531 ha)
- TSC EEC: Mount Gibraltar Forest in the Sydney Basin Bioregion (1105 ha)
- TSC EEC: Western Sydney Dry Rainforest in the Sydney Basin Bioregion (50 ha)
- TSC EEC: White Box Yellow Box Blakely's Red Gum Woodland (15673 ha) of which EPBC EEC: White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland (10896.77 ha)
- EPBC EEC: Natural Temperate Grasslands of the Southern Tablelands of NSW and the ACT (8907 ha)

3.2.4 Regional

Species of regional significance refer to the flora and fauna species that are not identified on national or state legislation and therefore not specifically protected. There are two regionally significant plants within the council area (see Appendix 4) (Falconer 2005).

3.2.5 Local

There is one species of local conservation concern known to occur within the LGA (see Appendix 5) (Falconer 2005).

4. Threats to Biodiversity in Goulburn Mulwaree

Threats to the biodiversity in Goulburn Mulwaree LGA reflect the rural nature of the shire and its proximity to the large population centres of Sydney and Canberra. Some of these threats are identified as 'Key Threatening Processes' in the *NSW Threatened Species Conservation Act 1995*, *NSW Fisheries Management Act* or the Commonwealth EPBC Act. However, there are a range of other factors that have an important effect on biodiversity. These need to be identified in order to implement a management program to mitigate, control or otherwise respond to their effects.

It should be noted that there is considerable overlap in the State and Commonwealth sets of key threatening process. All three pieces of legislation provide for the development of Threat Abatement Plans, which set out a process and set of actions for mitigating, reducing or eliminating the threat or the impacts of the threatening process.

4.1 Key Threatening Processes

More detail on each of the key threatening processes (state and commonwealth) can be found in the determination reports. These reports provide full details about the nature of the threatening process and the species or communities threatened. Links for these documents are below.

NSW Key Threatening Processes

<http://www.threatenedspecies.environment.nsw.gov.au>

Commonwealth Key Threatening Processes

<http://www.deh.gov.au/biodiversity/threatened/index.html> or
<http://www.deh.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl>

4.1.1 Commonwealth

The Commonwealth EPBC Act and the NSW TSC Act provides for the listing of Key Threatening Processes and the preparation of Threat Abatement Plans.

Key threatening processes listed under the Commonwealth EPBC Act that may be relevant in the Goulburn Mulwaree LGA are listed in Table 2 below. Under this Act a process is defined as a key threatening process if it threatens or may threaten the survival, abundance or evolutionary development of a native species or ecological community (for example predation by the European Red Fox).

A process can be listed as a key threatening process if it could;

- cause a native species or ecological community to become eligible for adding to a threatened list (other than conservation dependent), or;
- cause an already listed threatened species or threatened ecological community to become more endangered, or;
- if it adversely affects two or more listed threatened species or threatened ecological communities.

Table 2. EPBC Act Key Threatening Process potentially impacting on biodiversity in Goulburn Mulwaree LGA (Listed Key Threatening Processes EPBC Act) (Commonwealth).

Listed Key Threatening Process (EPBC Act)
Competition and land degradation by feral goats
Competition and land degradation by feral rabbits
Dieback caused by the root-rot fungus (<i>Phytophthora cinnamomi</i>)
Infection of amphibians with chytrid fungus resulting in chytridiomycosis
Land clearance
Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases
Predation by feral Cats
Predation by the European Red Fox (<i>Vulpes vulpes</i>)
Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs
Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species
The reduction in the biodiversity of Australian native fauna and flora due to the red imported fire ant, <i>Solenopsis invicta</i> (fire ant) http://www.deh.gov.au/cgi-bin/sprat/public/publicgetkeythreats.pl 11 January 2007.

4.1.1 NSW

Key threatening processes as defined by the TSC Act are the things that threaten, or could threaten, the survival or evolutionary development of species, populations or ecological communities. The key threatening processes from Schedule 3 of the TSC Act that may impact on biodiversity in the Goulburn Mulwaree LGA are listed below in Table 3.

Table 4 lists the key threatening processes listed under the NSW Fisheries Management Act. In the case of the FM Act to be listed a process must adversely affects at least two listed threatened species, populations or communities or could make others become threatened. Threatening processes potentially impacting on Goulburn Mulwaree include:

- Invasion of native plant communities by exotic perennial grasses
- Invasion, establishment and spread of *Lantana camara*

- Competition and grazing by the feral European rabbit
- Competition and habitat degradation by feral goats (*Capra hircus*)
- Competition from feral honeybees
- Herbivory and environmental degradation caused by feral deer
- Importation of red imported fire ants into NSW
- Introduction of the large earth bumblebee (*Bombus terrestris*)
- Invasion of the yellow crazy ant (*Anoplolepis gracilipes*)
- Predation by feral cats
- Predation by the European Red Fox
- Predation by the Plague Minnow (*Gambusia holbrooki*)
- Predation, habitat degradation, competition and disease transmission by Feral Pigs (*Sus scrofa*)
- Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands.
- Bushrock Removal
- Clearing of native vegetation
- Alteration of habitat following subsidence due to longwall mining
- Ecological consequences of high frequency fires
- Human-caused Climate Change
- Loss and/or degradation of sites used for hill-topping by butterflies
- Removal of dead wood and dead trees
- Infection by *Psittacine circoviral* (beak & feather) disease affecting endangered psittacine species
- Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis
- Infection of native plants by *Phytophthora cinnamomi*
- The introduction of fish to fresh waters within a river catchment outside their natural range
- The removal of large woody debris from NSW rivers and streams
- The degradation of native riparian vegetation along New South Wales water courses
- In-stream structures and other mechanisms that alter natural flow
- Cold water pollution

4.2 Other threats

In addition to the key threatening processes listed above there are a range of generic threats to biodiversity which Council can have a major role in managing. Some of these are outlined in more detail below.

4.2.1 Noxious and environmental weeds

Weeds are classified as noxious under NSW legislation primarily because of their impacts on agriculture. Many declared noxious weeds, as well as environmental weeds, can negatively impact on biodiversity, by degrading or destroying habitat, competing with native species or by providing inappropriate foods for fauna.

Council has a significant role in the management and control of noxious weeds. Owners are required to control declared noxious weeds on their property. Council is the local weed control authority and has the right to enter and inspect private properties and if required impose notices to carry out control work. Fines may also be applied. The noxious weed list for Goulburn Mulwaree Council can be viewed at www.dpi.nsw.gov.au/agriculture or in Appendix 6.

The Council's Environment Committee recognised that there are local weeds that are not included on the noxious weeds list. Council has created an environmental weeds list as a response to the perceived gap and has provided guidelines for the removal of weeds (see Appendix 7).

4.2.2 Feral animals

Feral animals are a threat to biodiversity for one or more of the following reasons:

- they are predators to native species
- they compete with native species for food and habitat
- they destroy or damage native species habitat
- they spread diseases that impact on native species

The Rural Lands Protection Board identifies the following vertebrate pests as a significant problem under the *Rural Lands Protection Act 1989*. Under this Act there is an obligation on Council to suppress and destroy these vertebrate pests where they occur on Council land (pers. comm. A Glover, RLPB, 2001).

- Rabbits
- Feral pigs
- Wild dogs
- Locust
- Foxes

Some other pest species which impact negatively on native species but which are not subject to the *Rural Lands Protection Act 1998* include: mice, rats, goats, cats (feral and domestic) domestic dogs, pigeons, Indian minors and European bees, wasps and carp. There are in fact a vast number of introduced terrestrial and aquatic vertebrates and invertebrates which impact negatively on indigenous biodiversity. Some of these are listed above as key threatening processes.

Council can have a role in the management of pest species through involvement with control programs and by restricting some potential pest species in some areas. For example councils can restrict (through DA consent conditions or in EPIs) the keeping of domestic pets in some places if they are a potential threat to native wildlife.

4.2.3 Land Clearing

Clearing of vegetation poses the greatest threat to biodiversity in the LGA. Vegetation clearing is listed as a key threatening process under State and Federal legislation. Vegetation clearing removes species, destroys habitat and

food resources for a wide range of species, not only those that would live permanently in the vegetation but also those that rely on it for food and shelter seasonally or during crisis times. Land clearing also destroys or alters ecological process relating to or dependent on hydrology and soil composition. Land clearing can also cause salinity. On a large scale land clearing has been shown to change weather patterns and may contribute to global warming and reduced rainfall.

The *Native Vegetation Act 2003* (NV Act) aims to halt broad scale clearing and manage native vegetation on rural land through Property Vegetation Plans (PVPs). Council also has a role in managing the clearing of native vegetation. Council can introduce provisions into the LEP requiring consent for clearing in those zones excluded from operation of the NV Act. In addition, even within those zones covered by the NV Act there are a large number of clearing activities that are exempt or excluded from the need for approval under the Act. A number of these clearing activities require council approval.

