Conservation Plan
for the
South West Goulburn Landscape Zone

Biodiversity Action Planning
in the
Upper Goulburn Broken Catchment

Victoria
The Place To Be

Department of Sustainability and Environment
Department of Primary Industries

GOULBURN BROKEN
CATCHMENT MANAGEMENT AUTHORITY

Australian Government

Developed By:

The Water and Biodiversity team, Department of Sustainability and Environment, for the Goulburn Broken Catchment Management Authority. Developed under the guidance of the Biodiversity Action Planning Steering Committee - comprising personnel from the Goulburn Broken Catchment Management Authority, Department of Primary Industries, Department of Sustainability and Environment and Trust for Nature (Vic).

Bronwyn Merritt
46 Aitken Street
Alexandra Vic 3714
Phone: (03) 5772 0200
Fax: (03) 5772 1361

Acknowledgments:

This project is funded as part of the Goulburn Broken Catchment Management Authority Regional Catchment Strategy in the Upper Goulburn Broken Region and is provided with support and funding from the Australian and Victorian Governments, through the Natural Heritage Trust. This project is delivered primarily through partnerships between the Goulburn Broken Catchment Management Authority, Department of Primary Industries, Department of Sustainability and Environment, Trust for Nature and other community bodies. Personnel from these agencies provided generous support and advice during the development of this plan. We also thank numerous Landholders, Landcare groups, Local Area Planning Groups and other individuals, who also provided generous support advice, information and assistance wherever possible.

Front cover: View from Mt Piper. Photo Bronwyn Merritt
Inset: Brush-tailed Phascogale (Phascogale tapoatafa). Photo Peter Robertson

Published & Printed By:

Water and Biodiversity
Department of Sustainability and Environment
Alexandra (Draft July 2006)

Authorised by:

Victorian Government
1 Treasury Place
Melbourne, Victoria
3000 Australia

ISSN – To be requested

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

For Further Information:

For further information about Biodiversity Action Planning please visit the DPI website at www.dpi.vic.gov.au or the DSE website at www.dse.vic.gov.au or call the Customer Service Centre on 136 186. Or visit the Goulburn Broken Catchment Management Authority website at www.gbcma.vic.gov.au

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 methodology used to develop the Landscape Zone plans is according to the 'Developer's Manual for Biodiversity Action Planning in the Goulburn Broken Catchment (GBCMA 2004a)'. The Central Victorian Uplands and Highlands Northern Fall Bioregional plans and the South West Goulburn Landscape Zone Plan outline biodiversity priorities at the bioregional level. This South West Goulburn Landscape Zone Conservation Plan has been developed at the local 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 to other planning processes, landholders and agencies.

The **South West Goulburn Landscape Zone** is located within the Goulburn Broken Catchment of Victoria. The Zone 91,100 hectares in extent, is part of the Victorian Central Uplands and Highlands Northern Fall Bioregions. It is within the Local Government areas of Mitchell and Macedon Ranges. Since European settlement much of the vegetation in the zone has been cleared, leaving a fragmented landscape, with many of the remnants being highly modified.

There are 962 **priority environmental sites** have been identified within the South West Goulburn Landscape Zone. The priority sites have been determined and ranked (low, medium, high or very high) based on factors such as, size, vegetation quality, Ecological Vegetation Class (EVC) conservation status, threatened species, landscape context and field survey results. These sites contain remnant vegetation and vary greatly in size from a stand of paddock trees, to Mt Disappointment State Park. In general, many sites within the zone were found to have low levels of understorey and fallen timber, a high percentage of exotic species and low numbers of old hollow-bearing trees.

Two important components in the Biodiversity Action Planning 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 represent some of the key requirements for conservation of a wider range of species in the area. Six focal species have been identified in the zone: Brush-tailed Phascogale, Sugar Glider, Golden Sun Moth, Golden Whistler, Crested Shrike-tit and Hooded Robin.

The **Key Biodiversity Assets** approach is a method of grouping biodiversity assets (eg. animals plants and communities) that use the same type of habitat. Seven Key Biodiversity Assets were identified for the South West Goulburn Landscape Zone: Grassy Woodlands, Grassy Dry Forests Group, Granite Country, Box Ironbark, Damp Forests (which includes Herb-rich Foothill Forest), Riparian Systems and Mt Piper. The grouping of these assets will assist in targeting actions towards the very high value sites first, down to the lowest priority sites.

