

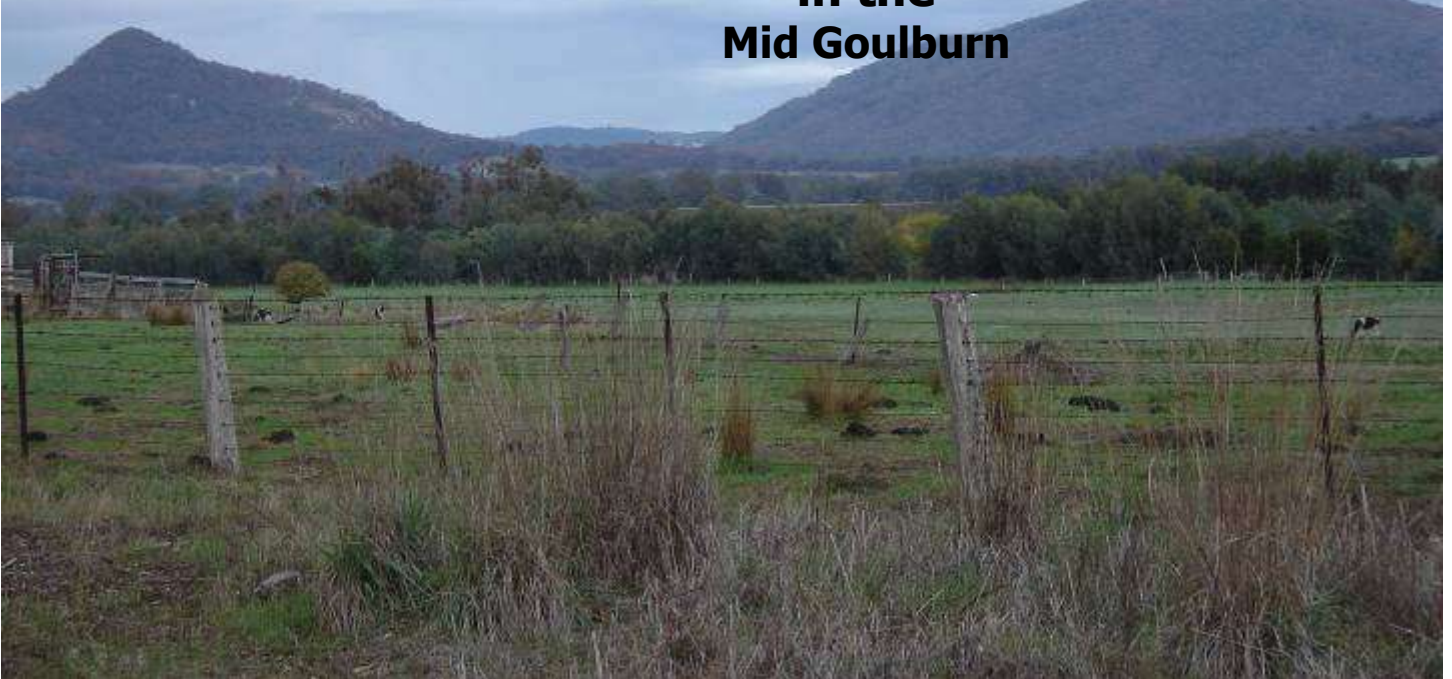
Conservation Plan

for the

Strathbogie Landscape Zone



Biodiversity Action Planning in the Mid Goulburn



Department of Sustainability and Environment
Department of Primary Industries



**GOULBURN
BROKEN**
CATCHMENT
MANAGEMENT
AUTHORITY



Australian Government

Developed By:

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EXECUTIVE SUMMARY

The **ultimate aim** of Biodiversity Action Planning (BAP) is to achieve broad-scale conservation of native biodiversity. BAP identifies priorities for the conservation of native biodiversity, as part of the implementation of the Victorian Biodiversity Strategy 1997. It is not a 'stand-alone' project; rather a process for translating objectives set out in Victoria's Biodiversity Strategy to regional, catchment and local level (Victoria's Biodiversity Strategy fulfils a statutory requirement under Section 17 of the *Flora and Fauna Guarantee Act 1988* and provides the biodiversity action plan for Victoria).

To **translate objectives** from state to regional, catchment and local landscape level, Victoria was first divided on a bioregional basis (bioregions) and then at a landscape level (landscape zones). The 'Central Victorian Uplands Bioregional Plan' and the 'Mid Goulburn Region North Landscape Zone Plan' outline biodiversity priorities at the bioregional level. This Conservation Plan has been developed at the local (landscape) level and is intended to assist government agencies (primarily extension staff) and the community, to work in partnership towards achieving catchment targets, by setting priority areas for protection and enhancement of native biodiversity. This plan is also intended to enable biodiversity priorities, data and advice, to be disseminated through existing planning processes, to landholders and agencies.

The **methodology** used to develop this plan is according to the 'Developers Manual for Biodiversity Action Planning in the Goulburn Broken Catchment (GBCMA 2004a)'. Two important components of the BAP process are the 'focal species' approach and the 'key biodiversity assets' approach. The **focal species** approach uses the habitat requirements of a particular species, or a group of species, to define the attributes that must be present in a landscape, for these species to persist. Five focal species have been identified in the zone: Sacred Kingfisher, Eastern Yellow Robin, Bush Stone Curlew, Brush-tailed Phascogale and Long-nosed Bandicoot. These focal species have been chosen in order to promote the uptake of actions, for conservation within the Zone.

The **key biodiversity asset** approach is a method of grouping biodiversity assets (eg. birds, animals and plants) that use the same type of habitat. Five key biodiversity assets were identified for the Strathbogie Zone: Riparian Systems and Bogs, Herb-rich Foothill Forest, Valley Grassy Forest, Dry Forest, Grassy Woodlands. The grouping of these assets will assist in targeting the very high value sites first, down to the lowest priority sites.

The **Strathbogie Landscape Zone** is located within the Goulburn Broken Catchment of Victoria. The Zone, which is approximately 93,000 hectares, is within sections of the Central Victorian Uplands and Highlands Northern Fall bioregions, and the Local Government area of Mansfield, Strathbogie and Rural City of Benalla. The Strathbogie Landscape Zone is predominantly covered by the Highlands Fall bioregion which reaches across the broad Strathbogie massif. The massif is largely cleared, but the higher plateau and steep escarpments are forested.

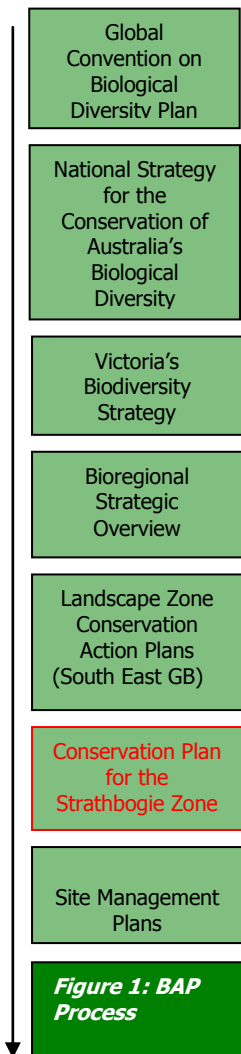
Within the Strathbogie Landscape zone 405 **priority environmental sites** have been identified. These priority sites have been determined and ranked (very high, high, medium or low) based on factors such as, size, quality, Ecological Vegetation Class (EVC) conservation status, threatened species, landscape context and field surveying. These sites contain remnant vegetation and vary greatly in size, from a stand of paddock trees, to large core areas such as Strathbogie State Forest.

Management actions (advisory only) have been developed for the Strathbogie Landscape Zone, based on the results of desktop analysis and surveying. It is intended that government agencies and the community, work together to incorporate these actions, in to existing projects/strategies, for the benefit of biodiversity conservation in the Strathbogie Landscape Zone, as well as the Mid Goulburn Region and the Goulburn Broken Catchment.

CONTENTS

SECTION	PAGE
EXECUTIVE SUMMARY	3
CONTENTS.....	4
1.0 BACKGROUND	5
1.1 INTRODUCTION	5
1.2 OBJECTIVES.....	5
1.3 CONTEXT FOR DEVELOPING THE STRATHBOGIE CONSERVATION PLAN	6
2.0 THE STUDY AREA	8
2.1 LANDSCAPE	8
2.2 VEGETATION.....	10
2.3 SIGNIFICANT FLORA AND FAUNA	14
2.3.1 Flora:.....	14
2.3.2 Fauna:	15
3.0 PREPARING A CONSERVATION PLAN	16
3.1 METHODOLOGY.....	16
4.0 IDENTIFYING PRIORITY SITES	18
5.0. SUMMARY OF SITE SURVEYING	19
5.1. VEGETATION QUALITY ASSESSMENTS	19
5.2 BIRD SURVEYS.....	19
5.3 CONSERVATION THREATS	19
5.4 SITE PRIORITISATION	21
6.0 BIODIVERSITY ASSETS	23
6.1 FOCAL SPECIES.....	23
6.2 KEY BIODIVERSITY ASSETS	25
7.0 PRIORITY ACTIONS - KEY BIODIVERSITY ASSETS.....	28
<u>7.1) KEY BIODIVERSITY ASSET – RIPARIAN SYSTEMS and BOGS</u>	29
<u>7.2) KEY BIODIVERSITY ASSETS – GRASSY WOODLAD</u>	31
<u>7.3) KEY BIODIVERSITY ASSET – DRY FOREST</u>	33
<u>7.4) KEY BIODIVERSITY ASSET – VALLEY GRASSY FOREST</u>	35
<u>7.5) KEY BIODIVERSITY ASSET - HERB-RICH FOOTHILL FOREST</u>	37
8.0 MONITORING	39
9.0 FURTHER INFORMATION - PRIORITY SITES	42
10.0 LANDHOLDER ASSISTANCE.....	44
11.0 REFERENCES	46
12.0 ACKNOWLEDGMENTS	48
13.0 APPENDICES.....	49
APPENDIX 1 – VICTORIAN BIOREGIONS	50
APPENDIX 2 – VICTORIAN LANDSCAPE ZONES	51
APPENDIX 3 – GOULBURN BROKEN CATCHMENT TARGETS	52
APPENDIX 4 –THREATENED FLORA.....	53
APPENDIX 5 – THREATENED FAUNA	54
APPENDIX 6 – SITE PRIORITISATION METHOD	55
APPENDIX 7 – VEGETATION QUALITY ANALYSIS (VQA) ASSESSMENT FORM	56
APPENDIX 8 – LANDSCAPE CONTEXT MODEL (LCM).....	58
APPENDIX 9 – PRIORITY SITE INFORMATION (MAPPING):	59

1.0 BACKGROUND



1.1 INTRODUCTION

The ultimate aim of Biodiversity Action Planning¹ (BAP) is to achieve broad-scale conservation of native biodiversity. BAP identifies priorities for the conservation of native biodiversity, as part of the implementation of the Victorian Biodiversity Strategy (Crown 1997). In particular, it aims to:

- Conserve native biodiversity² by maintaining viable examples of the range of ecosystems that occur naturally in Victoria,
- Promote a more strategic and cost-effective expenditure of public funds for the protection, restoration and ongoing management of priority biodiversity sites
- Achieve community support for biodiversity landscape planning and the conservation of strategic assets, in rural landscapes (Platt & Lowe 2002).

In order to achieve these aims, effective planning for native biodiversity also requires detailed planning at a bioregional and landscape level. Therefore, Victoria was first divided on a bioregional basis (Appendix 1) and then at a landscape level (landscape zones)(Appendix 2).

At the regional scale the 'Bioregional Strategic Overview for the Victorian Riverina Bioregion' and the 'Landscape Plan for the Goulburn Broken CMA - Mid Goulburn Region - North Zones', identifies the broad priorities for biodiversity conservation in the region. They also provide the foundation for producing detailed plans, such as the 'Strathbogie Landscape Zone Conservation Plan (Anderson et al 2003). At the landscape level, this Strathbogie Landscape Zone Conservation Plan, is intended to provide a biodiversity conservation resource for the community at a local level. Figure 1 illustrates the BAP process and where the Strathbogie Landscape Zone Conservation Plan (highlighted in red) fits within a policy context.

1.2 OBJECTIVES

The 'Strathbogie Landscape Zone Conservation Plan' has been developed at the local (landscape) level and is intended to assist government agencies (primarily extension staff) and the community, to work in partnership towards achieving catchment targets. This plan aims to ensure that private and public resources expended for conservation are targeted to priority sites. In this way, available resources can be used for the greatest possible outcomes. There are 405 priority sites, identified in the Strathbogie Zone, ranging across very high, high, medium or low value. The protection and management of these priority sites, is important for the conservation of flora and fauna in the local area.

Broadly, this plan details:

- The landscape, vegetation and significant flora and fauna of the Strathbogie Zone,
- Conservation vision for the Strathbogie Landscape Zone,
- Priority assets to be conserved, their biodiversity value and threatening processes,
- Actions to protect and restore these assets, and
- Monitoring opportunities for the Zone.

¹ For further information on Biodiversity Action Planning visit the Department of Sustainability and Environment website at www.dse.vic.gov.au

² Biodiversity: the natural variety of life: the sum of our native plants and animals, the genetic variations they contain, and the natural ecosystems they form (NRE 1997)

1.3 CONTEXT FOR DEVELOPING THE STRATHBOGIE CONSERVATION PLAN

The Goulburn Broken Regional Catchment Strategy (GBRCS) identifies a vision for biodiversity in the catchment. The vision is that “the community will work in partnership with Federal and State Governments and other agencies, to protect and enhance ecological processes and genetic diversity, to secure the future of native species of plants, animals and other organisms in the catchment” (GBCMA 2003 p87). This Strathbogie Landscape Conservation Plan is to assist in achieving this vision, through providing a strategic coordinated approach, for conservation of priority assets.

The GBRCS also identifies targets and priorities for the catchment (refer to Appendix 3 for further detail). The following points are intended to provide a summary of the Goulburn Broken Regional Catchment Strategy targets and priorities for biodiversity conservation. For further information please refer to GBCMA 2003.

The Goulburn Broken Catchment Management Strategy identifies the following biodiversity resource condition targets for native vegetation in the catchment:

1. Maintain the extent of all native vegetation types at 1999 levels in keeping with the goal of ‘Net Gain’ listed in Victoria’s Biodiversity Strategy 1997,
2. Improve the quality of 90% of existing (2003) native vegetation by 10% by 2030,
3. Increase the cover of all endangered and applicable vulnerable Ecological Vegetation Classes to at least 15% of their pre-European vegetation cover by 2030,
4. Increase 2002 conservation status of 80% threatened flora and 60% threatened fauna by 2030,
5. Maintain the extent of all wetland types at 2003 levels where the extent (area and number) has declined since European settlement, and
6. Improve the condition of 70% of wetlands by 2030, using 2003 as the benchmark for condition (GBCMA 2003 p11).

Priorities for action to conserve biodiversity in the Goulburn Broken are driven by the conservation significance of the biodiversity asset. Regional investments in biodiversity conservation in the Goulburn Broken Catchment are driven by the following goals (in order of priority):

1. **Protecting** existing viable remnant habitats and the flora and fauna populations they contain (ie through reservation, covenants, management agreements, fencing and statutory planning),
2. **Enhancing** the existing viable habitats that are degraded (management by controlling threats such as pest plants and animals, grazing, salinity, promotion of natural regeneration and/or revegetation with understorey), and
3. **Restoring** under-represented biodiversity assets to their former extent by revegetation (to create corridors, buffers, patches of habitat) (GBCMA 2003).

It is intended that the actions outlined in this plan will complement the targets of the GBRCS and other policy/strategies pertinent to the state, catchment and region (eg. Victoria’s Native Vegetation Management – A Framework for Action (NRE 2002a): Goulburn Broken Native Vegetation Management Plan (GBCMA 2000): and the Victorian River Health Strategy (NRE 2002b). This plan is also intended to integrate such policies (eg. targets and legislative requirements) in to the one document, for use by local communities. For example, this plan incorporates aspects of legislation (eg. Action Statements prepared under the Flora and Fauna Guarantee Act 1988), in to recommended on-ground actions, for the conservation of threatened species and communities.