4.2.4 Fire Regimes

Changed fire regimes as a result of wildfire or poorly planned controlled burns can have a detrimental effect on the diversity and quality of vegetation, resulting in changes to dominant species and community species composition. Changed fire regimes can also lead to a predominance of fire dependant species, increased fire frequency, weed invasion, soil erosion and unnecessary air pollution (Webb, 1996). Furthermore, provision of asset protection zones, required under Section 117(2) Direction G20 - Planning for Bushfire Protection of the *NSW Rural Fires and Environmental Assessment Legislation Amendment Act 2002*, can have considerable environmental impacts. The recently updated Planning for Bushfire Protection (2006) document provide guidelines to council in regards to bushfire protection measures and planning controls for subdivisions.

4.2.5 Other threats

Other threats to biodiversity which Council have a less direct role in the management off can include such things as:

- Water pollution
- Changed hydrology
- Soil and air pollution
- Salinity
- Nutrification
- Erosion and sedimentation
- Drought
- Disease
- Road kill
- Illegal hunting and gathering
- Climate change

These issues have been considered in preparation of the strategies outlined in Section 9.

5. Data Audit

A large amount of digital data (maps and databases) relevant to the area already exists. An audit of this information was undertaken and from it a database of baseline information was compiled. The relevant baseline information was then incorporated into a model to produce a single GIS layer to indicate conservation values (Section 7). The following table lists the data that was compiled, a description of the data, any limitations of the data, its source and currency.

Table 5. Results of data audit

Name	Description	Gaps in data/Limitations	Source, Currency (Date)
SCIVI (Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands.) V1.0) Based on the South Coast - Illawarra Vegetation Integration (SCIVI) Project	Classification & descriptions of native vegetation types of south east NSW and map of extant distribution. Aimed to integrate many previous vegetation classification and mapping works (e.g. P5MA (Tindal <i>et al</i> , 2004) and CRA) to produce single regional classification and map. Distribution of vegetation types was mapped by spatial interpolation (modelling) from classified sites, using a hybrid decision-tree/expert system. The final model was cut to 'extant' boundaries using aerial photograph interpretation (API) of woody and wetland vegetation boundaries. Vegetation types related to Endangered Ecological Communities are highlighted.	Vegetation mapped at 1:100 000 interpretation scale. The data resolution is relatively coarse and should thus be used at a broad-scale only and not for site specific assessments. Data should be ground truthed to verify community classification. Mapping was biased to forest ecosystems and grassland ecosystems under-represented. Vegetation types related to Endangered Ecological Communities were suggested in the report and assigned to corresponding vegetation polygons. Further analysis (using supporting mapping such as bioregion boundaries and substrate) was conducted using community determination information to further refine the classifications.	(Tozer <i>et al</i> , 2006) Department of Environment and Climate Change (DECC) and (formerly) Department of Natural Resources (DNR)
Planning Framework for Natural Ecosystems of the	Grassland ecosystem data (<10% tree cover). Information on percentage reserved and percentage extant was derived from literature on the EECs	Extent of mapping does not cover the whole LGA (about a third of the LGA is missed in the east). The data resolution is relatively coarse and should thus be used at a broad-scale only	(Fallding 2002) NPWS

Name	Description	Gaps in data/Limitations	Source, Currency (Date)
ACT & NSW Southern Tablelands.	represented within the data (e.g. Natural Temperate grasslands)	and not for site specific assessments. Data should be ground truthed to verify community classification Mapping biased to grassland ecosystems, forest ecosystems under-represented.	
Mitchell Landscapes	NSW Ecosystem Study, including information of percentage of cleared vegetation within landscape	Broad scale assessment only	DNR, 2002
Riparian buffer	Major rivers and tributaries within the LGA supplied by Council. Major rivers buffered by 40m and other streams and rivers buffered by 20m (using centre of river line data and NOT top of bank). Major Rivers refers to Mulwaree River, Shoalhaven River, Wollondilly River, Lachlan River, Tarlo River, Nerrimunga Creek, Boro Creek, and Bungonia Creek.	Data may need review to prioritise streams and rivers. The riparian zone boundaries in this layer are to be used for indication only and only at broad scales. Exact riparian zone boundaries need to be surveyed from top of bank. Where Council data was incomplete (for Shoalhaven and Boro Creek near LGA boundaries), LPI data was used. The comparative accuracy the datasets is unknown. Width and area of riparian buffers is underestimated due to being measured from stream centerline rather than top of bank.	Goulburn Mulwaree Council. LPI data was used for rivers near LGA boundary. Currency unknown
Wetland zones	Wetlands of NSW mapped by DECC (Richard Kingsford) (based on Landsat imagery) buffered by 30m following DNR riparian zone guidelines (Water quality reference guide).	Missing small wetlands.	Richard Kingsford, 2003 (DEC)
Important Wetlands	Lake Bathurst and the Morass (NSW066). Boundaries from 'Wetlands of NSW' mapped by DECC buffered by 40m following DNR riparian zone guidelines (Water Quality Tool reference guide).		Richard Kingsford, 2003 (DECC)
Known Conservation	Planning Setting A. Areas of known conservation importance for endangered	Does not include threatened species listed since 2002.	(Fallding 2002) NPWS

Name	Description	Gaps in data/Limitations	Source, Currency (Date)
Value – Planning Framework	grassland and woodland communities (i.e. sites where conservation values have been clearly identified), point data where threatened species or sites of high conservation value have been identified.	Biased towards grassland and woodland ecosystems.	
Predicted Conservation Value – Planning Framework	Planning Setting B. Areas of predicted conservation importance for endangered grassland and woodland communities (i.e. sites where conservation values have been clearly identified), threatened species or sites of predicted high conservation value have been identified. Field work is required to check whether site contains values.	Does not include threatened species listed since 2002. Biased towards grassland and woodland ecosystems.	(Fallding 2002) NPWS
Known habitat of selected TSC Act Threatened Flora species (DECC advice)	<p>SCIVI vegetation polygons within which selected flora species are known to occur (based on SCIVI vegetation type mapping and DEC targeted survey results in Atlas data):</p> <p>Tableland low woodland (SCIVI p9):</p> <ul style="list-style-type: none"> -<i>Bossiaea oligosperma</i>, -<i>Pultenaea pedunculata</i> and -<i>Dilwynia glaucula</i>. <p>Western Tablelands Dry Forest (SCIVI p.14) (around Windellema and south east of Goulburn)</p> <ul style="list-style-type: none"> - <i>Pomaderris delicata</i>. <p>Also Tallong Midge Orchid, <i>Rulingia prostrata</i> and Glossy Black Cockatoo</p>	May underestimate total area that could potentially support the species.	Atlas of NSW Wildlife as-held point location data, Eco Logical, 2007

Name	Description	Gaps in data/Limitations	Source, Currency (Date)
	<i>Habitat in Tallong</i>		
Southern Rivers CMA Private Lands Corridors	Corridors encompassing stepping stones (large and closely located remnants, strategically located) and areas of interest linking private lands to existing reserved public lands.	This data was not used due to existing HN CMA data in the same area (see below) and limitations of data: Wider than standard habitat corridors as "areas of interest" allow a narrower range of connection to be achieved within the area of interest to allow for lack of participation by disinterested landowners.	Southern Rivers CMA, 2003
Hawkesbury Nepean CMA Regional Corridors	Mapped based on P5MA vegetation. Digitising was conducted at a scale of 1:25000 within the Hawkesbury Nepean Catchment area (see Appendix 8)	Biased to forest ecosystems. Layer could be refined and updated with additional analysis of fauna locations and movement patterns throughout the area. The accuracy of the layer varied with the quality of the image and the ease with which connections between patches of vegetation could be determined.	DECC, 2005
DECC Estate	DECC Estate gazetted boundaries (e.g. National Parks, State Conservation Areas)		DECC, 2006
DECC Proposed Estate	Proposed DECC Estate		DECC, 2006
Voluntary Conservation Agreements	Shows boundaries for land for which a voluntary agreement has been made between the landowner and the Minister for the Environment to protect the special features occurring on the land, recognised under the <i>National Parks and Wildlife Act 1974</i> .		DECC, 2006
Council Owned Reserve	Reserve under non-statutory protection. Alison Hone is mapped using cadastral information.		DECC, 2006
Soil Landscapes	Southern CRA soil mapping (100K)	Ground truthing recommended.	Former DLWC (DECC), 1999

Name	Description	Gaps in data/Limitations	Source, Currency (Date)
Flora and Fauna Threatened Species	Presence of Threatened Species within the LGA		DECC Atlas of NSW Wildlife website 2006, EPBC website 2006, State of Environment Report 2004

6. Vegetation Mapping

Vegetation can be represented as plant communities which are defined by the composition of different plant species. Plant assemblages form the basis for the definition of many Endangered Ecological Communities (EECs) which are protected under both NSW TSC Act 1995 and Commonwealth EPBC Act 1999 government legislation. Some estuarine and marine plant assemblages may also be Protected Marine Vegetation under the NSW Fisheries Management Act 1994.

6.1 Method

The vegetation mapping used in this strategy was created by merging two native vegetation mapping sources :

- SCIVI (Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Version 1.0)
- Planning Framework for Natural Ecosystems of the ACT and NSW Southern Tablelands study area vegetation mapping.