Management actions have been developed for the South West Goulburn Landscape Zone, based on the results of desktop analysis and surveying. It is intended that government agencies (primarily extension staff) and the community will work together to implement these actions, for the benefit of biodiversity conservation in the South West Goulburn Landscape Zone and the wider area of the Goulburn Broken Catchment.

CONTENTS

SECTIONS PAGE

1.0 BACKGROUND

1.1 INTRODUCTION

Figure 1: BAP Process

Biodiversity Action Planning[1] (BAP) is an initiative by the Victorian Government to identify priorities for the conservation of native biodiversity, as part of the implementation of the State's Biodiversity Strategy (Crown 1997). In particular according to Platt & Lowe 2002, it aims to:

- Conserve native biodiversity[2] 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, and
- Achieve community support for landscape planning for biodiversity and the conservation of strategic assets, particularly in rural landscapes.

In order to achieve these aims, effective planning of actions 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 'the Landscape Plan for the Goulburn Broken CMA – South West Goulburn Broken Zones' identify the broad priorities for biodiversity conservation in the region. They also provide the foundation for producing detailed Plans, such as the 'South West Goulburn Landscape Zone Conservation Plan' (Ahern et al 2003). At the Landscape level, this South West Goulburn Landscape Conservation Plan is intended to provide biodiversity conservation actions for the community to implement at a local level. Figure 1 illustrates the Biodiversity Action Planning process and where the South West Goulburn Landscape Zone Conservation Plan (highlighted in red) fits within a policy context.

1.2 OBJECTIVES

The South West Goulburn Landscape Zone Conservation Plan aims to translate state, regional and catchment plans and targets for biodiversity, to a local landscape level. This plan aims to ensure that private and public resources expended for conservation are targeted to priority sites for priority actions. In this way, available resources can be used for the greatest possible outcomes, based on the best science. This plan identifies 962 priority sites, ranging across low, medium, high or very high value. The protection and management of these priority sites is important for the conservation of flora and fauna in the local area. Therefore, this plan is intended primarily for use by extension officers, as well as the community, to guide the management of conservation in the zone.

Broadly, this plan details:

- The landscape, vegetation and significant flora and fauna of the area
- Conservation objectives for the South West Goulburn Landscape Zone
- Actions to be conserved, and the threats to these biodiversity values
- Priority actions required to protect and restore the assets
- Further monitoring requirements for the zone (GBCMA in prep)

1.3 A CONTEXT FOR THE DEVELOPMENT OF THE – SOUTH WEST GOULBURN 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)

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 2003a p87). This South West Goulburn Landscape Conservation Plan aims 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 refer to GBCMA 2003.

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

- 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
- Improve the quality of 90% of existing (2003) native vegetation by 10% by 2030,
- Increase the cover of all endangered and applicable vulnerable Ecological Vegetation Classes to at least 15% of their pre-European vegetation cover by 2030
- Increase 2002 conservation status of 80% threatened flora and 60% threatened fauna by 2030,
- Maintain the extent of all wetland types at 2003 levels where the extent (area and number) has declined since European settlement
- 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 RCS 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 South West 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).

Therefore this plan will be reviewed when necessary to ensure that it remains a 'living' document. It is also intended that extension staff will utilise Geographical 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 that at a later stage, will lead to further sites and projects being identified by interested individuals and groups.