The Biodiversity Action Planning (BAP) process uses current scientific knowledge to produce an ‘ideal’ landscape for biodiversity conservation. This ‘ideal’ landscape provides for the current levels of species abundance, diversity and interactions. BAP attempts to take a strategic approach to the conservation of threatened and declining species and vegetation types, by looking for opportunities to conserve groups of species in appropriate ecosystems (Platt & Lowe 2002). It is therefore intended that this Strathbogie Landscape Zone Conservation Plan will assist government agencies and the community, to work in partnership towards achieving catchment targets and an ‘ideal’ landscape, by setting priority areas for protection and enhancement of native biodiversity.

This plan is not intended to be a method of 'taking over' land, but rather a resource document, that assists with identifying priority assets and methods of action, to protect or restore valuable assets, through voluntary extension principles. This document may be used by agencies and community groups, for informing existing projects and for strategic planning. However, it must be remembered that this document is by no means 'comprehensive', as the BAP process relies on the regular updating of information, to keep it accurate and timely. The plan has therefore been developed as an adaptive plan, to enable management actions and information to be modified, in response to further information (eg monitoring).

This plan will be reviewed when necessary to ensure that it remains a 'living' document. It is also intended that extension staff will use Geographic Information System (GIS) programs, databases and DSE/DPI staff, to fully identify and understand the BAP process and to provide further information to the community. Consultation and extension with relevant stakeholders, including agencies and community groups, was conducted (and will continue to occur) throughout the development and implementation of this plan. It is envisaged that this plan will be a valuable resource, for identifying priority biodiversity sites and initiating further conservation works in the Zone, and at a later stage, will lead to further sites and projects being identified by interested individuals and groups.

2.0 THE STUDY AREA



2.1 LANDSCAPE

The Strathbogie Landscape Zone covers an area of 93,000 ha, and contains sections of the Central Victorian Uplands and Highlands-Northern Fall Bioregions, within the Goulburn Broken Catchment (Figure 2). The major town in the zone is Swanpool, while other towns include Warrenbayne, Strathbogie and Tallangalook. The zone crosses the Local Government areas of Mansfield, Strathbogie and Rural City of Benalla. The western, southern and eastern boundaries of the Strathbogie Landscape Zone follow the Highlands – Northern Fall/Central Victorian Uplands bioregional interface with Hughes Creek, Lake Eildon and Samaria Landscape Zones. The northern boundary is another bioregion interface between Central Victorian Uplands and Victorian Riverina bioregions from Sheans Creek east to Swanpool. The Midlands Highway is the major regional road running along the eastern boundary. The Strathbogie massif is the dominating landform in the zone with Mount Strathbogie the highest point (1007m). The massif is the source of numerous waterways including; Seven Creeks, Honeysuckle Creek, and 5 Mile Creek and Moonie Creek which both drain into the Broken River. Approximately 57% of native vegetation cover has been cleared within the zone and the majority of the remnant vegetation occurs on public land (Strathbogie State Forest), roadside and riparian strips, or as scattered remnants.

Private land covers 49% of the zone and various plantations 8% (CGDL 2005). The massif is largely cleared, but the higher plateau and steep escarpments are forested. Land clearing is also associated with the plains and valley floors. Extensive areas of private land occur in the west and to the northeast of the massif. The native vegetation remaining on private land is generally fragmented, and usually highly disturbed. Eleven Trust for Nature conservation covenants exist on private land totalling 257ha (CGDL 2007).

Public land covers the remaining 43% of the Zone and is predominantly associated with the Strathbogie State Forest (20,214ha) and numerous reserves including Seven Creeks, Balmattum, Bald Hill and the largest Mt Wombat (773ha). Despite the impacts in this zone there are substantial core areas with threatened species associations and numerous waterways and roadsides that contain important habitat elements, such as large old trees and a diversity of structure, as well as providing important linkages across landscapes.

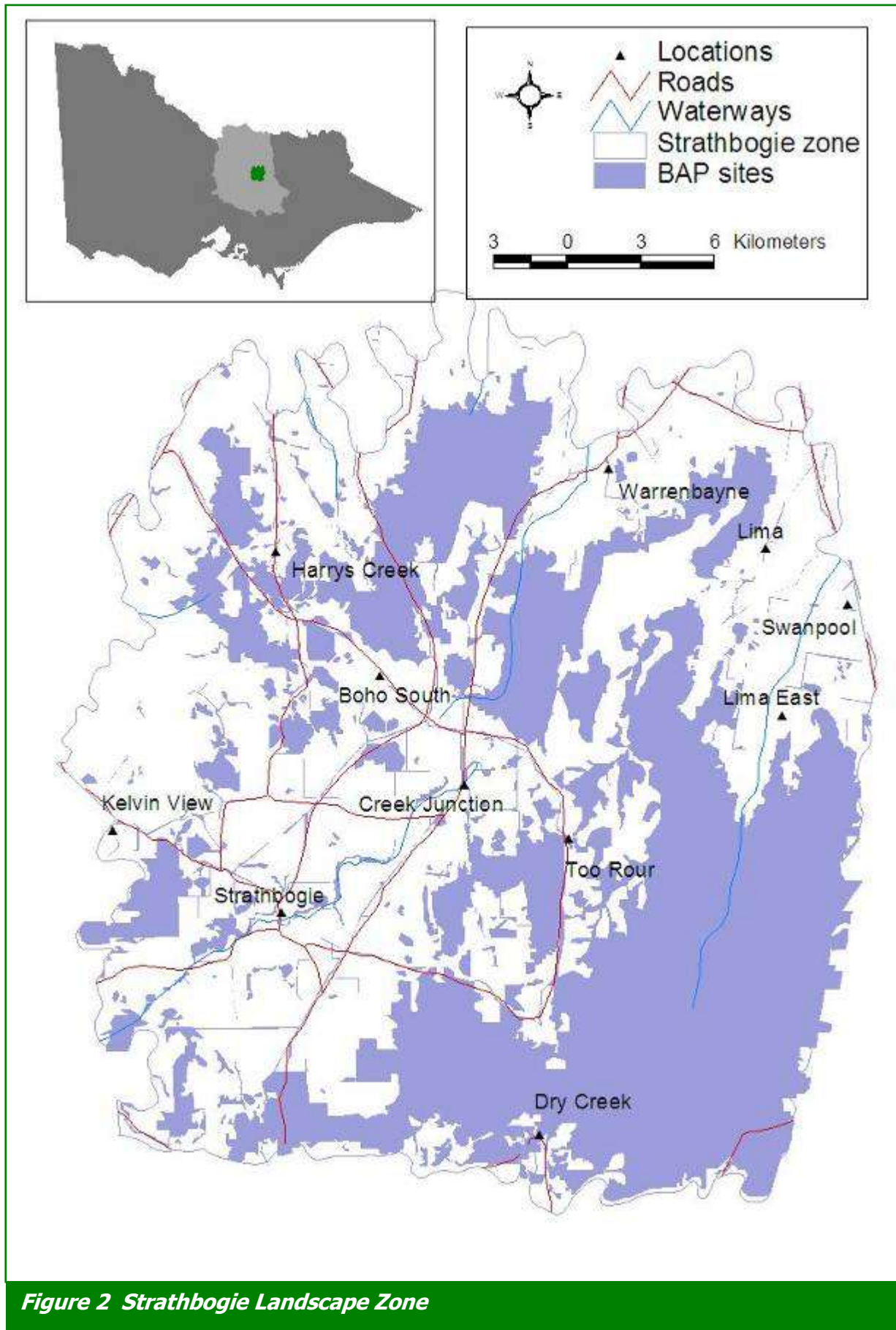


Figure 2 Strathbogie Landscape Zone

2.2 VEGETATION

Ecological Vegetation Classes (EVCs) are a vegetation classification system, derived from groupings of vegetation communities based on floristic, structural and ecological functions. Mosaics (combinations of EVCs) are a mapping unit, where the individual EVCs could not be separated, at the scale of 1:100,000 (Berwick, 2003).

Prior to European settlement, 20 EVCs were known to have been present within the Strathbogie Landscape Zone (Figure 3). The most wide spread EVCs were Herb-rich Foothill Forest, Grassy Dry Forest and Valley Grassy Forest.

Herb-rich Foothill Forest dominated the Highlands – Northern Fall bioregion area from Marraweeny in the north to Dry Creek in the south. Swampy Riparian Woodland/Perched Boggy Shrubland Mosaic was scattered throughout the Seven Creeks and its tributaries in the Strathbogie area. Remnants of this EVC mosaic occur at the Strathbogie North Creek junction and Strathbogie South and some of the Grassy Woodland along the north and north-west boundary have been cleared or modified for agricultural land use. Moone Moonee Creek in the west of the zone has been predominantly cleared of its Riparian Forest/Swampy Riparian Woodland Mosaic and Swampy Riparian Woodland west of Swanpool to Lima East. Heathy Dry Forest, Herb-rich Foothill Forest and Damp Forest in the Tallangalook State Forest is representative of the pre-1750's vegetation. Many blocks of softwood plantation are scattered near Dry Creek and to the north, replacing large amounts of Herb-rich Foothill Forest. Outside the State Forest and to the west, Herb-rich Foothill Forest is largely fragmented (Anderson et al 2003).

The nationally threatened community Box-Gum Grassy Woodlands and Derived Grasslands occurs in a number of locations in the Strathbogie Zone. It is associated with the EVCs Plains Grassy Woodland and Grassy Woodland and protected under the Environmental Protection and Biodiversity Conservation Act (EPBC Act). The threatened Lima Stringybark *Eucalyptus alligatrix* subsp *limaensis* is only found in a small area near Swanpool and is associated with the EVC Valley Grassy Forest and found predominantly along roadsides.

There has been selective clearing of EVCs with drier areas less cleared than EVCs associated with more fertile soils. Of the 20 EVCs thought to occur in the zone prior to settlement, 10 (50%) are considered to be Endangered or Vulnerable and 10 considered Depleted or Least Concern (See GBCMA 2000 for details of categories). The Goulburn Broken Native Vegetation Plan describes goals and targets that have been set for the vegetation communities within the catchment. This includes ensuring that all EVCs are at least 15% of the pre-European cover by 2030 (GBCMA 2000). Eight of EVCs within the Strathbogie Landscape Zone are below the 15% target (Table 1). Therefore, revegetation in this zone could be used to help achieve bioregional targets. For further details on each EVC contact GBCMA or DSE staff.

The current extent of native vegetation in the Strathbogie Zone has significantly reduced (Figure 3 & 4) since European settlement, primarily due to clearing. Table 1 identifies the EVCs in the Zone, including their Bioregional Conservation Status (BCS), their pre-European settlement extent and current (as of 2003) extent (in hectares and % cover).

The Goulburn Broken Regional Catchment Strategy (RCS) identifies goals and targets that have been set for the vegetation communities within the catchment (Appendix 3). This includes "increasing the cover of all 'Endangered' and 'Vulnerable' (where applicable⁴) EVCs to at least 15% of their pre-European vegetation cover by 2030" (GBCMA 2003). The majority of EVCs (14) within the Strathbogie Landscape Zone meet the 15% target (Table 1). There are 7 'Endangered' EVCs and 4 'Vulnerable' EVCs at the Bioregional level (Anderson et al 2003).

⁴ Applicable to Ecological Vegetation Classes that are 'Vulnerable' and are below 15%

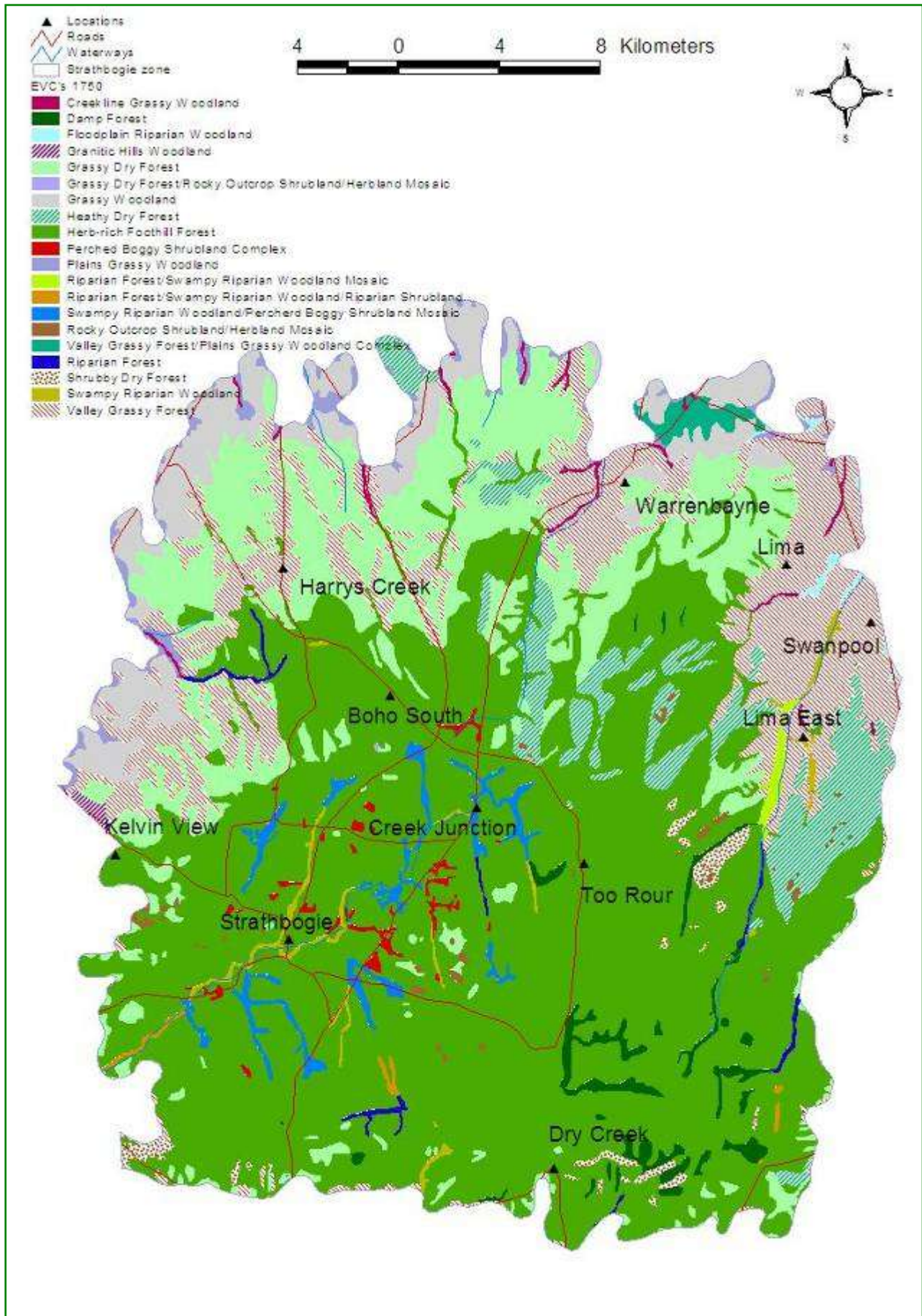


Figure 3: Pre 1750 distribution of EVCs

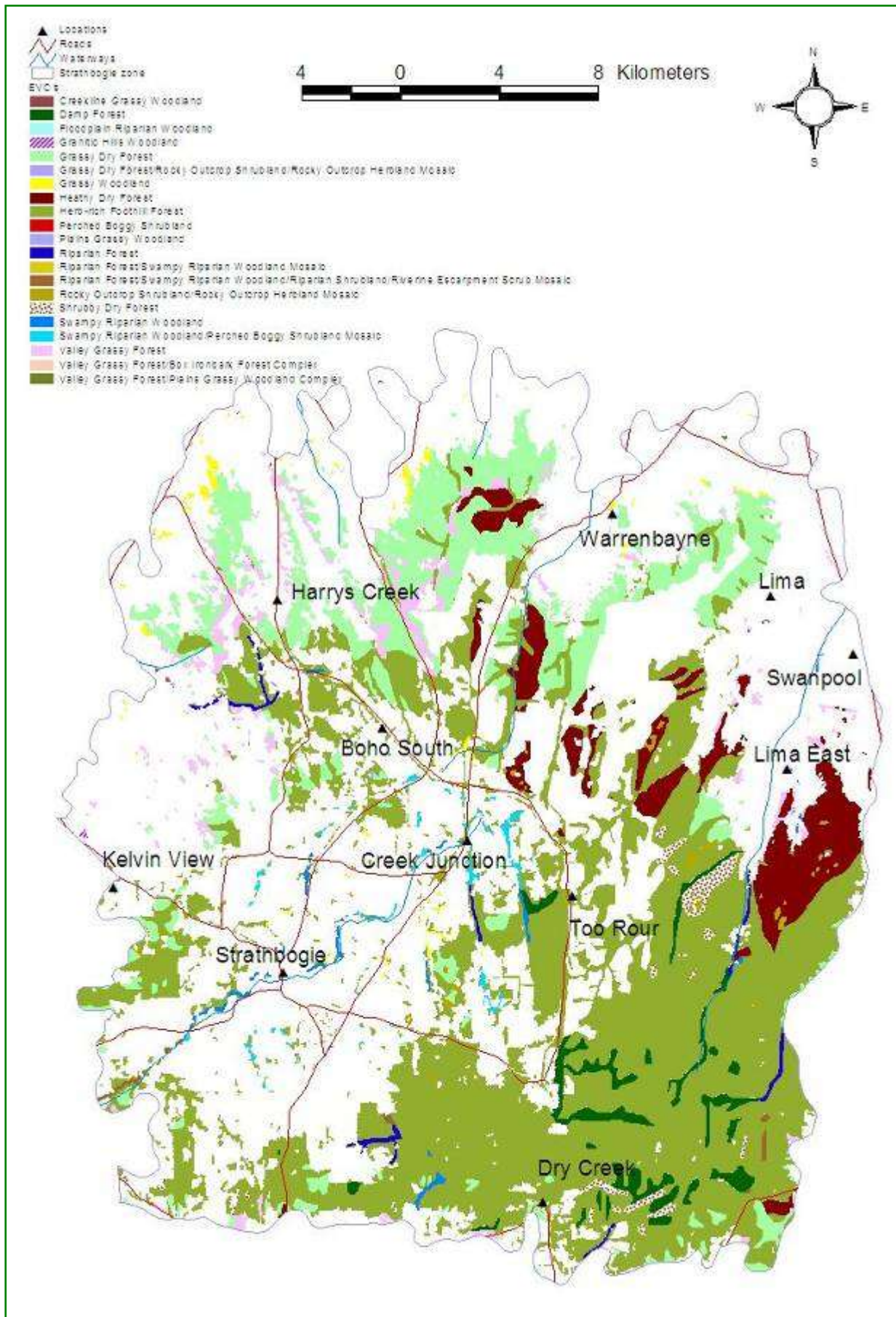


Figure 4: Current distribution of EVCs

Table 1: Strathbogie Zone Ecological Vegetation Classes (pre-1750 and current)