In merging the two existing vegetation layers, the most accurate information from each database was used in a priority order:

1. First priority was given to mapping the native grassland and derived grasslands from the Planning Framework layer.
2. Second priority was given to the SCIVI for all remaining ecosystems.
3. Third priority was where the SCIVI vegetation layer was absent, the non-grassland ecosystems from the Planning Framework was used.

The methodologies of the original vegetation mapping datasets (SCIVI (based on P5MA and CRA mapping) and Planning framework) incorporated mathematical analysis of systemic field survey plant data as well as a spatial interpolation of survey data points based on relationships of species composition and abiotic variables such as geology and climate. The main sources of error and uncertainty in the dataset were: potential biases in the content and coverage of field samples; linework and attributes derived from the interpretation of remote imagery; propagation of inaccuracies in spatial data layers used to derive the vegetation map; uncertainty in the assignment of samples to plant assemblages; insufficient data/information to determine the merits of alternative decision rules for mapping. The dataset used some ground-truthing (Tozer *et al*, 2006) however comprehensive ground truthing was not conducted thus errors relating to miss-classification of vegetation are possible.

Although vegetation maps are the most frequently used surrogates for biodiversity, it is recognised that there are limitations to such an approach.

6.2 Limitations

Surrogacy

The extent of native vegetation is unlikely to be a suitable surrogate for biodiversity. It has been demonstrated that vegetation type and condition only captures a subset of diversity of plants and animals that occurs in a region (Doherty *et al* 2000).

It is important to base decisions on a more diverse range of biological information such as rarity, security and ecosystem processes occurring in the region. The role of vegetation mapping is thus as base information, upon which further meaning is added to provide a more comprehensive idea of biodiversity values. Such an approach is represented for Goulburn Mulwaree's Biodiversity Strategy by a model of conservation significance, described in the next section.

Condition

Native vegetation may be modified to varying degrees by land management practices and unplanned threats and disturbances. The impacts include changes to the structure, function and species composition of vegetation, reduced regeneration, and a lowering of habitat values and integrity (DECC, 2006). Decline in vegetation condition is generally less visible than clearing and occurs over a longer time frame. Broad-scale information about vegetation condition is difficult to detect and assess and is thus not available in the available vegetation mapping for this report. On-site surveying is necessary for an accurate assessment of vegetation condition. The condition of the vegetation in Goulburn Mulwaree LGA will be assumed to be in good condition in the absence of on-site assessment. This assumption follows the Precautionary Principle, one of the principles of ESD (Ecologically Sustainable Development).

Accuracy

The limitations in the accuracy and reliability of the vegetation mapping used are detailed in the relevant reports (Tozer *et al*, 2006 and Tindall *et al*, 2004). They include errors in Aerial Photo Interpretation, the possibility of native vegetation where none is mapped (due to exclusion of patches less than 0.5 ha) and errors in community classification due to uncertainty in assigning samples to plant assemblages (Tozer *et al*, 2006). The vegetation mapping in this report can be used to trigger assessment approaches and management plans, however it should not be used as a replacement for on-ground assessment when making final decisions.

7. Conservation Significance Assessment of Terrestrial Vegetation

7.1 Principles

Conservation significance assessment (CSA) is a process using vegetation mapping and supporting ecological variables by which a number of biodiversity variables are evaluated as being present or absent for each mapped polygon of vegetation. CSAs give an indication of relative ranking of areas of native vegetation in terms of ecological importance, and can be used to show environmentally sensitive areas. This information can then be used to develop biodiversity conservation strategies. At a finer scale, identifying the presence of specific environmental variables associated with mapped polygons of vegetation also facilitates consideration of these variables when assessing the impact of development proposals on biodiversity.

The process employs a GIS (Geographic Information System) which allows a visual representation of the spatial information (i.e. a map) as well as a supporting database (i.e. a table) that holds information about each feature in the map. The resultant map provides a graphical representation of conservation values across the landscape and with the help of a desk-top GIS program, the criteria used to derive the values can be looked up by using a simple query tool. The data can also be overlaid with other information, to provide information on context, such as roads, LEP zones and cadastral information.

There are a number of different methods available for undertaking a CSA and the most appropriate set of decision-rules for each area will depend on many factors such as predominant landuse, extent of past clearing practises and major operating threats. The assessment should be based on best available information, and the limitations of the available data and the model itself must be considered when developing strategies.

7.2 Methods

Model design

A CSA model was developed in consultation with stakeholders. The model took into account available data and their limitations as well as the purpose for which the data was intended. The selection of criteria was loosely based on past CSA studies conducted in Western Sydney and with consideration of relevant policy frameworks such as BioMetric (*Native Vegetation Act 2003*), draft guidelines for Biodiversity Certification (in development) in s126G(5) of the TSC Act (1995) and the National Forest Policy Statement (NFPS) and its criteria for a comprehensive, adequate and representative (CAR) reserve system (see Table 6).

Conservation values

Specific environmental variables were identified as conferring high conservation value on a mapped polygon of native vegetation. The presence of one or more

of these variables resulted in that polygon of vegetation being labelled High Conservation Value (HCV). Medium Conservation Value (MCV) was also applied to any land occurring within a riparian zone, within wetland buffers and within a mapped regional corridor whether it was mapped as vegetation or not. MCV status was also conferred to land with predicted conservation values as mapped for the Planning framework report. Any mapped polygon of vegetation not identified as HCV or MCV was assigned as Low Conservation Value (LCV). Vegetation in those parts of the LGA that were not mapped as native vegetation (i.e. were considered to be “modified or disturbed vegetation”) were designated Low Conservation Value

Table 6 lists the environmental variables identified as conferring HCV, MCV or LCV status on an area of vegetation.

Data manipulation

Spatial analyses were used to merge many of the layers together to ensure that attribute information for each criteria was carried across. Some of the information needed some manual analysis and manipulation as follows:

Rarity

- The original vegetation mapping did not contain EEC classifications. EEC status of SCIVI vegetation types was assigned following broad recommendations in the SCIVI report. Where the vegetation types contained EECs only under certain circumstances, available data (e.g. soil mapping) were used to refine the broadly assigned polygon (see Appendix 9 for more detail).
- The SCIVI data under-represented the grassland EECs so native grassland data from the Planning Framework data was assigned EEC status following advice from DECC

Known threatened species habitat

- Hotspot habitat mapping was created using known flora hotspot point locations in the Windellema and Tallong area, buffered by their accuracy (e.g. 100m) rating and intersected by vegetation patches to derive a final habitat area, as per guidelines provided by DECC (see Appendix 10).

The data was made by Eco Logical Australia and a metadata statement is available in Appendix 11.

7.3 Conservation Categories

Native vegetation can be identified through the CSA as either High Conservation Value (HCV), Medium Conservation Value (MCV) or Low Conservation Value (LCV). The categories can be defined by a set of criteria as shown in Table 6.

Table 6. Criteria for Conservation Values in Goulburn Mulwaree LGA.

Data	Rationale	Relevance to Policies	CSA outcome
Known Biodiversity hotspot of selected Flora species	Known Threatened species habitat	BioCertification Guidelines	HCV
Known threatened species habitat : "Known Conservation Status" (Planning framework setting A)	Known Threatened species habitat	BioCertification Guidelines	HCV
Riparian zone (40m buffer on main rivers and 20m buffer on streams and minor creeks)	Important ecosystem processes, Landscape value	BioCertification Guidelines	HCV
Important Wetland (plus 40m buffer)	Recognised national habitat value	BioCertification Guidelines	HCV
Wetland buffer (within wetland or 40m from important wetland or 30m from other wetlands))	Important ecosystem processes/ Landscape value	BioCertification Guidelines	HCV
EEC	Rarity	BioCertification Guidelines, BioMetric, BioBanking	HCV
Less than 30% extant (i.e. over 70% cleared)	Rarity	BioCertification Guidelines, BioMetric,	HCV
Vegetation in Mitchell landscape that is >70% cleared	Rarity	BioCertification Guidelines, BioMetric,	HCV
Vegetation within mapped regional corridor	Landscape value - connectivity	BioCertification Guidelines	HCV
Vegetation within mapped roadside buffer (15m) in High or Medium condition	Habitat Corridor, Landscape value - connectivity	BioCertification Guidelines	HCV
Reservation (DECC estate, Proposed DECC estate, VCA and non-stat reserve (Alison Hone reserve).	Security	BioCertification Guidelines	HCV
Predicted Key Habitat (conservation values)	Threatened species		MCV
Land not mapped as vegetation within mapped regional corridor, riparian zone or wetland buffer (see page 46)			MCV
Other vegetation and area not covered by mapped vegetation	Identifies potential location of vegetation missed out during vegetation mapping.		LCV

7.4 Limitations of this approach

Omission of criteria from model:

- Local Corridors. Due to lack of funding for creation of new data as part of this project, local corridor data was not created during this project. Vegetation mapping should be analysed using 'nearest neighbour' or similar techniques to create corridors linking significant remnants of vegetation within the LGA.
- Condition has not been mapped and is not used in the model, yet is information required for BioCertification, PVP Biometric assessment and Biobanking assessment. Information on condition could be used to further refine the CSA model.
- Threat was not used in the model yet is information required for BioCertification, and Biobanking assessment. Threat here refers to threats relating to poor management practises. Available land-use mapping was not deemed to accurately represent good or poor land management practises on individual sites due to high variability in individual landowner practises.