2.0 THE STUDY AREA

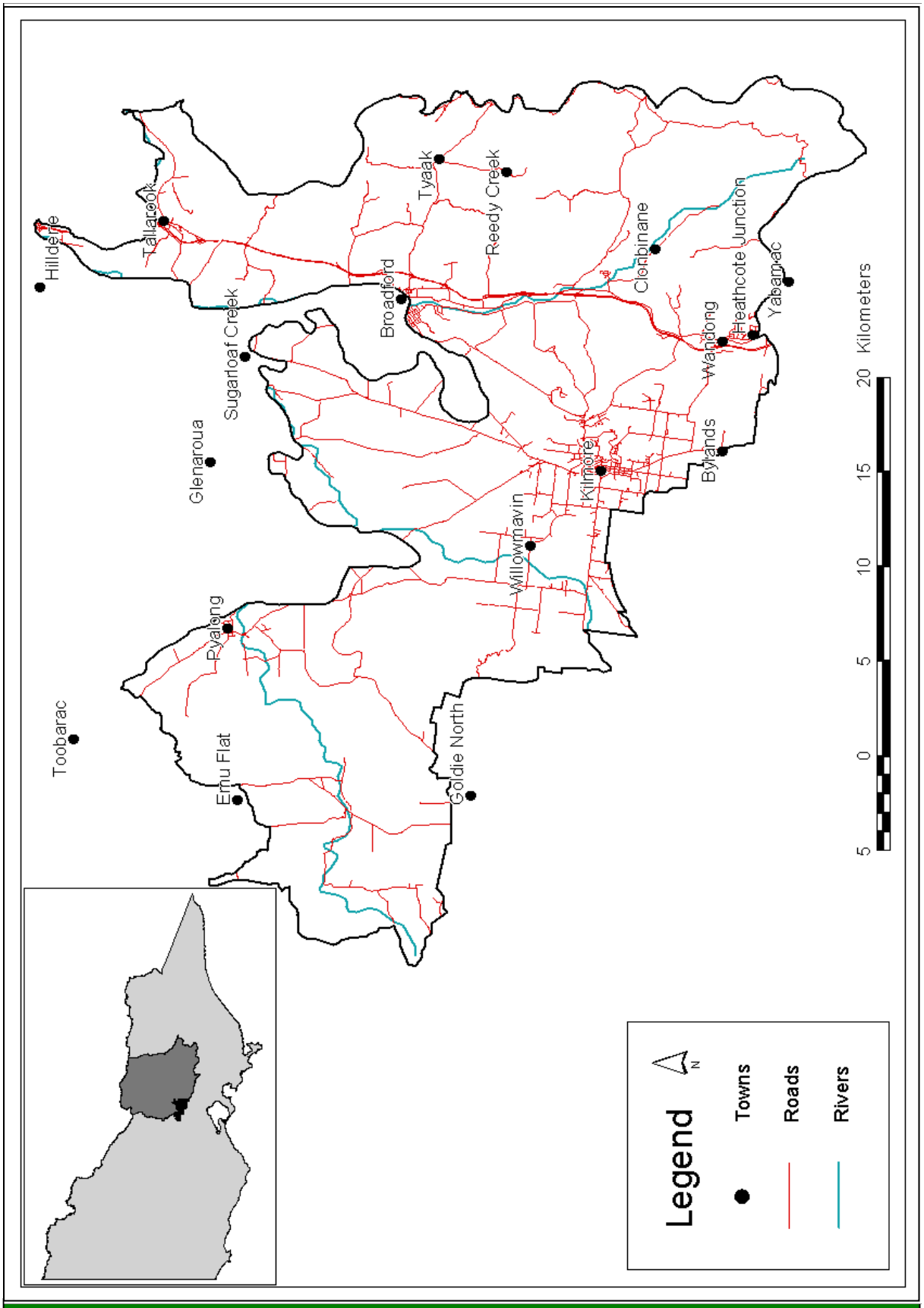


Figure 2a: Public land within the South West Goulburn Landscape Zone
Figure 2b: Inset – the Goulburn Broken Catchment and South West Goulburn Landscape Zone

2.1 LANDSCAPE

The South West Goulburn Landscape Zone (Figure 2) is located within the Goulburn Broken Catchment of Victoria. The zone (91,100 hectares) falls within the Victorian Central Uplands and Highlands Northern Fall Bioregions[3] and the Local Government areas of Mitchell and Macedon Ranges.

The Zone extends from the Cobaw Range in the west to the Tallarook and Mount Disappointment Ranges in the east, and includes catchments that arise along the Great Divide and join the Goulburn between Tallarook and Seymour. It is bounded to the North by the interface between the Central Victorian Uplands and the Victorian Riverina and Goldfields Bioregions. From the north-east, the zone boundary follows the interface between the Central Victorian Uplands and Highlands - Northern Fall Bioregions on the western side of the Tallarook Ranges. It then heads south along the divide between the Strath Creek and Dabyminga/Sunday Creek catchments through Mount Disappointment Forest to the divide between the Goulburn and Port Philip catchments. The zone boundary then follows the Goulburn Catchment boundary west and north encompassing the catchments of Kurkuruc and Mollisons Creeks. The Hume and Northern Highways are the major regional arteries traversing the zone (Way et al 2003).