EVC Group	EVC Number	EVC Bioregional Conservation Status	Ecological Vegetation Class (EVC) Name#	Pre-1750 Vegetation Area (ha)	Current Area of Vegetation (ha)	Current Area of Vegetation (%)	Catchment (15%) Target (ha)*
6	23	CVU-D, HNF-LC	Herb-rich Foothill Forest	50139	25468	51	7515
6	22	CVU-D, HNF-LC	Grassy Dry Forest	14621	7391	51	2190
6	47	CVU-V	Valley Grassy Forest	11515	1443	13	1725
6	20	CVU-LC, HNF-LC	Heathy Dry Forest	4662	3976	85	690
5	175	CVU-E	Grassy Woodlands	5198	201	4	765
7	29	CVU-LC, HNF-LC	Damp Forest	1256	1209	96	180
8	212	HNF-V	Swampy Riparian Woodland/Perched Boggy Shrubland Mosaic	1130	245	22	165
14	55	CVU-E	Plains Grassy Woodlands	977	15	2	145
6	21	CVU-LC, HNF-LC	Shrubby Dry Forest	644	502	78	96
8	83	CVU-E,HNF-V	Swampy Riparian Woodland	588	210	36	87
6	241	CVU-V	Valley Grassy Forest/Plains Grassy Woodlands Complex	445	2	0	66
8	185	HNF-E	Perched Boggy Shrubland Complex	421	79	19	63
15	68	CVU-E,HNF-E	Creekline Grassy Woodlands	331	10	3	49
9	18	CVU-V, HNF-LC	Riparian Forest	314	256	82	46
21	73	CVU-LC, HNF-R	Rocky Outcrop Shrubland/Herbland Mosaic	292	214	73	43
9	237	CVU-V	Riparian Forest/Swampy Riparian Woodland Mosaic	209	1	0	30
15	56	CVU-E	Floodplain Riparian Woodland	163	6	3	24
9	84	CVU-V,HNF-D	Riparian Forest/Swampy Riparian Woodland/Riparian Shrubland/Riverine Escarpment Scrub/Disturbed Mosaic	153	86	56	22
4	72	CVU-V,HNF-LC	Granitic Hills Woodland	102	7	7	15
6	174	HNF-LC	Grassy Dry Forest/Rocky Outcrop Shrubland/Herbland Mosaic	5	5	100	0.7
			TOTAL	93165	41326		
99	987	NA	Plantation		7019		
99	997	NA	Private land No Tree Cover		45728		

Table Information including column A & B modified from Anderson et al 2003 & CGDL 2005

A B C D

Column C derived from (column B divided by column A) multiplied by 100 (for %)

Column D derived from (column A divided by 100) multiplied by 15

EVC names have altered since Anderson et al 2003 & are listed according to current corporate date (CGDL 2005)

Explanation of Terms:

- 'EVC Number' refers to the unique number attributed to that EVC in available literature (eg. CGDL 2005).
- 'EVC Bioregional Conservation Status' (BCS) refers to the threatened status of the EVC in the bioregion. Endangered (E) means that 'less than 10% of the pre-European extent remains, whilst Vulnerable (V) is defined as 'less than 10-30% pre-European extent remaining' (Platt 2002). Highlands – Northern Fall (HNF), Central Victorian Uplands (CVU).
- 'Ecological Vegetation Class (EVC) Name' is the name given to that unique community.
- 'Pre-1750 Vegetation Area' refers to the area of vegetation cover (ha) prior to substantial clearance (eg. Pre-European Settlement).

2.3 SIGNIFICANT FLORA AND FAUNA

2.3.1 Flora:

Over 600 native flora species are associated with the Strathbogie Zone. On the lower slopes and hills to the south of Warrenbayne and around Harrys Creek is the endangered EVC Grassy Woodlands .

The nationally endangered vegetation community Box-gum Grassy Woodlands and Derived Grassland can also be located in these areas. Overstorey species can include; White Box, Grey Box and Red Gum, the sparse shrub layer generally comprises wattles and bush peas, and the ground cover in these communities has a significant component of native perennial grasses including; Kangaroo, Wallaby, Spear and Red-leg grasses.



Tiger Orchid – Paul Gullen

Swampy drainage lines on the Strathbogie massif include Perched Bogs and Riparian Woodlands. The overstorey comprises Swamp Gums, Silver Banksia and a variety of wattles. Shrubs include Tea-tree and Mountain Baeckia and ground cover comprises ferns, tussock grasses and reeds.

There are 17 species of threatened flora, recorded within the Strathbogie Landscape Zone (Viridans 2005). These species are noted in Appendix 4, along with their threatened status (as per the Flora Information System), the State Level (*Flora and Fauna Guarantee Act (FFG Act) 1998*) and the National Level (*Environmental Protection and Biodiversity Conservation Act (EPBC) 1999*) (Anderson et al 2003).

Examples of threatened flora recorded in the Strathbogie Landscape Zone include:

- Lima Stringybark (*Eucalyptus alligatrix ssp.limaens*) (endangered in Victoria and vulnerable Nationally)
- Leafy Greenhood (*Pterostylis cucullata*) (vulnerable in Victoria and Nationally)
- Highland Bush-pea (*Pultenaea williamsonii*) (rare in Victoria)
- Euroa Guinea-flower (*Hibbertia humifusa*) (vulnerable in Victoria and Nationally)
- Hairy Hop-bush (*Dodonaea boroniifolia*) (rare in Victoria)



*Lima Stringybark
Photo-J MentiplaySmith*



Leafy Greenhood Photo - P Gullen

2.3.2 Fauna:

There are 264 native fauna species recorded for the Strathbogie Landscape Zone, 27 of these are threatened (Viridians 2005) (refer to Appendix 5 for species, their threatened status and relevant acts).

175 bird species have been recorded in the zone, and of these 20 are considered threatened at the state level. Of particular importance in the zone is the provision of habitat for the Powerful Owl and riparian environments along the Seven Creeks system, where Macquarie Perch, Trout Cod and River Blackfish have been recorded.

Examples of threatened woodland bird species recorded in the Strathbogie Landscape Zone include:

- Bush-stone Curlew (*Burhinus grallarius*) (endangered in Victoria, listed under *FFG Act 1988*),
- Swift Parrot (*Lathamus discolor*) (endangered in Victoria and nationally, listed under *FFG Act 1988*),
- Regent Honeyeater (*Xanthomyza phrygia*) (critically endangered in Victoria, Endangered Nationally, listed under *FFG Act*)

Examples of threatened species recorded within the Strathbogie Landscape Zone, predominantly associated with wetlands and waterways include:

- Macquarie Perch (*Macquarie australasica*)
- Flat-headed Galaxias (*Galaxias rostratus*)
- Murray Spiny Cray (*Euastacus armatus*)
- Trout Cod (*Maccullochella macquariensis*)
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*)
- Growling Grass Frog (*Litoria raniformis*)

The Strathbogie Landscape Zone maintains high levels of biodiversity, due largely to the State Forest and larger remnants still existing on freehold land. The State Forests support a diverse mammal and bird fauna including breeding records of the Powerful Owl, Turquoise Parrot, Eastern Horse-shoe Bat, Squirrel Glider and Yellow-bellied Glider. Brush-tailed Phascogales also occur on the drier edges of the forest blocks, particularly around the Mount View area south of Strathbogie. Recent surveys (2006) in the Strathbogie State Forest failed to produce any Spot-tailed Quoll records.



Growling Grass Frog Photo: Viridans



Bush Stone-curlew Photo: Viridans

3.0 PREPARING A CONSERVATION PLAN



3.1 METHODOLOGY

The methodology used to develop this Conservation Plan is based on the 'Goulburn Broken Biodiversity Action Planning Developer's Manual' (GBCMA *in prep.*). This document provides the background information relating to BAP in the Goulburn Broken Catchment, and is designed to ensure consistency during the development of the plans.

The methodology used to prepare this plan contained eight main elements. These were,

- 1) Identification of Conservation Features and Threatened Species,
- 2) Ground-truthing of Potential BAP Sites,
- 3) Field Surveying of BAP sites,
- 4) Prioritisation of BAP sites,
- 5) Generation of Focal Species List,
- 6) Generation of Key Biodiversity Asset List,
- 7) Development of Actions for Key Biodiversity Assets, and
- 8) Landscape Context Analysis.

Step 1. Identification of Conservation Features and Threatened Species

Features in the landscape that are of potential priority for conservation were identified, as well as flora and fauna species of conservation significance (eg. threatened under State or Commonwealth legislation). This involved desktop analysis of data (eg. literature review; spatial data (eg EVC, trees cover, wetlands, flora and fauna records (post 1980), aerial photographs); corporate databases (eg. Biosites, Victorian Fauna Display and Flora Information Systems); local knowledge investigations; and the Landscape Context Model (refer to Step 8). From this analysis, a series of sites likely to have conservation values and threatened species, were identified and mapped using GIS (CGDL 2005).

Step 2. Ground-Truthing of Potential BAP Sites

Involved surveying the Zone from the roadside, to compare desktop analysis data (Step 1) to the actual on-ground area, in regards to presence/absence, type of vegetation and raw condition.

Step 3. Field Surveying of BAP Sites

Sites were prioritised for survey as per the 'Goulburn Broken Biodiversity Action Planning Developer's Manual' (GBCMA *in prep.*). This prioritisation method is shown in Appendix 6. A number of sites requiring ground-truthing were field surveyed (on-site or from the nearest public land). This involved:

3.1) Bird Surveys: Undertaken in accordance with the Birds of Australia – Atlas Search Methods (1-2-hectares, twenty minutes) (Birds Australia 2001).

3.2) Vegetation Quality Assessment (VQA)(DSE 2004): Site-based habitat and landscape components were assessed against a pre-determined 'benchmark' relevant to the vegetation type being assessed (eg. grasslands, wetlands, woodland/forest) (Refer to Appendix 7 for form).

3.3) Threat Identification: Whilst undertaking the Vegetation Quality Assessment (DSE 2004), a list of threatening processes (eg. pest plants and animals) at the priority sites, were recorded.

Step 4. Prioritisation of BAP Sites

These sites were given a ranked value of very high (VH), high (H), medium (M) or low (L), based on a range of factors (eg. conservation status of the EVC, presence of threatened species, size, VQA score). Sites not surveyed, nor automatically ranked (as per Appendix 6), were given a ranked value to the lesser of the available options (until surveying occurs).

Step 5. Generation of Focal Species List

The focal species approach (Lambeck 1997) uses the habitat requirements of a particular species, or group of species, to define the attributes that must be present in a landscape for these species to persist. For example, if a species that requires the largest remnant size is selected, then fulfilling the needs of that species may result in the conservation of all species, with smaller remnant size requirements. The factors used in this plan to select focal species were, remnant size and isolation distance (GBCMA *in prep.*).

Step 6. Generation of Key Biodiversity Asset List

The identified environmental features, including flora and fauna species, were categorised in to a series of 'nested' environmental assets. For example; similar species or environmental features may be located in 'nested assets' such as; creeklines, wetlands or ecological vegetation classes.

Step 7. Development of Actions for Key Biodiversity Assets

This step involved the development of a list of actions aimed at protecting and enhancing the biodiversity values in the Zone, by reducing the identified threats for each key biodiversity asset (as determine in Step 6). Available information (eg. Actions for Biodiversity Conservation (ABC) database) (DSE 2005a) and the Mid Goulburn Landscape Plan (Anderson et al 2003) were also used to compile the actions.

Step 8. Landscape Context Analysis

To achieve long-term viability of the priority 'BAP' sites, they need to be linked and/or increased in size and total tree cover, to form a viable functioning landscape. The Landscape Context Model (LCM) (Ferwerda 2003) uses a model of "known habitat" (based on mapping for tree cover, wetland, and major watercourses) to identify large remnants, key remnant clusters and the key linkages between them. However, because of potential limitations of the input data, areas of conservation significance (particularly grasslands and sparse woodlands) may not be identified. Similarly, areas with minimal conservation significance may be included, because habitat quality data is not included in the model.

However, the Landscape Context Model is useful as a background to BAP mapping, as it identifies areas that have the highest (or least) probability of containing additional sites, of conservation interest (as per Step 1). Therefore the model can be used to identify the areas of the landscape, that should be used to link and strengthen a network of conservation sites, and create a sustainable landscape. The model can also be used to further determine the major linkages between BAP sites. The Landscape Context Model is shown in Appendix 8.

4.0 IDENTIFYING PRIORITY SITES



In the Strathbogie Landscape 405 zone sites have been identified as Biodiversity Action Planning (BAP) priority sites, for conservation management. These sites are termed BAP sites. They contain remnant vegetation and vary greatly from a stand of paddock trees, to large forested areas such as the Strathbogie State Park. A number of these BAP sites have been ground-truthed and surveyed. In order to identify the BAP sites, each site was assigned a number that identifies its location and the associated data. This unique number has been calculated using the map-index (map reference) number (1:25,000 map) and a site number (eg. 802424-6). An example of the site identification numbering system (eg. how the site(s) are identified, using the site number system) is illustrated below (Figure 4). An example of the data that is contained in the database (referred to as attribute table), for each BAP site is detailed below (Figure 5).

The location of the 405 BAP sites (in map form) is available, in hard copy (overview map) and electronic form (CD - specific maps) in Appendix 9. Appendix 9 also provides; an Attribute Table identifying information relating to each site (eg. site number, asset type, conservation status, EVC and focal species), a bird list, definitions list and an assets map.