Accuracy:

- Vegetation mapping has not been ground-truthed and therefore limited to broad-scale analysis. At site-level, the community classification and extent should be verified on-ground.

Under-representation of HCV:

- Local corridor information not available
- Known biodiversity hotspots: Other important habitat for fauna may exist elsewhere in the LGA but not yet surveyed.
- Invertebrate/fungal biodiversity is not surveyed or represented for this LGA.
- Rarity and reserved information limitations (e.g. percentage of community that is extant is defined in the model as <30% however the categories in the data include some ranges that do not fit in the model (20-35%, 20-40% or 20-50% extant). Vegetation types assigned these categories are thus excluded from this step). This could have led to a possible underestimation of HCV area due to limitations of percentage cleared and percentage reserved information

Over-representation of HCV:

- Roadside vegetation data was provided as line data only. Buffer distances for each segment of road were provided in the report. However, due to time and budget constrictions, a default buffer of 15m was used as this was the maximum buffer indicated in the report. Some segments of the road may thus over-represent roadside vegetation.

7.5 Results

A single GIS data layer was created to represent conservation values. The graphical information (as shown in Figures 2-7) is linked to an accompanying attribute table, with the criteria used to derive the conservation values shown in separate fields (i.e. columns) within the table. This means that each patch of vegetation can be interrogated using a desk-top GIS package to find out which of the criteria in the model was met to derive the conservation value category of each vegetation patch. Supplying the data in a GIS format also allows the information within to be used for analysis and to allow flexible display of relevant features. Furthermore, the data may be overlaid over relevant information such as LEP zoning or cadastral boundaries. The GIS attribute field names in the model are listed in Appendix 12.

The results of the CSA are shown in a series of maps:

- Figure 2 shows pre 1750 and current cover of major vegetation formations (*subject to data availability*).
- Figure 3 shows native vegetation in the LGA
- Figure 4 shows Conservation Values (High, Medium and Low)
- Figure 5 shows regional corridors within the LGA as well as biodiversity hotspots and reserves.
- Figure 6 shows riparian zones (including wetlands)
- Figure 7 shows vegetation indicating Endangered Ecological Communities (under the TSC Act and/or EPBC Act)
- Figure 8 presents vegetation that is over-cleared (>70%) and under-reserved (<15% in a statutory reserve)
- Figure 9 shows vegetation occurring in over-cleared Mitchell landscapes.
- Figure 10 shows roadside corridors

8. Targets for Goulburn Mulwaree

8.1 Introduction

Managing ecological values and planning for biodiversity conservation is difficult in a complex landscape. Key requirements are:

- a knowledge of what the ecological values are,
- an understanding of their relative value, and
- developing specific targets, desired outcomes or performance objectives for these values.

The mapping prepared for the Goulburn Mulwaree Council provides a comprehensive and valuable resource to assist decision makers in identifying what ecological values are where in the LGA. It relies on a consistent, repeatable, and acceptable methodology. It is not an exhaustive list of all the biodiversity values. The mapping uses vegetation communities as a surrogate for the broader spectrum of biodiversity values, an approach endorsed by DECC and CSIRO.

The conservation assessment aims to provide an analysis of the relative priority of various communities and patches of vegetation across the LGA. It forms the basis of various strategy recommendations. Landuse planning and management decisions need to be cognisant not only of these values but the various objectives of the priority categories.

"If you can't measure it, you can't manage it"

To measure and monitor performance we need targets. Targets can provide a clear strategic direction, a quantifiable goal that enables decision makers to assess the context and relative significance of potential outcomes arising from their day to day decisions.

This section provides an outline of targets developed for the Goulburn Mulwaree Biodiversity Strategy, their policy framework and relevant justification.

8.1.1 What is a Target?

'Targets' for biodiversity management are essential to provide for sustainable long-term land management guided by strategic conservation and development planning. Clearly defined conservation targets enable benchmarking and assessment of progress towards meeting them over time.

Terms like objectives, goals, plans, aims etc, although they assist in holding a picture or vision for the future for planning and management, are often generic and rarely provide solid direction for decision making that allows for measuring of performance.

A good target is:

- defined and measurable
- meaningful
- consistent with accepted scientific concepts
- achievable – realistic
- understood by those implementing (and preferably readily understandable by broader community)
- based on a repeatable methodology
- based on data available (to fit into current systems)
- key accountabilities are known

8.2 Policy Framework for Biodiversity Targets

There are many documents and policies that refer to principles and objectives for biodiversity management but few have set concrete measurable targets. The relevant Commonwealth and State framework for the development of biodiversity conservation targets is outlined below.

8.2.1 Commonwealth

1) In June 2001 Environment Australia published a comprehensive set of 'National Objectives and Targets for Biodiversity Conservation 2001-2005' that were signed off by State and Territory Governments. The targets can be applied to any land management region and are built on the principle of protecting a sample of the variety of ecosystems present, to ensure their long-term survival.

The targets provided for native vegetation and terrestrial ecosystems state that by 2003 Australia would have:

“clearing controls in place that prevent clearance of ecological communities with an extant below 30% of that present pre-1750;” and

“native vegetation restoration programs to recover ecological communities that are below 10% of that present pre-1750 or are nationally listed as critically endangered”.

This provides a clear and measurable target within a recognised policy position. The effectiveness of these targets is dependent on the approach used to either control clearing or restore ecological communities.

2) The Commonwealth Government, in their National Forest Policy Statement (NFPS – signed in 1992) provide an undertaking to manage Australia's forests to conserve biological diversity. In order to achieve this it was agreed that a comprehensive, adequate and representative (CAR) reserve system be created

(JANIS, 1997 – a Commonwealth-State committee addressing the implementation of the NFPS).

The JANIS criteria for a CAR reserve system included numerical targets. Relevant numerical targets include:

- 15% of pre-1750 distribution of forest ecosystems,
- at least 60% of vulnerable ecosystems, and
- 100% of rare and endangered forest ecosystems.

Vulnerable ecosystems are defined as “approaching a reduction in aerial extent of 70% within a bioregional context and which remains subject to threatening processes; or not depleted but subject to continuing and significant threatening processes which may reduce its extent.

A rare ecosystem is one where its geographic distribution involves:

- a total range generally less than 10,000 hectares
- a total area of generally less than 1000 hectares, or
- patch sizes of generally less than 100 hectares (where such patches do not aggregate to form significant areas)

An **endangered** ecosystem is described as one where:

- its distribution has contracted to less than 10% of the pre1750 distribution (former range)
- the total area has contracted to less than 10% of its former area, or
- 90% of its area is in small patches which are subject to threatening processes and unlikely to persist

Other criteria raised in the JANIS process that could be considered relevant to this project include:

- Reserved areas should be replicated across the geographic range.
- Maximise the area of high quality habitat for all known elements of biodiversity.
- Reserves should be large enough to sustain the viability, quality and integrity of populations.
- Sample the full range of biological variation within each forest ecosystem.
- In fragmented landscapes, remnants that contribute to sampling the full range of biodiversity are vital parts of a forest reserve system.

The NFPS recognises the need to promote the management of forests on private land to meet the conservation goals. It is important to stress that its focus is on forests and not other communities such as heath, grassland, wetlands etc.

The targets and criteria developed under JANIS could be applied to Goulburn Mulwaree Council. They have a sound scientific basis that was developed over

some time. They provide more specific targets for reservation that slide depending on the extent of clearing and risk. The application of reservation would need to be looked at to ensure that it focuses on viable patches and that there are processes to support the implementation. Although reservation comes mostly under the governance of DECC within Goulburn Mulwaree LGA, Council has a role in setting up and managing non-statutory reserves, such as Alison Hone Reserve.

8.2.2 State

The 'National Objectives and Targets for Biodiversity Conservation' and the principles of a CAR reserve system (above) have been endorsed at both the Commonwealth and State level.

- 1)** The 'NSW Biodiversity Strategy' provides a considerable list of 'strategic goals', 'core objectives', principles and targets. The targets have not been developed for application to an LGA scale and are not quantifiable but provide direction on the principles and objectives of biodiversity planning and management.
- 2)** The recent government planning reforms, introduced a Standard Instrument (Local Environmental Plans) Order 2006 which consolidates many regional plans and strategies into one single instrument. Areas and targets identified through a regional or local conservation assessment process should be appropriately managed in the standard instrument.
- 3)** The NSW *Threatened Species Conservation Act, 1995* (TSC Act) contains provisions for the preparation and implementation of Recovery Plans. A Recovery Plan seeks to involve land managers such as Council to co-operatively protect, manage and promote the recovery of the threatened species, population or ecological community. The plans could adopt targets for a species, population or community where it is considered appropriate.