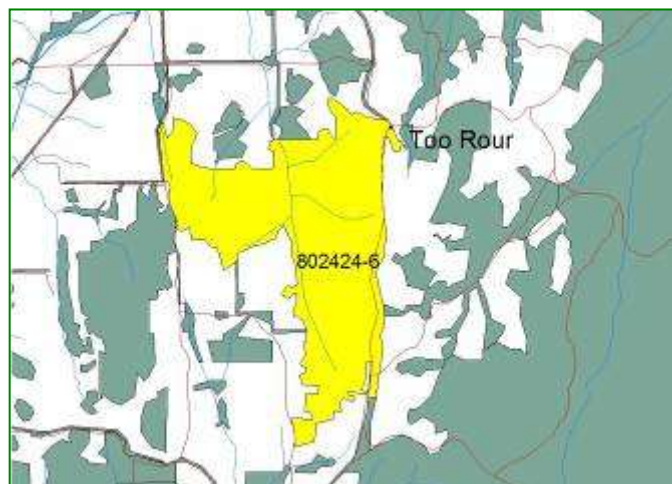


Figure 4 – An example of the site numbering system

Site Number:	802424-6
Biodiversity Asset 1	Herb-rich Foothill Forest (Section 6.2)
Hectare	1105
Bioregion	Highlands Northern Fall
Site Priority	High
EVC	23 (Section 2.2)
EVC Conservation Status	Least Concerned
VQA score	15
Th fauna	Powerful Owl, Eastern Horseshoe Bat
Th flora	Highland bush pea
Focal Species 1	Long nosed Potoroo (Section 6.1)
Landholder	Various

Figure 5 – An example of the data contained in the database (attribute table)

5.0. SUMMARY OF SITE SURVEYING



5.1. VEGETATION QUALITY ASSESSMENTS

A number of BAP sites were assessed based on habitat features of, 1) Large trees, 2) Canopy Cover, 3) Understorey, 4) Weediness, 5) Recruitment, 6) Organic Litter, 7) Logs (and Landscape Component Scores of), 8) Size, 9) Neighbourhood and 10) Core Area. They were scored out of a maximum score of 20 (assumed intact habitat). An example of the assessment sheet is provided in Appendix 7. It is hoped that extension staff will be able to complete more assessments in the future.

5.2 BIRD SURVEYS

None of the 405 priority BAP sites have had bird surveys completed. A list will be developed as additional onground assessments are undertaken.

5.3 CONSERVATION THREATS

Whilst undertaking surveys (DSE 2004), a list of threatening processes (e.g. pest plants and animals) at the priority sites, were recorded according to the Actions for Biodiversity Conservation (ABC) database (DSE 2005a). These included:

- Vegetation Clearance (Land Clearance – removal of native vegetation),
- Habitat Fragmentation/Edge Effects (includes 'Adjacent Land Use Practices'),
- Waterways (instream barriers) (Changes in hydrological regimes e.g. wetlands),
- Animals – Domestic Stock (Inappropriate grazing management (e.g. timing, stocking rate),
- Firewood Collection & Cleaning Up (Removal of Habitat)
- Animals – e.g. Pest Species - Foxes and Rabbits,
- Invasion by Environmental Weeds (Pest Plants),
- Recreational Activities – motorised (Transport and Recreation), and
- Removal of Rocks/Soil (Impacts of Roadworks on Roadside Vegetation).

Vegetation/Land clearance (a key threatening process under the EPBC Act 1999) (Wierzbowski et al 2002) particularly occurred in the past, however it continues to be a threat to conservation values within the Zone. Practices such as inappropriate earth works (e.g. removal of natural depressions/wetlands, removal of native vegetation cover) and illegal tree removal, is a threat to biodiversity values.

Habitat fragmentation (a potentially threatening process for fauna in Victoria under the FFG Act 1988 (Wierzbowski et al 2002)) is primarily the result of historical land clearance. A range of species such as the Swift Parrot (*Lathamus discolor*), and Grey-crowned Babbler (*Pomatostomus temporalis*) are detrimentally affected by habitat fragmentation. It affects their ability to source food and suitable habitat required for their survival (e.g. leads to less effective immigration, emigration and breeding success). Habitat fragmentation also favours species such as Noisy Miners (*Manorina melanocephala*) (Bennett 1993). Elevated competition from these aggressive species (although native to Australia) threatens species diversity, by the exclusion of less aggressive species (e.g. Grey-crowned Babblers) from remnants.



Softwood plantation Strathbogrie massif
Photo – Rowhan Marshall

Adjacent land use practices⁶ (e.g. intensive irrigation and inappropriate earthworks, can also lead to the colonisation of fragmented remnant areas by weeds, water logging of vegetation, high watertable depths, nutrient run-off and an increase in sediment input to rivers and streams (DPI 2005).

Changes in hydrology (e.g. hydrological regimes) threaten biodiversity values, particularly for wetlands, which have evolved to function with the natural cycles of flood and drought. Alteration to natural flow regimes of rivers and streams, is listed as a threat to Victorian waterways under the FFG Act 1988 (Wierzbowski et al 2002). A change in water regimes (including temperature and water quality) can dramatically alter system appearance and functioning, disrupt natural productivity cycles and cause changes in vegetation and habitat. This in turn affects the fauna that relies on wetlands (eg. for resources and breeding). However, environmental water allocations (EWA) are a process for providing appropriate hydrological regimes to wetlands with natural cycle interruptions (Howell 2002).

Inappropriate grazing management⁷ affects biodiversity conservation through soil compaction; removal of vegetation; changed nutrient levels in and around native vegetation; tree dieback and results in competition for fodder by native animals, which require tussocky grass for shelter (Wilson & Lowe 2002). A number of the surveyed sites had a diverse range of understorey. However a number sites surveyed, were heavily grazed, often resulting in minimal shrub or ground cover. A number of isolated trees in paddocks, are stressed and showing signs of dieback (e.g. dead limbs and loss of trunk bark). It is important to retain these trees as habitat for a range of species (e.g. birds, bats, reptiles and insects).



Cattle access in perched bog
Photo- R Nichols

The removal of fallen timber (or 'cleaning up') was evident along roadsides and within private remnants. Removal of fallen timber can result in a loss of habitat for birds; mammals, reptiles and insects, exposing them to predation by introduced predators. With a reduction in insect populations, timber removal also reduces the number of insect-eating birds in an area. For example, the Bushstone Curlew (*Burhinus grallarius*) is just one of the species that is severely impacted upon by timber removal, due to loss of insects and the loss of fallen timber that is used as habitat and camouflage for the protection of chicks (DSE 2005a).

Pest Animals are a threat to conservation values of the area. Predation of native wildlife by the Cat (*Felis catus*) and the Red Fox (*Vulpes vulpes*) are listed as potentially threatening processes under the FFG Act 1988 (Wierzbowski et al 2002), due to their impact on native species. The European Rabbit (*Oryctolagus cuniculus*) and European Hares (*Lepus europaeus*) compete for habitat, remove native vegetation and disturb soil structure. Macropod grazing is also emerging as an issue in areas of remnant vegetation to have an interface with agricultural land.

Pest Plants (Weeds) are a major threat to biodiversity because they compete with native species, for essentials (e.g. space, light and nutrients). Invasion of native vegetation by environmental weeds is listed as a potentially threatening process under the FFG Act 1988 (Wierzbowski et al 2002). Examples of weeds evident in the Zone include; Paterson's Curse (*Echium plantagineum*), Horehound (*Marrubium vulgare*), Sweet Briar (*Rosa rubiginosa*), Peppercorns (*Schinus molle*), St John's Wort (*Hypericum perforatum*), and Willows (*Salix* spp). Weeds are especially evident on roadsides due to escaped

⁶ The term inappropriate (in this sense) refers to the purposeful movement of soil/vegetation without considering the natural landscape (e.g. water flow).

⁷ The term inappropriate (in this sense) refers to grazing native vegetation without consideration of stock capacity, time of year or length of time.

garden/agricultural plants, machinery disturbance (e.g. roadworks) and poor vehicle hygiene. Pest plants invading remnants can also be a result of adjacent land practices (e.g. agricultural weeds) and animal movement (e.g. birds).

Transport and Recreational Pursuits (e.g. motorised activities) can also lead to increased weeds and loss of native vegetation). Removal of Rocks and Soil was evident along roadsides, where graders had caused impact on native vegetation.

5.4 SITE PRIORITISATION

As illustrated (Figure 6), the 405 BAP sites have been given a priority status (ranked value) of very high (VH), high (H), medium (M) or low (L), based on a range of factors (conservation status of the EVC, presence of threatened species, size, VQA score). This prioritisation occurred at 3 stages; prior to surveying; following surveying and for unsurveyed sites. For example, prior to surveying, large sites with high EVC conservation status and threatened species, that did not require ground-truthing, were automatically given a priority status of very high (VH). Following surveying (refer to 5.1, 5.2 & 5.3), the surveyed sites were given a priority status based on the three factors above and the VQA score (Appendix 7). Unsurveyed sites that required ground-truthing, but were not able to be surveyed, nor able to be automatically ranked as Very High prior to surveying, were given a ranked value to the lesser of the available ranking's (until surveying can be conducted). Further information on the method used to prioritise the sites is identified in Appendix 6.

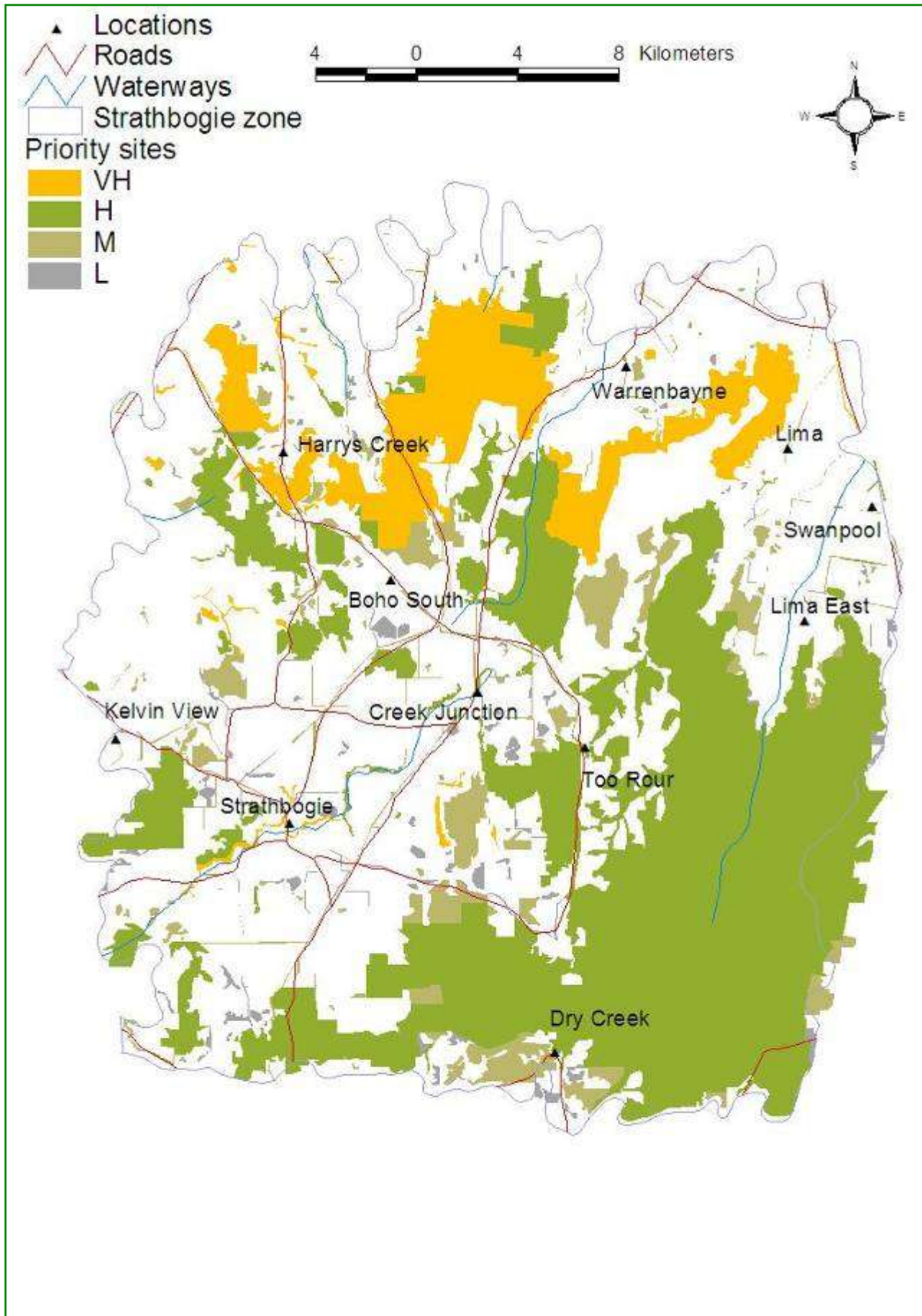


Figure 6 – Priority rating of BAP sites

6.0 BIODIVERSITY ASSETS



6.1 FOCAL SPECIES

Research shows that different species have different types of responses to landscape change. The focal species approach therefore uses the habitat requirements of a particular species or group of species, to define the attributes that must be present in a landscape, for these species to persist. Broadly, the focal species are predicted to be the most sensitive species (in a given landscape) to a threat or ecological process. Such that, their conservation should also conserve other less-sensitive species found in the same vegetation type. Therefore, focal species are a way of defining and guiding targets (eg. patch size and connectivity) for our landscape restoration strategies (Lambeck 1997).

Additional benefits of a focal species approach are that it allows for the monitoring of actions (eg. can undertake regular surveys to establish if focal species are becoming more common and using new sites). It also provides the community and organisations implementing on-ground works, with an 'iconic/focal' species (if they don't already have one), in order to increase enthusiasm for implementing works.






The five focal species identified in the Strathbogie Zone, and their ecological requirements (thresholds⁹) are identified (Table 2). A definition of the ecological terms used include:

- Minimum patch size (patch size threshold) – refers to the minimum patch size of vegetation required for the species to maintain viable populations,
- Critical distance between habitat patches (isolation threshold) – refers to the size of the gap between habitats, beyond which, on a daily basis, the animal doesn't generally cross (GBCMA in prep.)
- Dispersal threshold – refers to the distance (km) for which the species has been known to travel (e.g. for breeding, migration), but generally does not on a daily basis,
- Ecological Vegetation Class (EVC) – the vegetation community that the species prefers, and
- Other requirements – identifies some other known requirements (not comprehensive) for the species to survive, or to inhabit an area.

It is envisaged that community groups and agencies may target one, or a combination of, the focal species identified (Table 2), for planning and implementation of on-ground works in the Zone. The focal species are only a suggestion of species to focus on-ground works. Other species may also be the focus for on-ground works, given new information and community desire to implement works for another species. Keeping in mind that if we aim to cater for these species, we are also assisting a suite of species and working towards overall vegetation cover targets for the catchment.

⁹ Thresholds refer to the point at which relatively rapid change occurs (eg loss of species). Therefore, these should be used as a minimum target only.

Table 2: Focal Species and their Habitat Requirements –Strathbogie Zone

	<p>Sacred Kingfisher (<i>Todiramphus sanctus</i>)</p> <p>Minimum patch size (threshold) >10 ha Critical distance between patches Annual migrant Dispersal threshold Annual migrant Ecological Vegetation Class Riparian vegetation Some other requirements (general) Hollow bearing trees</p>
	<p>Eastern Yellow Robin (<i>Eopsaltria australis</i>)</p> <p>Minimum patch size (threshold) >5ha Critical distance between patches <1km Dispersal threshold Unknown Ecological Vegetation Class Valley Grassy Forest, Herb-rich Foothill Forest, Riparian Systems. Some other requirements (general) Patches of shrubs or regeneration, good ground litter layer, fallen timber.</p>
	<p>Bush-stone Curlew (<i>Burhinus grallarius</i>)</p> <p>Minimum patch size (threshold) >1ha, >40m wide Critical distance between patches <1km Dispersal threshold <2km from known site Ecological Vegetation Class Grassy Woodlands, Plains Grassy Woodlands. Some other requirements (general) Fallen logs, fox control</p>
	<p>Brush-tailed Phascogale (<i>Phascogale tapoatafa</i>)</p> <p>Minimum patch size (threshold) >100 ha Critical distance between patches 10 km Dispersal threshold 1.4 km Ecological Vegetation Class Most EVCs including Grassy Dry Forest and Heathy Dry Forest Some other requirements (general) Mature rough barked trees; good ground layer; fallen timber and litter</p>
	<p>Long-nosed Bandicoot (<i>perameles nasuta</i>)</p> <p>Minimum patch size (threshold) 3ha > Critical distance between patches 400m Dispersal threshold Unknown Ecological Vegetation Class Herb-rich Foothill Forest, Damp Forest Riparian Systems. Some other requirements (general) Dense ground or shrub cover.</p>

Habitat Requirement Source: Variety of Sources (GBCMA in prep.)
 Photo Credits (Viridans 2005)

6.2 KEY BIODIVERSITY ASSETS

Biodiversity Action Planning (BAP) attempts to take a strategic approach toward the conservation of threatened and declining species and vegetation types, by looking for opportunities to conserve groups of species, in appropriate ecosystems. The identification of the appropriate biodiversity assets to focus conservation effort is the most critical part of the BAP process. This approach has been used to group together species that use the same type of habitat. By protecting these assets, habitat for a suite of threatened species associated with that habitat can be conserved (e.g. by choosing 'Riparian Systems' as a key biodiversity asset, it incorporates all of the species that live in, and use a Riparian System, as well as the individual threatened species). Another benefit of this approach is that specific actions (Section 7.0), based on the requirements of each asset (e.g. to counter threats and improve the status of the asset), can be developed. Planning and implementation of on-ground works and actions that specifically target each of these assets, can then be undertaken (GBCMA in prep.).

The 405 BAP sites in the Strathbogie Zone have been categorised according to five key biodiversity assets: Riparian Systems and Bogs, Herb-rich Foothill Forest, Dry Forest, Valley Grassy Forest and Grassy Woodlands. For further information on each asset, along with threatened species examples, refer to Table 3.

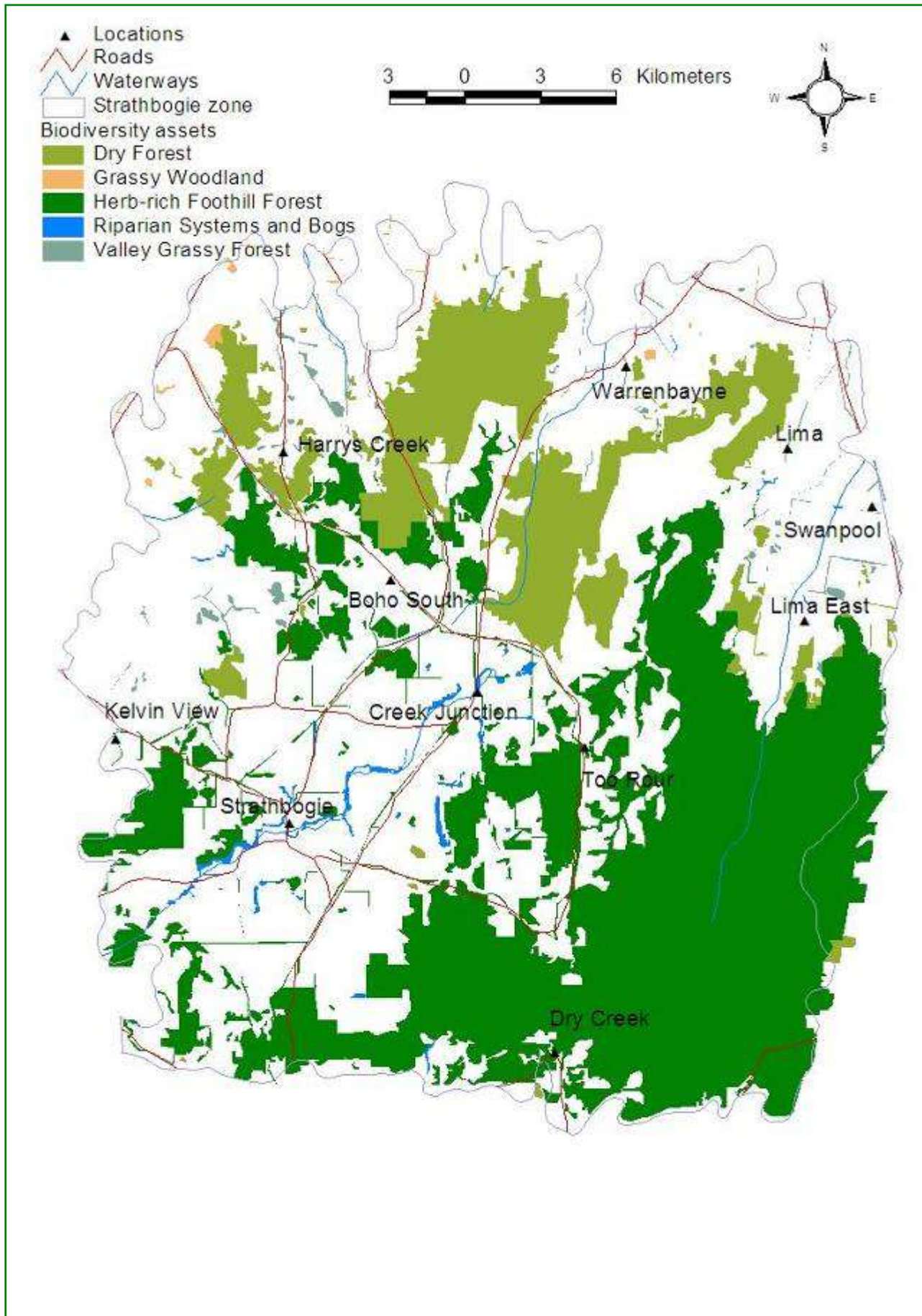


Figure 7 – Location of Key Biodiversity Assets – Strathbogie Landscape Zone

Table 3: Key Biodiversity Assets – Strathbogie Zone

Key Biodiversity Assets	Examples of significant species
<p>1) Riparian Systems and Bogs In the Strathbogie zone major systems include the Seven Creeks, Honeysuckle Creek and Moonee Creek. Over 50 bogs are located in the zone.</p>	<p>Fauna: Diamond Firetail, White-bellied Sea-Eagle, Pied Cormorant, Trout Cod, Blackfish, Murray Spiny Cray</p> <p>Flora: Fir Clubmoss, Highland Bush-pea, Rough Twig-sedge, Water Blinks</p>
<p>2) Grassy Woodlands Has been reduced to 4% of its former distribution and includes nationally threatened vegetation community <i>Box Gum Grassy Woodlands and Derived Grasslands</i></p>	<p>Fauna: Brush-tailed phascogale, Bush Stone-curlew, Regent Honeyeater, Swift Parrot</p> <p>Flora: Flat-leaf Bush-pea, Euroa Guinea-flower</p>
<p>3) Dry Forest Includes the EVCs Grassy Dry Forest and Heathy Dry Forest</p>	<p>Fauna: Brush-tailed phascogale, Powerful Owl</p> <p>Flora: Grey rice flower, Catkin Wattle</p>
<p>4) Valley Grassy Forest Has been reduced to 13% of its former distribution.</p>	<p>Fauna: Powerful Owl, Hooded Robin, Diamond Firetail</p> <p>Flora: Rough Twig-sedge, Slender Tick-trefoil, Narrow goodenia, Lima Stringybark</p>
<p>5) Herb-rich Foothill Forest Herb-rich Foothill Forest is the dominant EVC in this zone and retains 51% of its former distribution. It has associations with many significant flora and fauna species.</p>	<p>Fauna: Powerful Owl, Eastern horseshoe Bat, Brush-tailed phascogale</p> <p>Flora: Highland Bush Pea, Hairy Hop bush, Grey rice flower</p>

* The numbering of the Key Biodiversity Assets (1-5) is only intended to assist with the identification of the assets throughout the remainder of the report.

7.0 PRIORITY ACTIONS - KEY BIODIVERSITY ASSETS



Priority actions for the Strathbogie Landscape Zone have been developed and grouped based on each 'Key Biodiversity Asset'. Priority actions for the key biodiversity assets were developed based on the following factors, (1) size/extent (2) condition and (3) landscape processes (eg. habitat connectivity, hydrological regimes). The condition (2) section was also further split in relation to; education/extension; on-ground works; threatened species; and pest plants and animals. For example; an action relating to the condition of a remnant, due to rabbits, can be found under; 'condition' – 'pest plants and animals'.

For each of the five key biodiversity assets (1-5), the following pages identify:

- A) An introduction to the asset in the Strathbogie Landscape Zone,
- B) Photographic example of the asset in 'good condition' for the zone, and
- C) Proposed actions for each of the assets in the Zone (broader actions in Anderson et al 2003).

It is proposed that the community and agencies in the Strathbogie Zone investigate options for implementing these actions in to existing projects/policies. For example, BAP sites (refer to Appendix 10) in each asset type, should be targeted in order of priority (Very High, High, Medium to Low) in relation to these actions (where applicable). This forms the basis of BAP, where the very high value sites, that require less cost for long-term protection, will provide the highest prospect for conservation (GBCMA *in prep.*).

Note: The Flora and Fauna Guarantee Act 1988 provides for the listing of Victoria's threatened plant and animal species, ecological communities and potentially threatening processes. Under the Act, an Action Statement must be prepared. Action Statements outline what is required for the species conservation. They are developed based on a rigorous legislative process (Acts of Parliament) and are therefore of high priority. For further information refer to the 'Actions for Biodiversity Conservation Database' (ABC) (DSE 2005a).

7.1) KEY BIODIVERSITY ASSET – Riparian Systems and Bogs

A) Introduction –Riparian Systems and Bogs:

Riparian systems and bogs (Spring-soak Wetlands) are important biodiversity assets within the Strathbogie zone. They provide habitat for a range of fauna species and refuge areas during time of drought. These systems also provide connectivity through the landscape for mobile fauna especially in the valleys in the northern section of the zone and on the Strathbogie massif where the landscape has been significantly disturbed due to agricultural activity. The riparian systems and bogs biodiversity asset is made up of the EVC group numbers 8 and 9 (See Table 1) and can be found on public and private land throughout the zone.

The upper reaches (ISC Reaches 19,20) of Sevens Creek has been identified as Priority Waterways (GBCMA 2005), the high values to be protected include, Trout Cod and Macquarie Perch. Moonee Moonee Creek in the west of the zone has been predominantly cleared of its riparian vegetation from west of Swanpool to Lima East. The Honeysuckle Creek catchment has been the focus of the "Heartlands" initiative, a holistic approach to catchment management. The catchments reservoir has recently been decommissioned.

Nearly all bogs occur on freehold land on the Strathbogie massif. They are rare habitats with unusual physical characteristics and unusual vegetation structure and floristic composition. The two prevailing landuses are grazing by stock and water harvesting. Management issues also include dam construction and draining (Ecology Australia 2006).

B) Photographic Example – Riparian Systems and Bogs:



*Moonee Moonee Ck BAP site 802421-19
Photo: Rowhan Marshall*



*Spring – Soak Wetland. Cattle pugging
Photo: R Nichols*

C) Actions Proposed –: Riparian Systems and Bogs

Size/Extent:

- **Create buffers** to protect riparian systems and bogs from degrading processes.
- **Increase connectivity** along systems and enhance connectivity to other remnants.
- **Improve** the quality of existing systems.

Condition:

Education/Extension

- Use BAP mapping to assist in developing a strategic approach to protecting and enhancing ecological processes in the landscape.
- **Consult** with licensees of waterways, to fence these areas through waterway incentives.
- **Promote** the benefits of protecting and enhancing native vegetation in the in-stream and riparian environments and linking to private remnants, in extension and voluntary programs.
- **Encourage** retention of in-streams vegetation and snags and re-s snag where appropriate.
- Use **focal species** to generate interest in this asset.
- Promote the uniqueness of Bogs and discourage the practise of draining and construction of dams on and above these sites.
- Promote **Whole Farm Plan** on private land through DPI.
- In **consultation** with Goulburn Broken CMA, develop habitat management plans for streamsid es on freehold, with particular emphasis upon protecting and expanding priority areas.

On-ground Works

- **Protect and enhance** high priority sites (GBCMA 2005), through covenants, incentives and liaising with other agencies.
- **Establish** exclusion fencing and off stream watering points for all affected sites on waterways and bogs.
- **Encourage** retention of fallen timber on and in all waterways and adjoining remnants.
- **Control** weed infestations and feral animals.
- **Improve** instream habitat through re-snagging and revegetation.
- **Manage** impacts of recreational activities including fishing, access and firewood collection.
- Reduce **nutrient runoff** into systems through streamside buffers.

Threatened Species

- **Undertake** instream works to enhance habitat for threatened fish species and reduce impacts by exotic species such as trout and carp. Remove barriers to native fish migration.
- **Provide** linkages and habitat to support threatened fauna species including, Brush-tailed Phascogale and Squirrel Glider.

Pest Plant and Animals

- Continue ongoing **control of foxes and feral cats**.
- Control regionally listed **weeds** and environmental weeds (willow) from sites.

Landscape Processes (ie. hydrological regime, habitat connectivity):

- **Identify and prioritise potential** sites for habitat expansion and improved connectivity as identified by the landscape context model and maps provided in this document.

7.2) KEY BIODIVERSITY ASSETS – Grassy Woodlands

A) Introduction – Grassy Woodlands:

This biodiversity asset has been dramatically reduced to 4% of its previous distribution. Grassy Woodlands is mainly associated with lower slopes and low hills predominantly in the northern area of the zone. The majority of the Grassy Woodlands along the north and north-west boundary have been cleared or modified for agricultural use, few areas remaining in near original condition. This biodiversity asset includes the nationally protected community Box-Gum Grassy Woodlands and derived Grasslands. Key remnants of this community have currently been located in three locations, however there is potential for many other sites including along Sawpit Gully Rd.

Grassy Woodlands remnants serve many important functions, including, aesthetic values, habitat values, sources of native seed and sources of food shelter and nesting sites for a range of woodland birds and mammals (Lunt 1998) All patches are critical to the survival of this asset, as so few relatively undisturbed remnants remain. Even degraded or treeless remnants are particularly important as habitat for fauna, for conserving genetic diversity in many woodland species, and for their contribution to landscape values

A number of threatened plant and animal species, and the endangered *Temperate Woodland Bird Community* are associated with this Grassy Woodlands ecosystem.

Threatened birds such as the Regent Honeyeater and Swift Parrot feed upon the abundant White Box nectar during the winter months. The Squirrel Glider and Brush-tailed Phascogale utilise hollows provided by mature Box and Gum trees, and the ground cover of native grasses and fallen timber can provide important habitat for the threatened Striped Legless Lizard and Golden Sun Moth.

B) Photographic Example – Grassy Woodlands:



Bushy Lane near Violet Town BAP Site – 802442-30 Photo:Rowhan Marshall

C) Actions – Grassy Woodlands:

Size/Extent:

- **Encourage landholders to increase the size and quality** of existing remnants through stock exclusion, buffering edges and linkages.
- **Protect** significant areas as identified through BAP ie Bushy Lane.

Condition:

Extension/Education

- Use BAP mapping to assist in developing a **strategic approach** to protecting and enhancing ecological processes in the landscape.
- **Organise community education activities** relating to the importance of Grassy Woodlands and associated flora and fauna species, specifically targeting high priority remnants.
- Further **promote** the benefits of protecting and enhancing remnant patches through extension and voluntary programs, such as Environmental Management Incentives, Land for Wildlife and Trust for Nature.
- Promote **Whole Farm Plan** on private land through DPI
- Focus works to **complement** existing programs such as threatened vegetation communities.
- **Encourage** retention of fallen timber in privately owned Grassy Woodland sites.
- **Liase** with shire to ensure roadsides are protected.
- **Focus** efforts to protect the nationally threatened community Box-Gum Grassy Woodland and derived Grasslands.

On-ground Works

- **Maintain and improve condition** of all identified high value sites by encouraging the retention of fallen timber and hollow bearing trees, and manage regionally listed weeds.
- **Protect** clusters or individual specimens of large, hollow-bearing trees are retained and protected throughout the zone.
- Promote **appropriate** ecological burning regimes to create ideal age class structure (fire intervals 5-50years, DSE 2002)
- **Ensure** priority sites are incorporated into shire roadside management plans.
- **Exclude all grazing** to allow trees, shrubs and native ground cover regenerate.
- **Leave any dead standing trees.** Install nest boxes where natural hollows are in short supply to increase the number of nesting hollows for animals such as Brush-tailed Phascogales and Squirrel Glider.
- **Restore structural diversity** by supplementary planting degraded remnants with indigenous shrubs and ground cover, if regeneration has not occurred following fencing (eg. no existing seed source).

Threatened Species

- **Install nest boxes** where hollows are deficient to increase the number of nesting hollows for woodland birds and Squirrel Gliders.
- **Modify stocking levels and grazing times**, as necessary, to benefit threatened species.