In 2004, the NSW Government reformed the TSC Act to integrate threatened species with rural and urban land use planning and natural resource management, and the development assessment process. Part of this was the introduction of Threatened Species Priorities Action Statement (PAS) to substitute recovery and threat abatement plans.

The TSC Act now requires the Director General of the Department of Environment and Climate Change (DECC) to prepare and adopt a PAS that:

- sets out the recovery and threat abatement strategies to be adopted for each threatened species
- establishes relative priorities to implement the above strategies
- establishes performance indicators to report achievements in implementing recovery and threat abatement strategies and their effectiveness
- contains a status report on each threatened species (where information is available)

- sets out clear timetables for recovery and threat abatement planning and achievement.

4) The *Native Vegetation Act 2003* provides for the management of native vegetation on a regional basis, a ban on broadscale clearing unless it improves or maintains environmental outcomes, the protection of native vegetation of high conservation value having regard to its contribution to such matters as water quality, biodiversity, and encourages revegetation of land. The act is primarily implemented by the catchment management authorities (CMA's) through Property Vegetation Plans (PVPs). The Act covers all of the Goulburn Mulwaree LGA except for land zoned residential, industrial and equivalent, and National Parks.

The then DLWC previously prepared a series of technical papers to support Regional Vegetation Committees¹ (formed under the old Native Vegetation Conservation Act) and they advocate a different approach where a 30/40/30 ratio is adopted. This refers to targets where 30% of the landscape is available for intensive use, 40% for complimentary uses and 30% for protection (of which 15% is in reserves and 15% in covenants Voluntary Conservation Agreements (VCAs) etc). Recommendations for a higher overall coverage is provided to accommodate shifts in condition from major events e.g. fire, cumulative impacts of threatening process e.g. weeds, and major land use changes planned and otherwise.

This approach does not focus on ecosystems but cover of vegetation across the landscape. It does not however define how it determines what a 'landscape' is, so it is assumed that it refers to a definable land system like a floodplain or a mountain range, etc. It appears to be developed for more rural areas where a large proportion (40%) is targeted for the middle category, which may be more difficult to achieve in a rural context.

It is understood that State government is developing this landscape approach further however no formal position has been released. Preliminary discussions have identified that landscapes are likely to be delineated by geology.

Translation of these state derived targets across numerous LGAs and land managers has not been addressed and it raises many issues of application.

8.2.3 Regional

The regional context for Goulburn Mulwaree is documented in the Catchment Action Plans administered by the Southern Rivers, Hawkesbury Nepean and Lachlan CMA's. The relevant biodiversity targets and objectives are briefly outlined below in Table 7. Additionally, the table translates some of these

¹ Regional Vegetation Plans were only gazetted for the Mid Lachlan and Riverina Highlands and are not applicable in Goulburn Mulwaree.

regional targets, where quantifiable, to express the local implications of these CMA plans based on the area of each catchment within the LGA.

8.2.4 *Local Catchment*

At a local catchment level riparian lands form the transition between terrestrial and aquatic environments. The importance of riparian land is well established in scientific literature and is increasingly being recognised in Government legislation, policy and planning instruments.

Table 7. Suggested CMA actions, plans and initiative corresponding to Goulburn Mulwaree LGA.

CMA	Hawkesbury / Nepean	Southern Rivers	Lachlan	Local Outcome (aggregate)
Size (ha):	2,140,000 ha	2,900,000 ha	8,470,000 ha	
Area within GM LGA:	164,838 ha (~51%) (7.5% of CMA)	141736 (~44 %) (4.8% of CMA)	15,591 ha (~5%) (0.2% of CMA)	Total LGA = 322,165 ha
Native Vegetation	Conserve 2300 ha of native vegetation	Increase from 11,000 hectares to at least 41,000 hectares of land managed for conservation.	Increase of 145 000 hectares of terrestrial native vegetation that is being actively managed for biodiversity conservation. 20 000 hectares of terrestrial native vegetation managed for biodiversity conservation in perpetuity.	Approximately 2000 additional hectares of native vegetation to be managed for conservation
Corridors	Improve condition in Mitchell landscapes, priority fauna habitat, and/or areas that are part of the network of regional corridors	Additional 10,000 hectares of native vegetation with connectivity.	5 000 kilometres of corridor habitat is established and/or protected.	500 ha and 10km of corridor
Land Management		Increase in the number of land managers who adopt management practices that conserve biodiversity and promote sustainable production.	100 000 hectares of terrestrial native vegetation are actively managed for biodiversity conservation through management agreements	200 ha managed through conservation agreements
Regeneration of native vegetation	Establish 2300 ha of native vegetation through revegetation	Improve condition (regeneration) of buffers around high priority, existing remnants	20 000 hectares of native vegetation established through revegetation using local endemic species	Approximately 212ha revegetated
Threatened Species	Undertaking actions to assist in conservation of threatened species	Maintain or improve regional status	Highest priority terrestrial and aquatic species managed for conservation.	Follow Priority Action Statements for known species and EECs.
		Implement threatened species strategy	Maintain and improve the habitat of 25 species	

CMA	Hawkesbury / Nepean	Southern Rivers	Lachlan	Local Outcome (aggregate)
		Target threatened species outside protected areas		
Threatening Processes	Reducing negative impacts of invasive species	Identify and include in management plans activities classified as 'threatening processes'	Identify and implement for significant aquatic and terrestrial species	
	Reduce weeds through primary weed control and eradicating new weed outbreaks and emerging weed threats	Vertebrate pest species will be controlled in key locations.	An Integrated Pest Animal Management Plan completed and populations of priority controlled and/or suppressed	
	Sustaining progress of areas treated for invasive plant control	Priority weed species will be controlled in key locations.	Integrated Weed Management Strategy developed and priority actions identified implemented.	
Invasive Species	Reducing conditions that favour invasive species through improving ecosystems	Reducing conditions that favour invasive species	Restrict the extent of priority pest animals and environmental weeds.	
Native Fauna	Improving sustainability of key native fauna populations	For Icon species - identifying key species and populations through subcatchment action plans	An increase in the number of sustainable populations of a range of native fauna species.	

NB: The above table is a summary and is not a comprehensive list of all CMA actions, plans or initiatives.

Riparian land provides a number of important environmental services and other values including:

- a diversity of habitat for terrestrial, riparian and aquatic species;
- food for aquatic and terrestrial fauna;
- movement and recolonisation of plant and animal species and populations;
- shading and temperature regulation;
- conveyance of flood flows;
- settlement of high debris loads;
- reduction of bank and channel erosion through root systems binding the soil;
- water quality maintenance through the trapping of sediment, nutrients and other contaminants;
- an interface between development and waterways;
- visual amenity; and
- a sense of place with green belts naturally dividing localities and suburbs.

Riparian Corridor Management Studies (RCMS) involve setting management objectives and mapping riparian lands. This approach was developed by the DIPNR South Coast Region for a Riparian Study (DIPNR 2004) prepared in response to the 1999 Commission of Inquiry (Col) into the “*Long Term Planning and Management of the Illawarra Escarpment*” in the Wollongong LGA. The study has provided significant input into the *Illawarra Escarpment Management Plan* being developed by Wollongong City Council. They are also being implemented by DECC or DWE? in the North West and South West Growth Centres of Sydney, and on the South Coast Region.

The principles of the RCMS have also been included in the 2004 version of *Managing Urban Stormwater: Soils and Construction*. This manual is produced by Landcom and is more commonly known as the “Blue Book”.

8.3 Goulburn Mulwaree Biodiversity Strategy Targets

The *Native Vegetation Act 2003* and *Threatened Species Conservation Act 1995* and *Drinking Water Catchments Regional Environmental Plan No. 1* instil a planning approach based on the ‘maintain or improve’ test. The Catchment Action Plans have developed specific targets to translate these broad goals across catchments. Table 7 above summarised the relevant biodiversity targets for the three Catchment Management Authorities (CMAs) that cover the LGA.

This Biodiversity Strategy further distils these goals to define specific targets within the Goulburn Mulwaree LGA. The objective of this strategy is:

To improve and maintain the extent and condition of native vegetation, wetlands, riparian environments, known threatened ecological communities and populations of species and reduce the impact of invasive species.

There are a number of methods to achieve this broad objective, they include

1. Strategic Planning – e.g. input into the new LEP
2. Information, Education and Research
3. Council Management i.e.: policies, procedures and development assessment
4. Education and Community Partnerships

Each of the strategies outlined in the following sections contains strategies, actions and in some cases performance measures.