Pest Plant and Animals

- **Minimise disturbance** at high value sites to prevent erosion and minimise weed invasion.
- **Reduce** all herbivore (including Macropod) populations in and around remnants to allow for the regeneration of native understorey and ground cover species.
- **Continue ongoing control** of foxes and feral cats for the protection of threatened species and focal species including Bush Stone-curlew and Squirrel Glider.

Landscape Processes (eg. hydrological regime, habitat connectivity):

- **Identify and prioritise potential sites** for habitat expansion and improved connectivity as identified by the landscape context model and maps provided in this document.

7.3) KEY BIODIVERSITY ASSET – Dry Forest

A) Introduction – Dry Forest:

This biodiversity asset incorporates the EVCs, Heathy Dry Forest and Grassy Dry Forest, and comprises a major component of native vegetation cover. Generally associated with drier north and west facing aspects and ridge-tops with associated free draining soils, this asset can be found at a variety of locations throughout the northern end of the zone. Although these EVCs are classified as Least Concerned, they provide important core areas for many native species.

Common overstorey species include, Red Stringybark and Broad-leaf Peppermint with a shrub layer including Guinea-flowers and Heaths and a variety of grasses and herb.

Examples of this biodiversity asset can be found in directly south of Warrenbayne and between Boho and Warrenbayne. Larger core areas are associated with the Strathbogie State Forest and Reserves. Smaller fragmented areas are associated with freehold land.



Heathy Dry Forest near Lima East- BAP No 802421-9

Photo: Rowhan Marshall

C) Actions – Dry Forest:

Size/Extent Related:

- **Liase** with public and private land managers to increase the quality of existing sites.
- **Promote** landscape linkages using existing remnants.
- Promote **cross tenure** management for sites containing public and private land.

Condition Related:

Education/Extension:

- Use BAP mapping to assist in developing a **strategic approach** to protecting and enhancing ecological processes in the landscape.
- **Encourage** the retention of logs, leaf litter and dead trees, as habitat for focal and threatened species.
- Promote **appropriate** ecological burning regimes to create ideal age class structure (fire intervals 10-50years, DSE 2002).
- Promote **Whole Farm Plan** on private land through DPI
- Promote **focal species** to generate works on private land.

On-ground Works:

- **Implement** North East Forest Management Plan recommendations and management prescriptions.
- **Restore structural diversity** through natural regeneration and supplementary planting with indigenous shrubs and groundcover
- **Exclude** grazing to promote regeneration.
- **Promote** sites of high value for conservation covenant, Land for Wildlife and incentives.

Threatened Species:

- **Exclude** regular burning at sites which contain threatened flora and fauna unless otherwise indicated.
- **Raise awareness** among landowners of threatened species requirements.
- **Raise awareness** among public land managers of threatened species requirements and associated forest management zoning (SPZ Powerful Owl/EVC protection, SMZ VROT).

Pest Plants and Animals:

- **Undertake pest plant management** for regional priority weeds for all high priority sites and encourage stakeholders to coordinate the removal of weeds (eg. landcare groups).
- **Undertake pest animal management** (eg. Foxes, Cats and Rabbits) in areas adjoining all reserves for the benefit of threatened fauna such as Squirrel Glider and Brush tailed Phascogale.
- **Promote** the good neighbour program through DPI to address cross tenure pest plant and animals issues.

Landscape Processes (eg. habitat connectivity):

- **Identify and prioritise potential sites** for habitat expansion and improved connectivity as identified by the landscape context model and maps provided in this document.

7.4) KEY BIODIVERSITY ASSET – Valley Grassy Forest

A) Introduction – Valley Grassy Forest:

This biodiversity asset was once extensive throughout the zone and has been reduced to 13% of its former distribution, having been cleared extensively for agricultural. It has a relatively high weed composition facilitated by close proximity to agricultural land. Remnants are located in the northwest of the zone and are generally associated with waterways and roadsides such as Honeysuckle Creek and Harry Creek Road. In the northeast of the zone it is associated almost exclusively with remnant roadsides and the threatened Lima Stringybark. Valley Grassy Forest occurs under moderate rainfall regimes on fertile well-drained soils on gently undulating slopes and valley floors. In undisturbed patches a rich array of herbs, lilies, grasses and sedges dominate the ground layer.

B) Photographic Example – Valley Grassy Forest



*Remnant corridor of Valley Grassy Forest with overstorey of Lima Stringybark
Photo: J MentiplaySmith*

C) Actions – Valley Grassy Forest:

Size/Extent:

- **Encourage landholders to increase the size** of existing remnants, to establish buffer zones and create linkages to core areas.
- **Protect** significant roadsides as indicated through BAP and Shire roadside management plans such as Lima East Rd near Tulley Rd and Midlands Hwy north of Swanpool.

Condition:

Education/Extension:

- Use BAP mapping to assist in developing a **strategic approach** to protecting and enhancing ecological processes in the landscape.
- **Encourage** the retention of logs, leaf litter and dead trees, as habitat for focal and threatened species.
- **Ensure** local shires are aware of significant roadsides.
- Promote **appropriate** ecological burning regimes to create ideal age class structure (fire intervals 10-50years, DSE 2002).
- Promote **Whole Farm Plan** on private land through DPI
- Promote **focal species** to generate works on private and public managed land.

On-ground Works:

- **Restore structural diversity** through natural regeneration and supplementary planting with indigenous shrubs and groundcover
- Focus works to **complement** existing programs such as Lima Stringybark.
- **Exclude** grazing to promote regeneration.
- **Ensure** priority sites are incorporated into shire roadside management plans and promoted accordingly.
- **Promote** private sites of high value for conservation covenant, Land for Wildlife and incentives

Threatened Species:

- **Exclude** regular burning at sites which contain threatened flora and fauna unless otherwise indicated.
- **Raise awareness** among landowners of threatened species requirements.

Pest Plants and Animals:

- **Undertake pest plant management** for regional priority weeds for all high priority sites and encourage stakeholders to coordinate the removal of weeds (eg. community working bees/landcare groups).
- **Undertake pest animal management** (eg. Foxes, Cats and Rabbits)

Landscape Processes (eg. hydrological regime, habitat connectivity):

- **Identify and prioritise potential sites** for habitat expansion and improved connectivity as identified by the landscape context model and maps provided in this document.

7.5) KEY BIODIVERSITY ASSET – Herb-rich Foothill Forest

A) Introduction – Herb-rich Foothill Forest:

Occurs on relatively fertile, moderately well-drained soils on an extremely wide range of geological types and in areas of moderate to high rainfall. This biodiversity asset favours sheltered aspects mainly easterly and southerly aspects on lower slopes and gullies. A high cover and diversity of herbs and grasses in the ground layer characterise this biodiversity asset.

The majority of this asset is located on public land in the Strathbogie State Forest and also in a number of Reserves and Reference areas, including Mt Wombat Reserve and Toorour Reference Area. Areas on Freehold land are located in the west and south of the zone.

Many species rely on these forest and ecological services that they provide. More than 36% of Herb-rich Foothill Forests in the Goulburn Broken Catchment have disappeared since European settlement. Of the remnant area, 21% occurs on private land. The support of private landholders is important for the ongoing conservation of this asset. Current threats include, inappropriate fire regimes, soil disturbance, weed invasion, pest animals, loss of tree and ground habitat and grazing pressures. The Strathbogie Zone has retained 51% of its previous extent, predominantly managed as public land.

B) Photographic Example – Herb-rich Foothill Forest:



Strathbogie State Forest BAP site – 202421-19

Photo: Rowhan Marshall

C) Actions – Herb-rich Foothills Forest:

Size/Extent:

- **Encourage landholders to increase the size** of existing remnants through supplementary planting and landscape linkages. Establish buffer zones with revegetation or fence out and allow regeneration.
- **Liase** with public land managers to protect significant roadsides and enhance existing areas through minimising disturbances such as recreational use, inappropriate fire regimes and timber harvesting

Condition:

Extension/Education

- Use BAP mapping to assist in developing a **strategic approach** to protecting and enhancing ecological processes in the landscape.
- **Organise community education activities** relating to the importance of Herb-rich Foothill Forest and associated flora and fauna species, specifically targeting high priority remnants adjacent to public land.
- Promote **Whole Farm Plan** on private land through DPI
- Further **promote** the benefits of protecting and enhancing remnant patches through extension and voluntary programs, such as Environmental Management Incentives and Land for Wildlife.
- **Encourage** retention of fallen timber.
- Promote **appropriate** ecological burning regimes to create ideal age class structure (fire intervals 10-50years, DSE 2002).

On-ground Works

- **Implement** North East Forest Management Plan recommendations and management prescriptions (NRE 2001)
- Ensure the **application** of Code of Forestry Practices (DNRE 1996)
- **Maintain and improve condition** of all identified high value sites by encouraging the retention of fallen timber and hollow bearing trees, and manage regionally listed weeds.
- **Protect** clusters or individual specimens of large, hollow-bearing trees are retained and protected throughout the zone to enhance habitat for hollow dependant species such as Powerful Owl and Gliders.
- **Exclude grazing** in priority sites to promote natural regeneration.
- **Restore structural diversity** by supplementary planting in degraded remnants.

Pest Plant and Animals

- **Promote** the good neighbour program through DPI to address cross tenure pest plant and animals issues.
- **Minimise disturbance** at high value sites to prevent erosion and minimise weed invasion.
- **Continue ongoing control** of foxes and feral cats for the protection of threatened species and focal species including Brush-tailed Phascogale, Sugar Gliders and Hooded Robins.

Landscape Processes (eg. hydrological regime, habitat connectivity):

- **Identify and prioritise potential sites** for habitat expansion and improved connectivity as identified by the landscape context model and maps provided in this document.

8.0 Monitoring



Monitoring is a fundamental component of all management activities and an important tool, which can be used to enhance the knowledge of biodiversity assets and manage for their on-going protection (Robinson *in prep.*).

The following table (Table 4) provides a basis for monitoring in the Strathbogie Landscape Zone. Where possible, this information will feed in to the various Goulburn Broken Catchment monitoring programs. It identifies a general monitoring outline, including actions that may be conducted to determine progress towards achieving catchment biodiversity targets. It identifies the key biodiversity asset, key indicators for monitoring and the suggested frequency/intensity of monitoring.

It is important to note that many of the monitoring activities listed below are already taking place, through a variety of mechanisms (eg. collection of data via local/catchment and Statewide databases and processes). Where existing mechanisms are already in place, they will continue to be used. However, there are other monitoring activities that are needed, to provide useful information and allow for accuracy assessment of the Catchments progress, towards meeting the Biodiversity Resource Condition Targets (RCT's).

A wide variety of monitoring actions are listed below. However this does not result in a binding commitment of those organisations (eg. time or funding), to undertake all of the monitoring. Rather, this table is intended to be a source of ideas for agency staff and community groups (eg. community groups may be interested in conducting future surveys). Interested persons can contact the Goulburn Broken Catchment Management Authority, Shepparton, or the Department of Primary Industries and Department of Sustainability and Environment Offices, Benalla, to discuss ideas and to ensure a coordinated approach (refer to Section 10.0 for contact information).

Whilst Table 4 outlines monitoring actions, evaluation of the BAP process also needs to occur, to evaluate the effectiveness of the BAP process (eg. in engaging people and prioritising works). An evaluation plan is therefore being developed to provide an overarching evaluation process for BAP in the Goulburn Broken Catchment.

Table 4: Monitoring - Strathbogie Zone

Key Biodiversity Asset	Key Indicators for Monitoring	Frequency/Intensity
1) Riparian Systems/Bogs		
	<ul style="list-style-type: none"> Trends in environmental flows and in-stream habitat condition (as measured by ISC) 	Five yearly* ISC assessments
	<ul style="list-style-type: none"> Trends in water quality 	Once yearly as part of EPA monitoring; five yearly as part of ISC: at least 30 sites (GBCMA 2004b)
	<ul style="list-style-type: none"> Monitor the trends in condition and functionality of riparian vegetation/stream frontages condition (resurveying of sites using VQA assessments; area/number fenced; area/number with restored flows) 	Every 5 years, 30 sites: part of ISC; CAMS inputs
	<ul style="list-style-type: none"> Surveying of mean habitat width of waterways in Zone 	Every 5 years, all sites (or in accordance with existing waterways monitoring), aerial photography
2) Grassy Woodlands		
	<ul style="list-style-type: none"> Refer to "All Key Biodiversity Sites" below 	See below
3) Dry Forest		
	<ul style="list-style-type: none"> Refer to "All Key Biodiversity Sites" below 	See below
4) Valley Grassy Forest		
	<ul style="list-style-type: none"> Refer to "All Key Biodiversity Sites" below 	See below
5) Herb-rich Foothill Forest		
	<ul style="list-style-type: none"> Refer to "All Key Biodiversity Sites" below 	See below
All Key Biodiversity Assets		
	<ul style="list-style-type: none"> Trends in vegetation condition (resurvey sites using VQA assessments) (this includes threats data) 	Every 5 years, riparian system – 20 sites; woodlands/forests – 30 sites
	<ul style="list-style-type: none"> Trends in bird survey data (resurvey sites using bird survey method) 	Every 5 years, riparian system – 20 sites; woodlands/forest – 30 sites
	<ul style="list-style-type: none"> Establish photographic monitoring points at each survey site. 	Every 5 years: when complete VQA and bird surveys

	<ul style="list-style-type: none"> Vegetation Quality Assessments, bird surveys and photographic point surveys at the remaining unsurveyed BAP sites 	Within next 5 years, to allow monitoring of these sites (as outlined above)
	<ul style="list-style-type: none"> Inclusion and surveying of up to date data and information (if any changes), or addition of sites (eg. if not already an identified site) 	Once yearly. Information to be fed into BAP database
	<ul style="list-style-type: none"> Trends in Focal Species reporting/sightings (eg. population size, age distribution, frequency of records, number of birds/pairs recorded, habitat (eg number of sites/EVC), breeding success, recruitment) 	Initial survey throughout zone to establish baseline data on population size and structure, subsequent two-yearly as part of bioregional program: across the zone
	<ul style="list-style-type: none"> Monitoring of threatened species, against current records 	Every 2 years: across the zone
	<ul style="list-style-type: none"> Undertake surveys for all of listed (threatened) species to establish baseline data on abundance and distribution in accordance with VROTPop procedures 	Within next 5 years: across the zone
	<ul style="list-style-type: none"> Subsequent assessments of selected populations (as per above threatened populations) to determine population trends 	Within next 5 years (subsequent to above action): across the zone
	<ul style="list-style-type: none"> Trends in connectivity and characteristics of sites within landscape (eg. size of remnants) 	Every 5 years; aerial photography
	<ul style="list-style-type: none"> Overlay of on-ground works areas against this plans mapping data 	Once yearly (end financial year), all applicable sites
	<ul style="list-style-type: none"> Number of incentives processed and implemented for priority sites for all Key Biodiversity Assets (private land only) 	Once yearly, in accordance with incentive mapping and overlaying of on-ground works areas (as per above action)

* Five yearly refers to five times per year

9.0 FURTHER INFORMATION - PRIORITY SITES



Priority Site Data:

Appendix 10 provides further information for the 405 priority BAP sites within the Strathbogie Landscape Zone. This information has been derived using the Geographical Information System - ArcView 3.3. It is intended that the priority site information and other information detailed in this plan, will allow groups and staff (eg. extension staff and community groups) to:

- ◆ Be pro-active in targeting sites,
- ◆ Act as a basis for informed management of the site,
- ◆ Provide a further rationale for applying incentives,
- ◆ Provide a tool for landholders and the wider community,
- ◆ Provide a tool to show how a site fits into the wider landscape, and
- ◆ Provide a benchmark against which future improvements in management can be monitored.

How To Use The Data Provided:

The data provided is intended for use by a range of agencies and community groups, to assist with biodiversity conservation in the Zone. It is particularly targeted towards agency extension officers. For example, it is anticipated that prior to, or following a site visit, an extension officer will investigate the data associated with a site, such as;

- ◆ What is the Ecological Vegetation Class of the site?
- ◆ How does the site fit in to the wider landscape?
- ◆ Are there any management agreements or incentives for the site (eg. covenant, bush tender)?
- ◆ Are there threatened or significant species recorded at the site or nearby?
- ◆ What is the rating of the site and those near it (eg. very high, high, medium or low)?
- ◆ What is the overarching management recommendation for the site (eg. protect or restore)?
- ◆ What are the actions recommended for the site? (eg. pest plant management) (Negotiations need to occur to get the best possible outcome for all involved)
- ◆ What are the options available to the landholders to fulfil these actions(eg. fencing incentive)?
- ◆ What are the options for joining the site to public land? (eg. widening roadsides to provide a corridor/link)?
- ◆ Using the Landscape Context Map (Appendix 8), determine where possible linkages (revegetation) may be of the most benefit – think about the landscape, what we could do to help the area.
- ◆ It is also important to remember that sites with scattered trees are still a vital link in the landscape and especially in an area where much of the original vegetation has given way to agriculture. Officers need to determine on site, where the best possible linkages could occur, and often this should include scattered vegetation, as although they generally have not been identified as a site in this plan, they form an important element for providing links between the identified sites.