9. Strategic Planning

9.1 Zoning

It is recommended that the provisions in the Draft Goulburn Mulwaree LEP for environmental zones be amended as follows:

- **E1 – National Parks and Nature Reserves**
This is the top order conservation zone and is generally intended to cover existing national parks and nature reserves. All uses currently authorised under the *National Parks and Wildlife Act 1974* will continue to be permitted without consent within this zone.
- **E2 – Environmental Conservation**
This is the top order conservation zone after E1 National Parks and Nature Reserves and is primarily for public and private conservation, with scope for restoration, recovery and maintenance of ecological values including aquatic and terrestrial habitat values, and water quality. The zone needs to prohibit clearing and prescribe only a very limited number of activities to be permissible with consent such as: Environmental facilities, Environmental protection works, filming and road construction. All the activities listed as permitted with consent in this zone should be prohibited apart from actions permitted with consent under the *National Parks and Wildlife Act 1974*.
- **E3 – Environmental Management**
This zone is covered by the Native Vegetation Act. It may not be advisable to enable Agriculture, Extensive Agriculture and Agricultural Protection Industry to be permissible with consent. By allowing for some agricultural activities clearing for RAMAs is therefore currently allowed without consent. The table and objectives need to be clear that any activity that involved clearing would require consent. Environmental facilities and roads should require consent within this zone. Biosolid waste application should not be permissible in this zone. A minimum lot size should be applied to control development density.
- **E4 - Environmental Living**
This is the Environmental Zone that provides for low impact residential development which does not adversely affect 'special ecological, scientific or aesthetic values' The objectives for this zone need to be more specific about these values. It should mention retaining high and medium conservation value native vegetation, and meeting the 'improve or maintain' test for terrestrial and aquatic values. The zone should also have objectives relating to the management, protection and where applicable the improvement/restoration/recovery of environmental and ecological values. All activities that require or result in clearing of native vegetation should require consent in this zone including RAMAs, Private roads and advertising structures.

It is also recommended that the following High Conservation Value land be zoned as summarised in Table 8 below.

Table 8. Summary of zoning recommendations of areas of High Conservation value (HCV)

Environmental assets of high conservation value	Recommended zone	Comments
National Parks, Nature Reserves, and other areas reserved under the NPW Act.	E1	Zone E1 should be applied, as per the Standard Instrument.
Areas currently zoned in Mulwaree LEP 1995 as 7(a) Environmental Protection-Water Catchment, 7(b) Environmental Protection, and 7(b1) Environmental Preservation.	E2 or E3	Equivalent protection should be maintained by the new LEP.
Areas currently zoned in Goulburn LEP 1990 as 7 Environmental Protection (Scenic) Zone.	E2 or E3	Equivalent protection should be maintained by the new LEP.
All areas identified as High Conservation Value or Medium Conservation Value in the Goulburn Mulwaree Biodiversity Strategy.	Environmentally Sensitive Land Overlay	The "Environmentally Sensitive Land" clause applies, requiring consideration of the listed matters in assessment of any development application. See sample clause below.
All vegetation within Regional Corridors	E2 or E3	Prefer E2. Any area of HCV vegetation should be zoned E2 or E3, with no minimum area applying. Dwellings and roads should be prohibited in areas of native vegetation.
All vegetation within Riparian Corridors	E2 or E3	Prefer E2. No minimum area applies. Dwellings should be prohibited.
HCV areas, other than those located within Regional Corridors or Riparian Corridors.	E2 or E3	Areas of HCV Vegetation >10ha to be zoned as E3. Areas <10ha zoned same as surrounding matrix (Rural Landscape?) but will still be covered by Overlay.
Areas subject to Voluntary Conservation Agreements under the NPW Act.	E3	

NOTES

Area thresholds apply to size of HCV vegetation patch, not size of landholding.

9.2 Special Assessment of Ecologically Sensitive Land

Clearing of land identified in the ecologically sensitive areas (high conservation value), regardless of the zoning, requires consent (unless prior consent is granted by the NV Act or PVP). A person must not undertake an action in HCV vegetation where the requirements of the TSC Act and/or an approved Property Vegetation Plan certified by the CMA have not been met.

The conservation value map produced for this report (Figure 4) should be referenced in section 7 of the Draft Goulburn Mulwaree LEP. If the zoning criteria in Section 9.1 is not adopted, ELA recommends consideration of the following proposed new clause (43) for biodiversity. This clause applies to land mapped as HCV in Figure 4.

New Clause 43: Environmental Sensitive Land — Biodiversity

(1) The objective of this subclause is to protect, improve and maintain the diversity of landscapes including;

- (a) protecting biological diversity, native fauna and flora, and
- (b) protecting ecological processes necessary for their continued existence, and
- (c) encouraging the recovery of threatened species, communities, populations and their habitats.

(2) This clause applies to development on land identified as *Environmentally Sensitive Land* on the *Environmentally Sensitive Land – Biodiversity Map*.

(3) For the purpose of this clause the *Environmentally Sensitive Land - Biodiversity Map* means the *Goulburn Mulwaree Local Environmental Plan [year] Environmentally Sensitive Land - Biodiversity Map*.

(4) Consent must not be granted to development unless an environmental assessment has been undertaken to the satisfaction of the consent authority to identify any potential adverse impact on;

- (a) any significant vegetation community, or
- (b) the habitat of any threatened species, populations or ecological communities, or
- (c) any regionally significant species of plant or animal, or
- (d) any habitat corridor, or
- (e) a wetland, or
- (f) biodiversity values within a reserve, including a road reserve or a stock route.

(5) Where an environmental assessment has determined that the development will cause a potential adverse impact the consent authority must be satisfied;

- (a) the development meets the objectives of the clause, and
- (b) that the development is designed, sited and managed to avoid the potential adverse environmental impact, or
- (c) where a potential adverse impact cannot be avoided the development;
 - (i) is designed and sited so as to have minimum adverse impact, and
 - (ii) incorporates effective measures to remedy or mitigate any adverse impact, and
 - (ii) where possible offset any significant adverse impact through the restoration of any existing disturbed areas on the site.

The following more targeted objectives and performance measures have been developed for each layer identified in the conservation significance assessment, specifically for Goulburn Mulwaree LGA. The following provisions should be additional to clause 43 of the LEP:

9.2.1 High Conservation Values (sensitive areas)

Objective

- To protect remaining high conservation value vegetation,
- No trading or offsets permitted unless the proposed development is considered to have a social and economic benefit of state significance,
- To protect and restore buffer areas to high conservation value vegetation, and
- To protect the contribution high conservation value vegetation has to regional connectivity areas and riparian corridors.

Performance Measures

A person must not take an action in or adjacent to high conservation value lands where that action:

- leads to a long-term adverse affect on high conservation value vegetation, or
- reduces the extent of high conservation value vegetation, or
- fragments an occurrence of high conservation value vegetation, or
- adversely affects habitat critical to the survival of high conservation value vegetation, or
- modifies or destroys abiotic factors (such as water, nutrients, or soil) necessary for the survival of high conservation value vegetation, or
- results in invasive species that are harmful to high conservation value vegetation becoming established in an occurrence of these lands, or
- adversely affects the capacity of a regional connectivity area or riparian corridor.

9.2.2 *Medium Conservation Value*

Objectives

- No net loss of medium conservation value vegetation,
- Some flexibility for trading and offsets,
- To protect the viable remnants of medium conservation value,
- To restore medium conservation value when low conservation value native vegetation is to be cleared (a ratio of 3:1 applies), and
- To protect the contribution medium conservation value lands have to regional and riparian corridors.

Performance Measures

A person must not take an action in or adjacent to medium conservation value lands where that action:

- leads to a long-term adverse affect medium conservation value vegetation, or
- reduces the extent of a medium conservation value vegetation, or
- fragments an occurrence of the medium conservation value vegetation, or
- adversely affects the capacity of a regional connectivity area or riparian corridor.

Note: A person must not take an action in or adjacent to medium conservation value vegetation where the requirements of the TSC Act and/or an approved Property Vegetation Plan certified by the CMA have not been met.

9.2.3 *Low Conservation Value*

Objectives

- To protect the viable remnants of native vegetation,
- To restore low or medium conservation value vegetation when any native vegetation is to be cleared (a ratio of 2:1 applies),
- To protect the contribution isolated stands of native vegetation make to regional and riparian corridors.

Performance Measures

- Nil

9.2.4 Riparian Corridors and Wetland buffers

Native vegetation along streams has value for protection of in-stream habitat, prevention of soil erosion and often provides highly valuable habitat areas.

Objectives

- To protect and manage existing good condition native vegetation remnants in Riparian Corridors, and
- To restore degraded native vegetation in riparian corridors, and
- To regenerate native vegetation in cleared areas along Riparian Corridors, and
- To protect and restore buffer areas to native vegetation in the Riparian Corridors, and
- To identify, protect and manage the aquatic ecological values including bed and bank stability, water quality and natural flow regimes,
- To protect the linkages provided by Riparian Corridors, and
- To have a neutral or beneficial effect on water quality.

Performance Measures

Category 1

A person must not take an action in or adjacent to lands mapped as Category 1 (40m from Top of Bank) where that action:

- Is within 10m of the 40m buffer or
- leads to an adverse affect on the condition of native vegetation within the Riparian Corridors, or
- reduces the extent of native vegetation within the Riparian Corridor, or
- fragments an occurrence of native vegetation within the Riparian Corridor, or
- modifies or destroys abiotic factors (such as water, nutrients, or soil) necessary for the survival of native vegetation within the Riparian Corridor, or
- results in invasive species that are harmful to Riparian Corridors becoming established in an occurrence of these lands, or
- diminishes the capacity of a buffer area adjacent to a Riparian Corridor, or
- adversely affects the capacity of a regional connectivity area or riparian corridor, or
- reduces bed and bank stability, or
- adversely affects water quality.