Keeping The Data Current:

The data contained in this report is by no means 'comprehensive', as this process relies on the regular updating of information, to keep it accurate and timely. Therefore this plan is adaptive, to enable management actions and information to be modified, in response to further information, including monitoring. The plan will also be reviewed when necessary to ensure that it remains a 'living' document. In order for the data and associated maps to remain as up to date and relevant as possible, it is important that site data continue to be added to the database. For example, the Department is not always aware of sightings of flora and fauna by individual landholders or community groups and there are still a number of sites that require Vegetation Quality Assessments and Bird Surveys.

Further Information or To Provide Data:

For clarification of information or to provide further data, please contact the Water and Biodiversity Team, Department of Sustainability and Environment, Benalla on (03) 5761 1611.

10.0 LANDHOLDER ASSISTANCE



There is a range of assistance available for landholders in regards to planning for biodiversity conservation, and implementing works, on their properties. This section is designed to provide an overview of some of the property planning, management tools and incentives, available to landholders and the community, within the Mid Goulburn Region. Also included are some of the programs within the community, which will benefit from the information provided in this plan.

Environmental Incentives	WHOLE FARM PLANS
These financial incentives will provide funding for environmental works such as fencing off of remnants and revegetation projects.	Protecting biodiversity on a farm is an important element when developing and implementing a Whole Farm Plan. Biodiversity Action Planning can inform the process and provide extra information for landholders and extension officers.

Advice and Information:

Please contact your local Department of Primary Industries (DPI)/Department of Sustainability and Environment (DSE) Office, the Goulburn Broken Catchment Management Authority (GBCMA), the Goulburn Murray Landcare Network (GMLN) or Trust for Nature (TFN) (Vic), for further information on biodiversity conservation. There are extension officers within these organisations who can provide advice on a range of aspects such as; whole farm planning, irrigation design, groundwater management, revegetation and protection of remnant vegetation, threatened species protection and best management practices.

Incentives for On-Ground Works:

There is a range of incentives available for landholders within the Mid Goulburn Broken Catchment for catchment works, including:

- ◆ Environmental incentives - to assist with the protection and/or enhancement of remnant vegetation, including wetlands and grasslands,
- ◆ Tree Growing incentives - to assist with the re-establishment of native vegetation,
- ◆ Variety of Whole Farm Planning Incentives - to assist with farm management,
For the above three points, contact the Department of Primary Industries, Benalla (03) 5761 1611.
- ◆ Waterways Incentives – for on-ground works along rivers and creeks contact the GBCMA office, Shepparton on (03) 58 201 100.

Management Arrangements:

Programs such as Bush Returns, EcoTender and Bush Broker, may provide incentives and advice, for long-term conservation management on properties. *Contact the GBCMA, Shepparton (03) 58 201 100 or Benalla office (03) 57 611 611 for further information or visit www.gbcma.vic.gov.au*

Permanent Protection:

A Conservation Covenant permanently protects sites for conservation. It may provide assistance for rate relief, tax concessions and incentives for the costs of on-ground works. *TFN (Vic) is the managing organisation in regards to Conservation Covenants; visit their website at www.tfn.org.au*

Other Assistance:

- ◆ Goulburn Murray Landcare Network Shepparton – Landcare related advice (www.gmln.org.au)
- ◆ Land for Wildlife – a voluntary scheme aiming to encourage and assist landholders to protect and enhance biodiversity values on their properties. *Managed by the Department of Sustainability and Environment – for further information visit www.dse.vic.gov.au.*

- ◆ Local Government (Rural City of Benalla, Strathbogie and Mansfield Shire) – managing authority for native vegetation statutory planning requirements.

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A special acknowledgment to all representatives (current and past) on the Goulburn Broken Biodiversity Action Planning (BAP) Steering Committee. This steering committee was established to oversee the BAP process and is responsible for the coordination of BAP, in the Goulburn Broken Catchment. The committee is comprised of personnel from a range of departmental organisations, including the GBCMA, DPI, DSE and TfN (Vic). Core committee members are detailed below, along with contributors to BAP in the Goulburn Broken (eg. meeting attendance, trial implementation, and plan development). Thank you to person's whom have attended meetings as invited guest's (names not listed) and provided valuable comment.

BAP Steering Committee Members:

- GBCMA - Barlow, Tim – Manager, Biodiversity Programs, GBCMA (current)
- Brunt, Kate – Biodiversity Projects Coordinator, GBCMA (current)
- Bell, Kate – (as) Manager, Biodiversity Programs, GBCMA (past)
- DPI - Heard, Rebecca – Native Biodiversity Coordinator, DPI (SIR) (current)
- Stothers, Kate – Nature Conservation Coordinator, DPI (Dryland) (current)
- Williams, Lance – Planning Officer, DPI (SIR) (past)
- Sislov, Alex – Team Leader Environment Program, DPI (SIR) (current)
- DSE - Merritt, Bronwyn – Biodiversity Landscape Plan Project Officer (Upper) (past)
- Rowhan Marshall – Biodiversity Project Officer (current)
- Smith, Stephen – Senior Flora and Fauna Officer, DSE (Upper) (past)
- Edmonds, Tobi – Threatened Flora Projects Officer, DSE (Lower) (current)
- Wilson, (Dr) Jenny – Biodiversity Projects Officer, DSE (Dryland) (past)
- Colbourne, Debbie – (as) Flora and Fauna Planner, DSE (Dryland) (past)
- Sheahan, Mark – (as) Biodiversity Team Leader, North East, DSE (past)
- TFN (Vic) - Robinson, (Dr) Doug – Regional Manager, Goulburn Broken – TfN (Vic) (current)

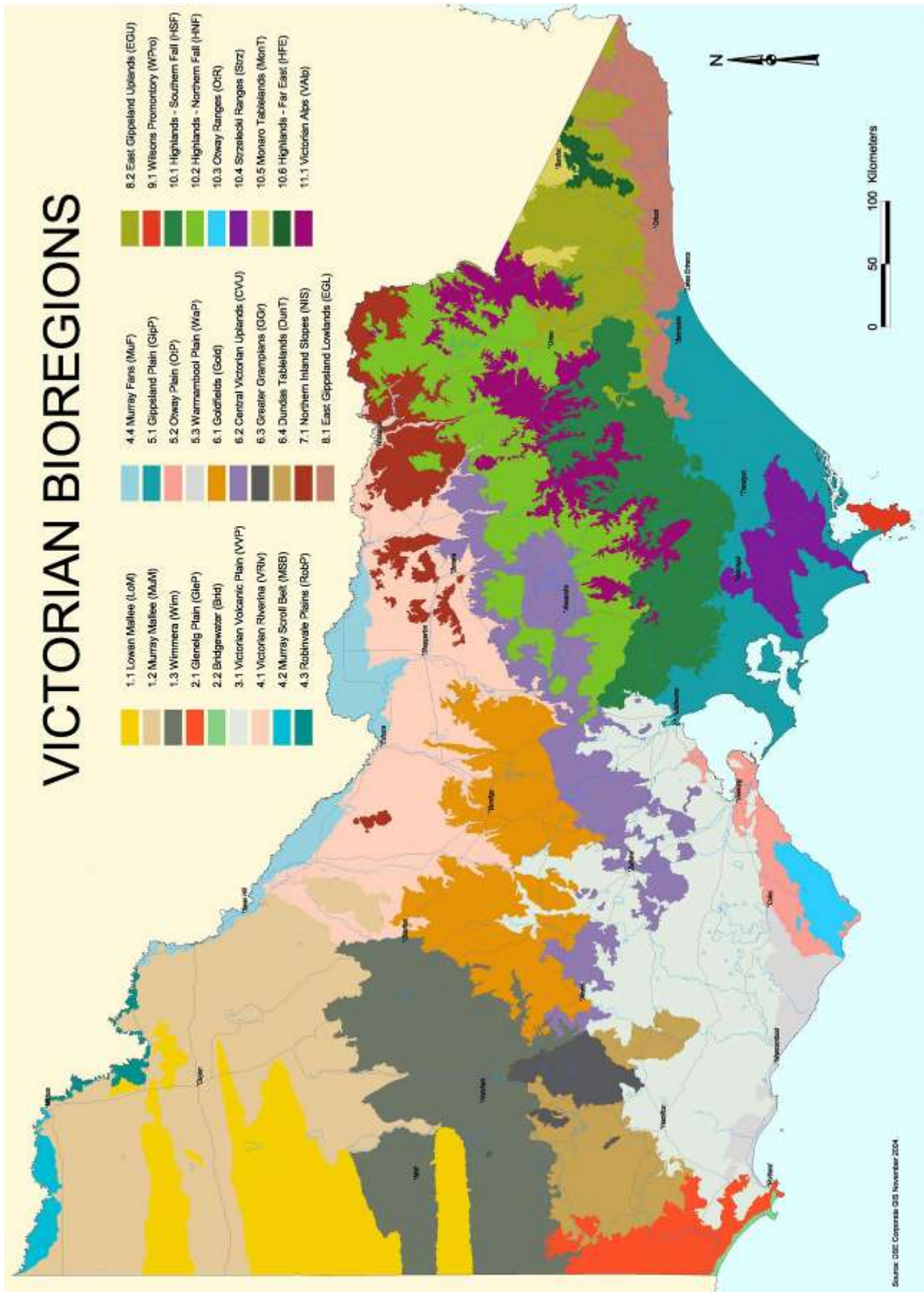
Biodiversity Action Planning Contributors:

- Mitchell, Peter – Links Officer, DPI (trial implementation)
- Olive, Cathy – Links Officer, DPI (trial implementation)
- Weber, Rolf – (as) Acting Biodiversity Team Leader, DSE
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- Mentiplay-Smith, Janice - Links Officer, DPI (current)
- Howell, Marion – Biodiversity Officer, GBCMA (past)

13.0 APPENDICES

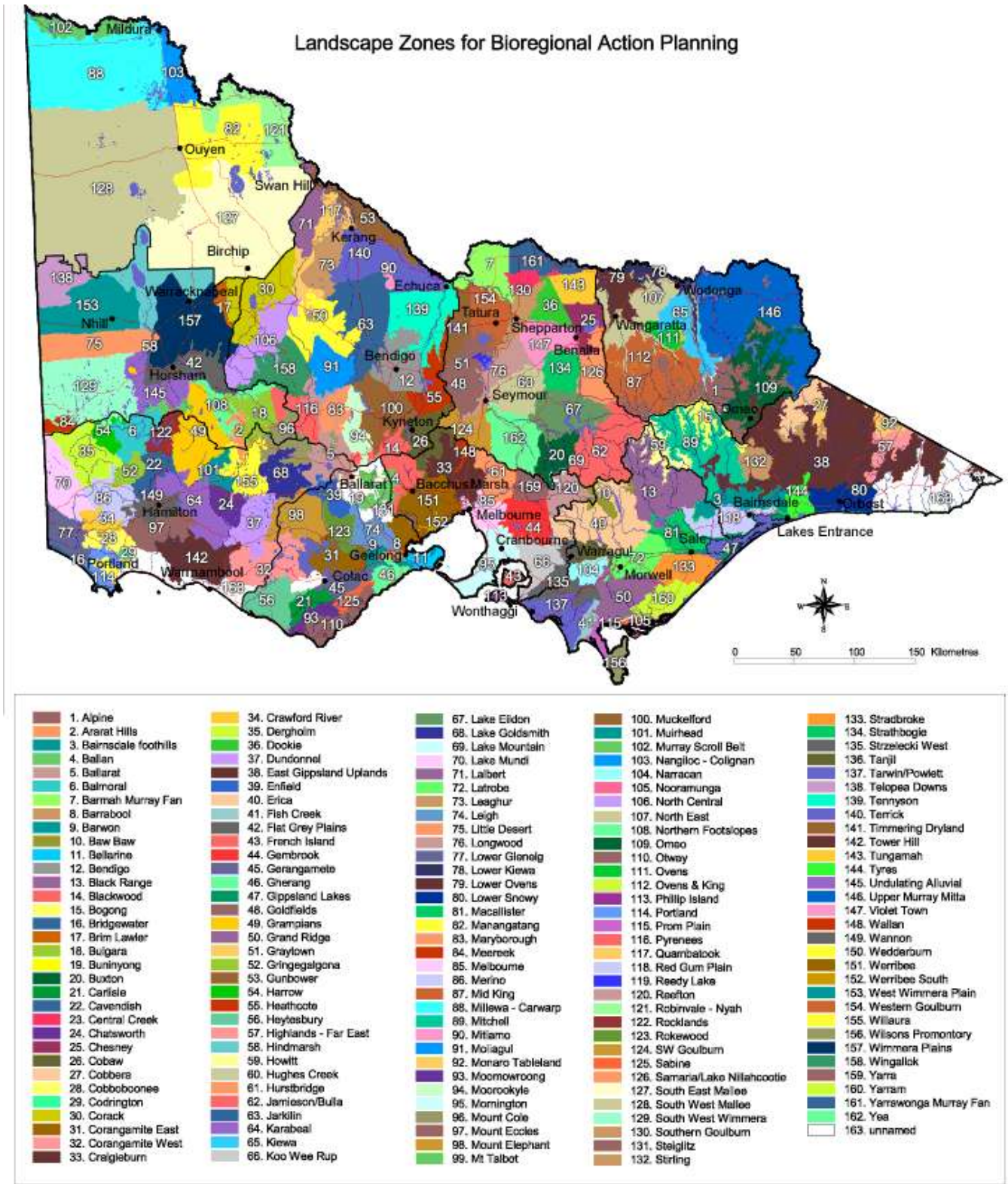


APPENDIX 1 – VICTORIAN BIOREGIONS



Source: www.dse.vic.gov.au

APPENDIX 2 – VICTORIAN LANDSCAPE ZONES



Source: www.dse.vic.gov.au

APPENDIX 3 – GOULBURN BROKEN CATCHMENT TARGETS

This Appendix is intended to provide a summary of the Goulburn Broken Regional Catchment Strategy targets and priorities for biodiversity conservation. For further information please refer to GBCMA 2003 or visit www.gbcma.vic.gov.au.

The Goulburn Broken Regional Catchment Strategy identifies the following biodiversity resource condition targets, for native vegetation in the catchment:

1. Maintain the extent of all native vegetation types at 1999 levels in keeping with the goal of 'Net Gain' listed in Victoria's Biodiversity Strategy 1997,
2. Improve the quality of 90% of existing (2003) native vegetation by 10% by 2030,
3. Increase the cover of all endangered and applicable vulnerable Ecological Vegetation Classes to at least 15% of their pre-European vegetation cover by 2030,
4. Increase 2002 conservation status of 80% threatened flora and 60% threatened fauna by 2030,
5. Maintain the extent of all wetland types at 2003 levels where the extent (area and number) has declined since European settlement, and
6. Improve the condition of 70% of wetlands by 2030, using 2003 as the benchmark for condition (GBCMA 2003 p11).

Priorities for action to conserve biodiversity in the Goulburn Broken Catchment (GBC) are driven by the conservation significance of the biodiversity asset. Regional investments in biodiversity conservation in the GBC are driven by the following goals (in order of priority):

1. **Protecting** existing viable remnant habitats and the flora and fauna populations they contain (eg. through reservation, covenants, management agreements, fencing and statutory planning),
2. **Enhancing** the existing viable habitats that are degraded (eg. management of threats such as pest plants and animals, grazing, salinity, promotion of natural regeneration and/or revegetation with understorey), and
3. **Restoring** under-represented biodiversity assets to their former extent by revegetation (to create corridors, buffers, patches of habitat) (GBCMA 2003).

APPENDIX 4 –THREATENED FLORA

List of threatened flora and their conservation status in the Strathbogie Landscape Zone (FIS 2005). Table modified from Anderson et al 2003.