Category 2

A person must not take an action in or adjacent to lands mapped as Category 2 (20m from Top of Bank) where that action:

- Is within 10m or
- leads to a long-term adverse affect on good or moderate condition native vegetation within the Riparian Corridors (moderate/good vegetation defined as less than 50% weed cover and at least a canopy cover of 25% of the lower threshold for the vegetation type), or
- reduces the overall extent of vegetation within the Riparian Corridors, or
- fragments an occurrence of vegetation within the Riparian Corridors, or
- modifies or destroys abiotic factors (such as water, nutrients, or soil) necessary for the survival of vegetation within the Riparian Corridors, or
- results in invasive species that are harmful to Riparian Corridors becoming established in an occurrence of these lands, or
- adversely affects the capacity of the riparian corridor, or
- reduces bed and bank stability, or
- adversely affects water quality.

Category 3

A person must not take an action in or adjacent to lands mapped as Category 3 (10m from Top of Bank) where that action:

- leads to a long-term adverse affect on good condition native vegetation within the Riparian Corridors, or
- fragments an occurrence of vegetation within the corridor, or
- destroys abiotic factors (such as water, nutrients, or soil) or
- results in invasive species that are harmful to Riparian Corridors becoming established in an occurrence of these lands, or
- adversely affects the capacity of the riparian corridor, or
- reduces bed and bank stability, or
- adversely affects water quality.

Note: A person must not take an action in or adjacent to riparian corridors where the requirements under the *TSC Act*, *Fisheries Management Act 1994*, *Rivers and Foreshore Improvement Act 1948* (or *Water Management Act* when it repeals the RFI Act) and *Native Vegetation Act 2003* have not been met.

Wetlands

The performance measures for Category 1 riparian corridors should be applied to 40m buffers surrounding important wetlands whereas performance measures for Category 2 riparian corridors should be applied to 20m buffers of other wetlands.

9.2.5 Regional Corridors

As stated in the Hawkesbury Nepean CAP: "Regional Corridors or pathways aim to link primary landscape features and large areas of similar habitat. Examples include: linking lower slopes to highland communities, coastal plains to escarpment forests, and providing a bridge between sandstone plateaus. The inclusion of altitudinal and latitudinal grades, such as from valley floor to mountain top and north and south along upland plateaus, provides linkages for altitudinal and seasonal migration and allows for adjustments relating to climatic and evolutionary change. A network of regional corridors provides a habitat continuity enabling recolonisation or dispersal after fire or continued drought" (HNCMA, 2006).

Objectives

- To protect and manage existing native vegetation remnants in regional corridors,
- To protect the linkages provided by regional corridors,
- To restore degraded native vegetation, and
- To regenerate native vegetation in cleared areas within and adjacent to regional corridors.

Performance Measures

A person must not undertake an action in or adjacent to lands mapped as regional corridors where that action:

- leads to a long-term adverse affect on native vegetation within the regional corridor areas, or
- reduces the extent of vegetation within the regional corridors, or
- adversely affects the capacity of a regional connectivity area or riparian corridor.

A person must not undertake an action in or adjacent to vegetation within regional corridors where the requirements of the TSC Act have not been met.

9.3 Clarification of Terms

There is a need to define and clarify the use of ecological and environmental terms used to describe values in the Draft LEP. The following range of terms is currently used throughout the document without being defined or differentiated. Many of these terms do not appear in the LEP Template.

- "high biodiversity significance' Clause 18(2)f

- 'ecologically sensitive areas' Part 5. 41
- "special ecological values" RU2, E3 and E4 Objectives
- "areas of high environmental value" E3 Objectives
- 'areas of natural ecological significance' E3 Objectives
- 'significant stands of native vegetation' RU1 Objectives
- "environmentally sensitive areas" RU2 objectives
- 'environmentally sensitive locations' R5 Objectives
- 'habitat of native fauna' 34(5)
- "environmental heritage" 35(1)a and 'heritage conservation area' 35(2)
- 'tree'

9.4 Biocertification

Develop a policy and plan for determining when Biocertification would be appropriate and applicable in the LGA.

1. Liaise with DECC on the requirements for Biocertification
2. Collate and gather data in a format that will inform Biocertification
3. Develop a strategy for determining which aspects or places should be considered for Biocertification.

10. Information and Research

In order to revise, and distribute accurate vegetation mapping information to inform planning decisions, the following actions are recommended:

10.1 Information	Priorities
1. Validate vegetation mapping via a systematic ground truthing and verification process to confirm community, and mapped boundaries of vegetation.	Moderate
2. Develop a systematic approach for updating the mapping and flora and fauna lists in response to changing information (including GIS data as well as legislative changes).	Low
3. Consider the acquisition of new aerial photography of the shire, to be used to interpret and digitise to produce an up to date vegetation map.	Low
4. Regularly update the assessment of conservation significance of remnant vegetation patches and landscape features by revising the conservation significance assessment for vegetation and key landscape features based on ground truthed vegetation condition and connectivity mapping and availability of new data.	Moderate

10.2 Research	Priorities
5. Map 'protected regrowth' across the Shire (or liaise with the Catchment Management Authority) in accordance with the definition of protected regrowth in the <i>Native Vegetation Act 2003</i> .	Moderate
6. It is necessary to develop a consolidation and connectivity network for the LGA and include this (and the defining criteria) into a statutory planning documents. This would involve: <ul style="list-style-type: none"> a) Conduct a 'nearest neighbour' or similar analysis of native vegetation patches to determine potential local corridors to improve connectivity. b) Prepare a study that evaluates opportunities for consolidation and connectivity within the LGA and across the region, including riparian and in-stream connectivity. c) Include regrowth in the consolidation and connectivity network as 'Protected Regrowth', as defined by the <i>NV Act</i>, and outlined above. d) Prepare a series of consolidation and connectivity maps for inclusion or reference to an EPI, based on the findings of the consolidation and connectivity studies above. 	High
7. Consider mapping potential koala habitat across of the Shire, in accordance with the SEPP 44 requirements and methods.	Moderate
8. Prepare a plan of management for lands that trigger SEPP 44 Koala habitat	Low

11. Council Management

There are a number of management actions in relation to Councils operation or incentive programs that require revision or updating. These are outlined below:

11.1 Council Polices	Priority
1. Revise and update all other planning instruments such as the DCP, used by Council to ensure that they are compatible with the Council's biodiversity objectives and the new LEP.	High
1. Revise the Tree Preservation Order (TPO) to ensure that ALL clearing of native vegetation (other than in specified situations e.g. Farm forestry, wind breaks) and any activity disturbing native vegetation be covered by the TPO and require council consent where this is not already prescribed by the <i>Native Vegetation Act 2003</i> . Revise the DCP to prescribe the trees or other vegetation to which clause 43 of the LEP applies by reference to species, size, location or other manner.	High
2. Ensure biodiversity objectives are reflected in Councils S94 plans	High
3. Promote the adoption of compatible biodiversity objectives and mechanisms for all regional planning instruments and policies.	Low

11.2 Development Approval	Priority
1. Ensure biodiversity issues are addressed at all stages of the site based activity and development assessment and approvals process	High
2. Develop assessment guidelines to ensure biodiversity issues are addressed early in the development planning process (e.g. use of Conservation Value GIS data to trigger assessment)	Moderate
3. Develop model development consent conditions, that address protection, maintenance and improvement of biodiversity values	Low
4. Prepare a fact sheet that can be used to guide pre-development application advice, tailored for each zone and land identified as having high and medium conservation values.	Moderate
5. Utilize specialist ecological expertise in reviewing DAs and developing consent conditions. This could be in-house expertise or external independent expertise or a combination of both.	High
6. When determining significance of impact on Endangered Ecological Communities (TSC Act) and cumulative impact (under the EP&A Act) consider conservation significance assessment and maintain and improve objective, along with the targets of the LGA and the relevant CAPs.	High
7. Consider the conservation significance assessment mapping prior and during master planning of new release areas and other master planning processes	Moderate
8. Establish a policy and procedure for managing clearing consents for situations when both Council and the CMA are consent authorities.	Moderate
9. Develop compliance and auditing process to ensure compliance with the consent conditions.	Low
10. Develop (or use agency) guidelines for flora and fauna assessment, for both Council staff and private consultants.	High