Scientific Name	Common Name	National Status	Vic Status	FFG Status	Species Code
<i>Acacia dallachiana</i>	Catkin Wattle		r		23
<i>Acacia penninervis</i> var. <i>penninervis</i>	Hickory Wattle		r		74
<i>Baumea planifolia</i>	Rough Twig-sedge		k		3722
<i>Brachyscome ptychocarpa</i>	Tiny Daisy		r		472
<i>Desmodium varians</i>	Slender Tick-trefoil		k		4425
<i>Dillwynia sieberi</i>	Sieber's Parrot-pea		r		4605
<i>Dodonaea boroniifolia</i>	Hairy Hop-bush		r		1087
<i>Eucalyptus alligatrix</i>	Silver Stringybark		r		1262
<i>Eucalyptus alligatrix</i> subsp. <i>limaensis</i>	Lima Stringybark	V	e		4685
<i>Hibbertia humifusa</i> subsp. <i>erigens</i>	Euroa Guinea-flower	V	v	L	5083
<i>Huperzia australiana</i>	Fir Clubmoss		r		1709
<i>Lotus australis</i>	Austral Trefoil		k		2057
<i>Montia fontana</i> subsp. <i>amporitana</i>	Water Blinks		k		4056
<i>Pimelea treyvaudii</i>	Grey Rice-flower		v		2534
<i>Pterostylis cucullata</i>	Leafy Greenhood	V	v	L	2790
<i>Pultenaea platyphylla</i>	Flat-leaf Bush-pea		r		2865
<i>Pultenaea williamsonii</i>	Highland Bush-pea		r		4863

Definitions - E: endangered in Australia; k: poorly known in Victoria; e: endangered in Victoria; v: vulnerable in Victoria; r: rare in Victoria; L: listed under FFG; N: nominated under FFG

APPENDIX 5 – THREATENED FAUNA

List of threatened fauna and their conservation status in the Strathbogie Landscape Zone (VFD 2005). Table modified from Anderson et al 2003.

Scientific Name	Common Name	National Status	Victoria Status	FFG Status	Species Code
<i>Anas rhynchotis</i>	Australasian Shoveler		v		212
<i>Falco subniger</i>	Black Falcon		v		238
<i>Melithreptus gularis</i>	Black-chinned Honeyeater		n		580
<i>Climacteris picumnus</i>	Brown Treecreeper		n		555
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale		v	L	1017
<i>Burhinus grallarius</i>	Bush Stone-curlew		e	L	174
<i>Stagonopleura guttata</i>	Diamond Firetail		v	L	652
<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe Bat		v	L	1303
<i>Galaxias rostratus</i>	Flat-headed Galaxias		d		4037
<i>Ardea alba</i>	Great Egret		v	L	187
<i>Litoria raniformis</i>	Growing Grass Frog	V	e	L	3207
<i>Aythya australis</i>	Hardhead		v		215
<i>Melanodryas cucullata</i>	Hooded Robin		n	L	385
<i>Macquaria australasica</i>	Macquarie Perch	E	e	L	4096
<i>Euastacus armatus</i>	Murray Spiny Cray		d	L	5041
<i>Biziura lobata</i>	Musk Duck		v		217
<i>Phalacrocorax varius</i>	Pied Cormorant		n		99
<i>Ninox strenua</i>	Powerful Owl		v	L	248
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E	c	L	603
<i>Chthonicola sagittata</i>	Speckled Warbler		v	L	504
<i>Circus assimilis</i>	Spotted Harrier		n		218
<i>Cinclosoma punctatum</i>	Spotted Quail-thrush		n		436
<i>Lophoictinia isura</i>	Square-tailed Kite		v	L	230
<i>Lathamus discolor</i>	Swift Parrot	E	e	L	309
<i>Maccullochella macquariensis</i>	Trout Cod	E	c	L	4093
<i>Neophema pulchella</i>	Turquoise Parrot		n	L	302
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		v	L	226

Definitions: V: vulnerable in Australia; E: Endangered in Australia; c: critically endangered in Victoria; e: endangered in Victoria; v: vulnerable in Victoria; n: near threatened in Victoria; L: listed under FFG

APPENDIX 6 – SITE PRIORITISATION METHOD

To determine the conservation significance and the need for ground-truthing (surveying), sites were prioritised according to the following table (GBCMA *in prep.*). If ground-truthing was required and no survey was completed (eg. more than 100 sites required survey), the minimum priority status was applied. *LCM refers to the Landscape Context Model.

Conservation Status of EVC	Potential habitat within known dispersal range of threatened taxon or focal species, or within priority areas as identified by LCM*	EVC Patch Size	Ground-truthing required to confirm priority rank on basis of vegetation condition	Priority Status: Very High, High, Medium, Low
Endangered	Y	<5ha	Ground-truthing needed	VH or H
E	N	<5ha	Ground-truthing needed	VH or H
E	Y	5-10ha	Ground-truthing needed	VH or H
E	N	5-10ha	Ground-truthing needed	VH or H
E	Y	11-40ha		VH
E	N	11-40ha		VH
E	Y	>40ha		VH
E	N	>40ha		VH
Vulnerable	Y	<5ha	Ground-truthing needed	M, H or VH
V	N	<5ha	Ground-truthing needed	M or H or VH
V	Y	5-10ha	Ground-truthing needed	M, H or VH
V	N	5-10ha	Ground-truthing needed	M or H or VH
V	Y	11-40ha		VH
V	N	11-40ha	Ground-truthing needed	H or VH
V	Y	>40ha		VH
V	N	>40ha		VH
Rare	Y	<5ha	Ground-truthing needed	M, H or VH
R	N	<5ha	Ground-truthing needed	M or H or VH
R	Y	5-10ha	Ground-truthing needed	M, H or VH
R	N	5-10ha	Ground-truthing needed	M or H or VH
R	Y	11-40ha		VH
R	N	11-40ha	Ground-truthing needed	H or VH
R	Y	>40ha		VH
R	N	>40ha		VH
Depleted	Y	<5ha	Ground-truthing needed	M or H
D	N	<5ha	Ground-truthing needed	L or M
D	Y	5-10ha	Ground-truthing needed	M or H
D	N	5-10ha	Ground-truthing needed	L, M or H
D	Y	11-40ha		H
D	N	11-40ha	Ground-truthing needed	M or H
D	Y	>40ha		VH
D	N	>40ha		VH
Least Concern	Y	<5ha		M
LC	N	<5ha		L
LC	Y	5-10ha		M
LC	N	5-10ha	Ground-truthing needed	L or M
LC	Y	11-40ha	Ground-truthing needed	M or H
LC	N	11-40ha	Ground-truthing needed	L or M
LC	Y	>40ha	Ground-truthing needed	H or VH
LC	N	>40ha	Ground-truthing needed	H or VH

APPENDIX 7 – VEGETATION QUALITY ASSESSMENT FORM

Refer to DSE 2004 for further information on assessments. Recording of site information and other factors (eg. threatening processes) was also recorded at each of the surveyed sites.

BAP – Vegetation Quality Assessment Sheet (Woodlands and Forests)

USE OTHER SHEETS FOR WETLAND AND GRASSLAND

Date:

Assessor:

BAP Zone:

Map:

Easting:

BAP Site No:

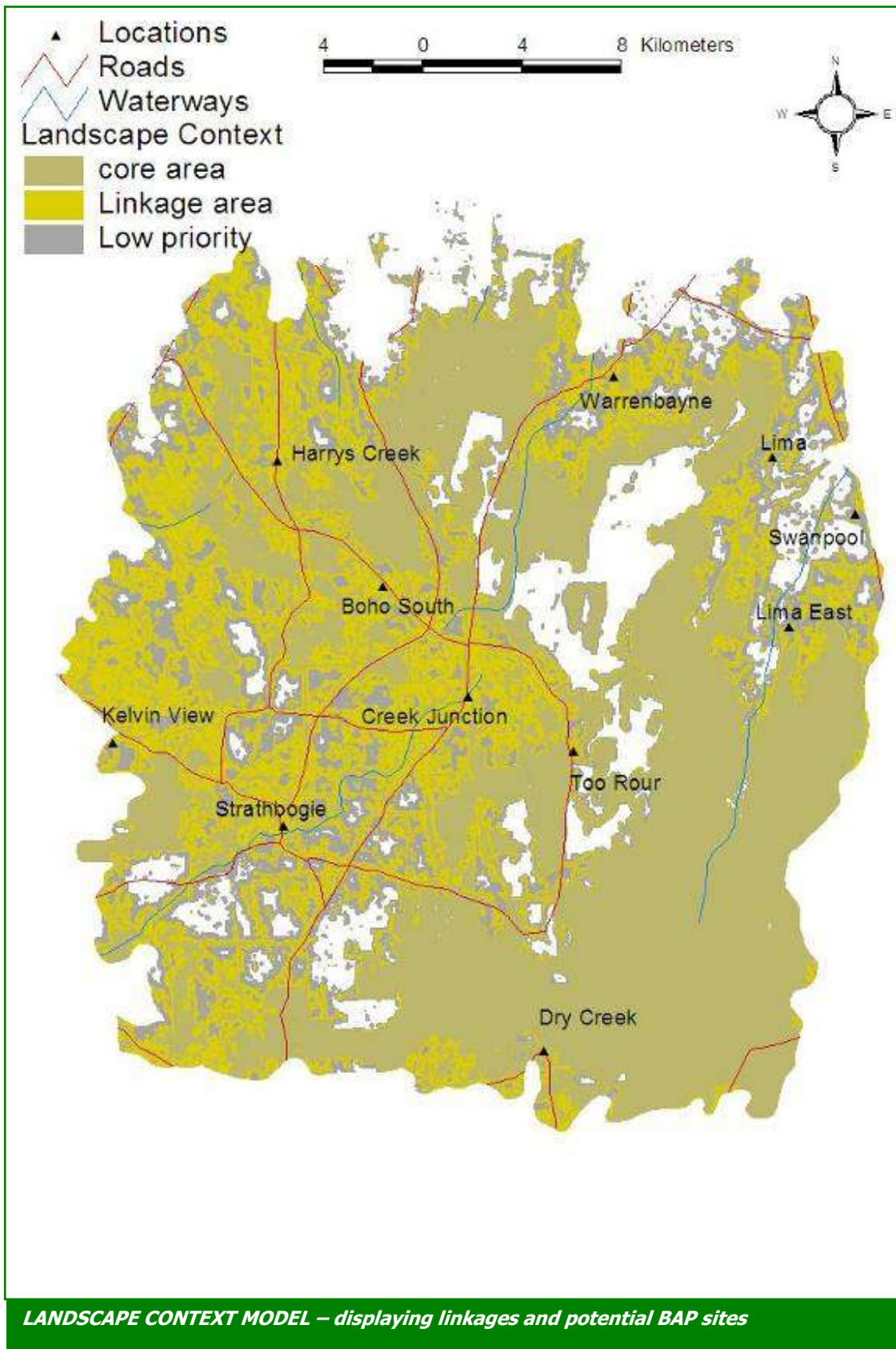
Northing:

	TARGET	QUALITY RANKING	WEIGHT	VALUE
LARGE TREES (over 50cms) Apply to living and dead	10-15/ha in woodlands 20/ha in forests	No large trees	0	
		Present but not common Woodlands, up to 7/ha Forests, up to 12/ha	1	
		Common Woodlands, more than 7/ha Forests, more than 12/ha	2	
CANOPY COVER (use all trees over 80% of their mature height)	10-20% in woodlands 20-50% in forests	Very substantially reduced (<25% of benchmark)	0	
		Significantly reduced (25-50% of benchmark)	0.5	
		Comparable to benchmark, although it may be reduced (>50% of benchmark)	1	
UNDER-STOREY Include shrubs, grasses, herbs and young regenerating trees	Cover of native species – 90-100% in woodlands and forests; Diversity of lifeforms - 25-35 species in woodlands and forests.	Absent or virtually so (<10% total expected cover)	0	
		Native cover greatly reduced (10-25% total expected cover)	2	
		Native cover somewhat reduced, low diversity (25%-75% total expected cover, < 50% diversity)	3	
		Native cover somewhat reduced, high diversity (25% - 75% total expected cover, >50% diversity)	4	
		Native cover little reduced, high diversity (>75% total expected cover, >50% diversity)	5	
WEEDS	% cover	Dominated by exotic species (>50% cover)	0	
		Exotic species common but not dominant (25 – 50% cover)	1	
		Exotic species present but not common (5 – 25% cover)	2	
		Exotic species absent or very rare (<5% cover)	3	

RECRUIT- MENT	Include all components - trees, shrubs, grasses and herbs.	Recruitment absent or, if present then only for a minority of species ($<30\%$ of species)	0	
		Recruitment common but not for all species ($30-70\%$)	1	
		Very common for most life forms ($>70\%$ of species)	2	
ORGANIC LITTER	20% cover in woodlands	Organic litter absent or significantly reduced from benchmark level ($< 50\%$)	0	
		Organic litter present and not significantly reduced from benchmark level ($>50\%$)	1	
LOGS m/Ha	100m in woodlands, 150m in forests	Logs and/or cut stumps absent or significantly reduced from benchmark ($< 25\%$)	0	
		Logs and/or cut stumps common but reduced from benchmark (25 $- 50\%$)	0.5	
		Logs and/or cut stumps present and not significantly reduced from benchmark ($>50\%$)	1	
SIZE	Area	< 2 ha	0	
		$2 - 10$ ha	1	
		> 10 ha	2	
NEIGH- BOURHOOD	Within 1 km radius, % area covered by indigenous vegetation	$< 10\%$ cover	0	
		$20 - 60\%$ cover	1	
		$> 60\%$ cover	2	
Distance to the nearest 'core area'	'Core area' is a block of native vegetation $>$ 50 Ha	> 1 km from 'core area'	0	
		< 1 km from 'core area'	1	
			TOTAL	

APPENDIX 8 – LANDSCAPE CONTEXT MODEL (LCM)

The Landscape Context Model Mapping is now also contained on the BAP CD (Version 1, January 2008)* or on the GBCMA website (www.gbcma.vic.gov.au). This mapping can be used in conjunction with the BAP mapping and this Conservation Plan.



LANDSCAPE CONTEXT MODEL – displaying linkages and potential BAP sites

* To obtain copies of the BAP CD (Version 1, January 2008), or for further information on BAP, please contact bap@gbcma.vic.gov.au OR the Biodiversity Action Planning Officer, Department of Sustainability and Environment (DSE) Benalla at Ph: (03) 57 611 611

APPENDIX 9 – PRIORITY SITE INFORMATION (MAPPING):

Mapping and accompanying information for each of the 'priority BAP sites' is now contained on the BAP CD (Version 1, January 2008) or on the GBCMA website (www.gbcma.vic.gov.au). This mapping data is designed to be used in conjunction with this Conservation Plan to assist users to obtain further information on priority sites.

HOW TO OBTAIN INFORMATION FROM THE BAP CD:

1. Locate the available mapping data by clicking on the 'BAP Mapping' hyperlink#.
2. Click on the hyperlink relating to the Zone of interest under the 'BAP Mapping' subheading' (e.g. 'Barmah').
3. This will lead to a map identifying priority BAP sites within the chosen Zone.
4. On this map, locate the area/site of interest by clicking on the area.
5. Zoom in or out to the areas/sites of interest, using the North, South, East, West arrows.
6. Click on a BAP site to view the Attribute Table information for that site.
7. Refer to the list of birds surveyed at each site (where available).
8. An explanation of the data provided in the Attribute Table, is provided in the 'Attribute Table Definition' document under the BAP Mapping Subheading
9. For further information to assist with the identification of opportunities to link the BAP sites, refer to 'BAP Mapping', 'Landscape Context Model Maps' and choose the relevant Zone name hyperlink(e.g. 'Barmah').
10. To access the data via the Geographical Information System (GIS) (where available) select 'BAP Mapping',
11. 'GIS data' then either 'BAP GIS layer' or 'LCM GIS layer'.

Note: Mapping data for each Landscape Zone can also be located by clicking on the 'BAP Zones' hyperlink and choosing the Landscape Zone of interest from the map of the Goulburn Broken Catchment.

To obtain copies of the BAP CD (Version 1, January 2008), or for further information on BAP, please contact bap@gbcma.vic.gov.au OR the Biodiversity Action Planning Officer, Department of Sustainability and Environment (DSE) Benalla at Ph: (03) 57 611 611