11.3 Council Owned Land	Priority
1. Prepare a generic plan of management (POM) for all Council owned reserves (e.g. Alison Hone Reserve), with specific plans developed, for high conservation community land or where other specific biodiversity values are identified, or as required.	High
2. Council landscaping projects to use locally occurring native species, with the aim of recreating the full suite present in original plant communities, or at least using local provenance species from all vegetation structures originally present (ground cover, shrubs and canopy)	High
3. Complete a roadside management plan for the entire LGA.	High
4. Develop the Roadside and TSR, Threatened Species Register into a strategy to preserve and promote native vegetation along roadsides and provide for connectivity.	Moderate
5. Establish management actions such as 'no mow', seasonal mowing and/or 'no go' zones on Council lands with potential to enhance natural and habitat values, and to encourage regeneration, especially in riparian, woodland and grassland areas. Certain grasses and forbs in grasslands or woodlands are best managed by seasonal slashing, burning or grazing during periods when these species are not flowering or seeding fruiting. Some grassy ground layers benefit from judicious biomass control. Optimal times are defined by component species flowering and seeding times.	Low
6. Adopt a Best Practice Bushland/Grassland Management operating procedures for the management of Council reserves (e.g. Alison Hone Reserve).	Low
7. Support the continuation of existing programs of bushland regeneration and keep a record of works on Geographic Information Systems.	High
8. Prioritise Council's land acquisition program to acquire land that has high conservation significance, and seek funding from the Catchment Management Authority to support land acquisition and management.	Moderate
9. Investigate opportunities for additional and/ or extended reserve systems - including linkages with regional and inter-regional conservation corridors.	Moderate
10. Seek funding to introduce best management standards practises on Council owned lands; identify prioritise and develop projects for funding opportunities to restore/improve management for biodiversity on Council owned lands.	Low

11.4 Council Programs	Priority
1. Develop an environmental code of practise, designed to mitigate any negative biodiversity impacts related to works undertaken by Council;	High
2. Design and develop training programs focussing on environmental management and biodiversity conservation for Council staff.	High
3. Investigate a range of financial and non financial mechanisms for landholders that may be used as a reward for entering into voluntary conservation agreements or covenants that will contribute to biodiversity conservation	High
4. Use conservation significance assessment to identify priority bushland, grassland and corridor areas to be targeted by community bush regeneration projects, and threat management activities.	High
5. Require that integrated stormwater management plans are established for new developments to improved stormwater drainage, particularly surrounding remnant bushland.	Moderate
6. Promote and implement the use of water sensitive urban design (WSUD) in all maintenance and improvement works, as well as for new projects and developments	Moderate
7. Set a system in place to ensure consent conditions applying to a property be communicated to concurrent property owners	Moderate

11.5 Pest Species	Priority
1. Continue to expand and adjust Council's weed management strategies to use the conservation significance assessment mapping to prioritise weed control programs and inform LGA wide weed management strategies, with a focus on weed infestation and /or those weeds listed as key threatening processes.	Moderate
2. Council to fulfil obligations under the <i>Noxious Weeds Act 1993</i> on council owned land.	High
3. Ensure that weed clearing notices do not adversely impact land identified as significant by this biodiversity strategy or the threatened species legislation.	Moderate
4. Issue notices for weed control on privately owned land, in accordance with the <i>Noxious Weeds Act 1995</i> .	High
5. Outline the responsibilities of landholders to remove noxious weeds, and include information about environmental weeds occurring in the Shire with this advice including s149 certificates.	Moderate
6. Require that all new developments provide integrated weed management strategies.	High
7. Continue to undertake roadside weed control programs to prevent roadside weeds spreading to adjoining bushland/grassland, and seek partnerships with other roadside managers.	High
8. Continue, expand and adjust current feral animal control strategy and maintain partnerships with the Rural Lands Protection Board (RLPB), NSW Department of Primary Industry (Agriculture), DECC and landholders regarding feral animals.	Moderate
9. Promote responsible ownership of companion animals such as dogs and cats, thereby minimising the impact of animals on native species while also recognising the benefits they provide.	Low

11.6 Fire	Priority
1. Manage fire for the protection of life, property and biodiversity through incorporating biodiversity issues into the review and development of bushfire risk management plans	High
2. Seek advice on appropriate fire regimes (minimum and maximum inter-fire periods) for each vegetation community on council land and build this into fire management/hazard reduction plans.	High
3. Identify and map fire history across all bushland, and link to monitoring and reporting in the Goulburn Mulwaree State of Environment Report.	Moderate
4. Consider including 'heads of consideration' about appropriate fire regimes for sensitive vegetation communities in advice given to development applicants within lands identified in the Ecologically Significant lands areas.	Low

12. Education, community and regional partnerships

12.1 Education (Council)	Priority
1. Provide vegetation mapping to DA/AA (Activity Approval) applicant	High
2. Provide electronic and hard copy vegetation remnant and conservation significance mapping to relevant managers in Council.	High
3. Develop a partnership with local schools and universities in the region and support biodiversity studies in the educational curricula, and undertake joint research and/or monitoring projects.	Low
4. Initiate and develop a strategy and process to formalise a partnership with the local Aboriginal community that focus's on the management of biodiversity and ensures that Aboriginal sites are protected.	Moderate
5. Develop and publish a 'flora and fauna of Goulburn Mulwaree' handbook, to be used by the local community and Council staff for educational purposes and to promote biodiversity.	Moderate
6. Prepare and publish education material to highlight the various vegetation communities that exist in the region, in order to help raise awareness and change attitudes (this could be a joint project with the CMAs)	Moderate
7. Update Council's website in order to effectively disseminate biodiversity information and educational material, including the provision of vegetation mapping.	High
8. Provide information to the community on what they can do to promote biodiversity in their backyards	Moderate

12.2 Community and Regional Partnerships	Priorities
1. Adopt and support community based programs and provide incentives that encourage and assist landholders in managing their land for the conservation of biodiversity	High
2. Continue to encourage and support the development of Landcare and Bushcare groups	High
3. Develop a communication strategy with CMAs and the community to support the achievement of CAP and Biodiversity Strategy targets.	Moderate
4. Develop a communication strategy with adjacent councils and the community to support the achievement of Biodiversity Strategy and CAP targets through identifying opportunities for joint funding and other mechanisms.	Moderate
5. Work with the CMAs to support landholders to develop property vegetation plans which support native vegetation retention and management with an aim of streamlining and simplifying the DA process.	Moderate
6. Encourage participation in the River Health Strategy so that the number of reaches along which landowners and community is involved is increased in the LGA (a priority target MT C1-2 in HNCMA CAP, 2006) by involvement in education and outreach programs.	High
7. Identify reaches of riparian areas in the LGA along which there is little community involvement in their management (using Figure 6 in HNCMA CAP, 2006)	High
8. Seek funding from state and federal governments (including CMAs) to fund community conservation projects.	High
9. Support landowners in rural and semi rural areas to develop whole farm management plans, which contain actions that will contribute to biodiversity conservation, and include a property vegetation plan.	Moderate
10. Investigate rate reduction or other financial incentives for land managed to achieve regionally important conservation outcomes.	Low
11. Develop a community nursery and seed bank, and promote these resources as a source of locally indigenous plant stock to be used for re-vegetation projects.	High

12.3 Review of Council functions and responsibilities	Priorities
1. Develop, implement and review a reporting, monitoring and evaluation framework to assess achievement of Biodiversity Strategy Targets, possibly in collaboration with CMAs.	High
2. Develop and support community monitoring programs seeking funding from state and federal government sources as suggested in 12.2 (8).	High
3. Collate and disseminate information on biodiversity outcomes in appropriate formats such as GIS, newsletters, meetings and the council website. Liaise with CMAs to allow transfer of data and information and to encourage potential collaboration.	High
4. Report back to landowners, community groups and key stakeholders on the results and roles of their actions in the achievement of biodiversity targets and objectives.	High
5. Review Councils functions and responsibilities in response to improved biodiversity outcomes.	High

12.4 Prioritisation of Strategies

The priorities for implementation of this strategy will be subject to Council funding and discretion, however the implementation of the Strategic Planning outcomes recommended in this Biodiversity Strategy will be critical in securing the longer term future of the Goulburn Mulwaree's biodiversity. These strategic planning recommendations also coincide with the review of the Goulburn Mulwaree LEP and as such are the highest priority.

13. Summary

The development of the conservation significance assessment for the Goulburn Mulwaree Local Government Area is based on the best available local and regional data at the time of compilation. There is however a range of surveys and mapping that have been highlighted that could improve the accuracy and application of this data set.

The data set provides a robust planning layer to inform Council of the high, moderate and low conservation value remnant vegetation and highlights riparian and corridor vegetation of particular importance within the LGA and at a regional level. It is important to note that all remnant vegetation is valuable and that this strategy does not extinguish the requirements of state and commonwealth environmental law with regard to threatened species and communities that occur in the area.

A range of recommended actions have been described and assigned priorities subject to Councils budgetary and resource demands. Zoning recommendations are offered and as a critical minimum the ecological sensitive overlay showing high conservation values is suggested to be integrated into clause 43 of the draft Goulburn Mulwaree LEP. The overlay is the result of the conservation significance assessment and the provisions outlined in Section 9.2.

Performance measures are provided for areas of high and medium conservation values, as well as riparian areas, wetlands and habitat corridors. Actions relating to information, council management, education, community and regional partnerships are listed in order to provide targets and objectives against which biodiversity outcomes can be assessed. The conservation values presented in the data can also be used to trigger local assessments such as those needed for Development Approvals.

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