The Central Victorian Uplands Bioregion covers the majority of the South West Goulburn Landscape Zone, with the Highlands-Northern Fall Bioregion extending south-east from Kilmore. The Zone comprises a basin of older sediments, with granites forming the higher ranges in the West and east of the zone and newer Basalt forming valley flows and low plateaus north of Kilmore. The major creeks in the zone include Sunday/Dry Creek in the Broadford area, Dabyminga to the east and Mollisons near Pyalong, all of which drain northwards to the Goulburn River at Seymour (Way *et al* 2003).

Private land covers 89% of the zone and most of this area is extensively cleared. The native vegetation remaining on private land in the South West Goulburn zone is highly fragmented, and usually occurs as isolated remnants. Over 40% of the private properties in the area are now lifestyle properties, but historically most of the land-use is agriculture, predominantly sheep grazing with some cattle grazing around the Kilmore area (Ahern et al 2003).

Public land covers 11% of the zone. Most public land occurs in the east of the zone in the Mount Disappointment State Forest and a small south-west section of Tallarook State Forest. There is also a small State Forest block north east of Pyalong. There are several important reserves, one of which is Mount Piper Education Area, which contains the uncommon Lemon Starbush (*Asterolasia asteriscophera*), five species of Wallaby Grasses, and populations of the Nationally threatened Large and Small Ant-blue Butterfly and Golden Sun Moth. The largest area of public land is the Mount Disappointment State Forest which over 9,000ha and provides habitat to a range of plants and animals. Public land also occurs along some stream frontages and roadsides. A small number of reserves, significant roadside verges and disused railway reserves (Laurie, 1993, 1994) provide the best examples of pre-1750 vegetation.

Photo: View from Monument Tower Reserve, Kilmore. Photo: Bronwyn Merritt

[3] Bioregions are the broadscale mapping units for biodiversity planning in Victoria. Bioregions capture patterns and ecological characteristics in the landscape.

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). There were 37 EVCs[4] that are thought to have been present within the South West Goulburn Landscape Zone prior to European settlement (Figure 3).

Prior to European settlement, the vegetation of the South West Goulburn Landscape Zone was mainly a mixture of grassy and shrubby forests and grassy woodlands. The predominant EVCs include Herb-rich Foothill Forest, Grassy Dry Forest and Shrubby Dry Forest. The majority of these EVCs are considered endangered or vulnerable within the Goulburn Broken Catchment. Within the Highland Northern Fall component of the South-West Goulburn Landscape zone.

The Grassy Forests were dominated by Red Box (*Eucalyptus polyanthemos*), Yellow Box (*E. melliodora*), Red Stringybark (*E. macrohyncha*), Long-leaf Box (*E. goniocalyx*), as well as a range of understorey species. North of Broadford the Box Ironbark Forests would have been dominated by Long-leaf Box, Yellow Box, Red Box and Red Ironbark (*E. tricarpa)*.

Grassy woodland communities were dominated by Grey Box (*Eucalyptus microcarpa*), Yellow Box and Red Stringybark. Ground cover in these woodlands included grasses, sedges, lillies, orchids and herbs, with pea shrubs and wattles providing an understorey. The streamsides supported an overstorey of River Red Gum (*E. camaldulensis*) and thicker understorey of a variety of wattles, grasses, lillies, sedges and herbs.

The current extent of native vegetation in the South West Goulburn Zone has dramatically reduced since European settlement due to clearing (Figure 4). Table 1 identifies the Pre 1750 EVCs in the South West Goulburn Landscape Zone, including their Bioregional Conservation Status, their current (as of 2003) extent (in hectares and % cover). The table also identifies the area of 'Private Land No Tree Cover' and Unknown/Unclassified EVCs (Ahern et al 2003).

The Goulburn Broken Regional Catchment Strategy 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 applicable[5]) EVCs to at least 15% of their pre-European vegetation cover by 2030" (GBCMA 2003a). The majority of EVCs within the South West Goulburn Landscape Zone are below the 15% target (Table 1) and are considered 'Endangered' (17) or 'Vulnerable' (9) at the Bioregional level (Ahern et al 2003).

4 For further information on each EVC, refer to the Department of Sustainability and Environment website at www.dse.vic.gov.au
5 Applicable to Ecological Vegetation Classes that are 'Vulnerable' and are below 15%

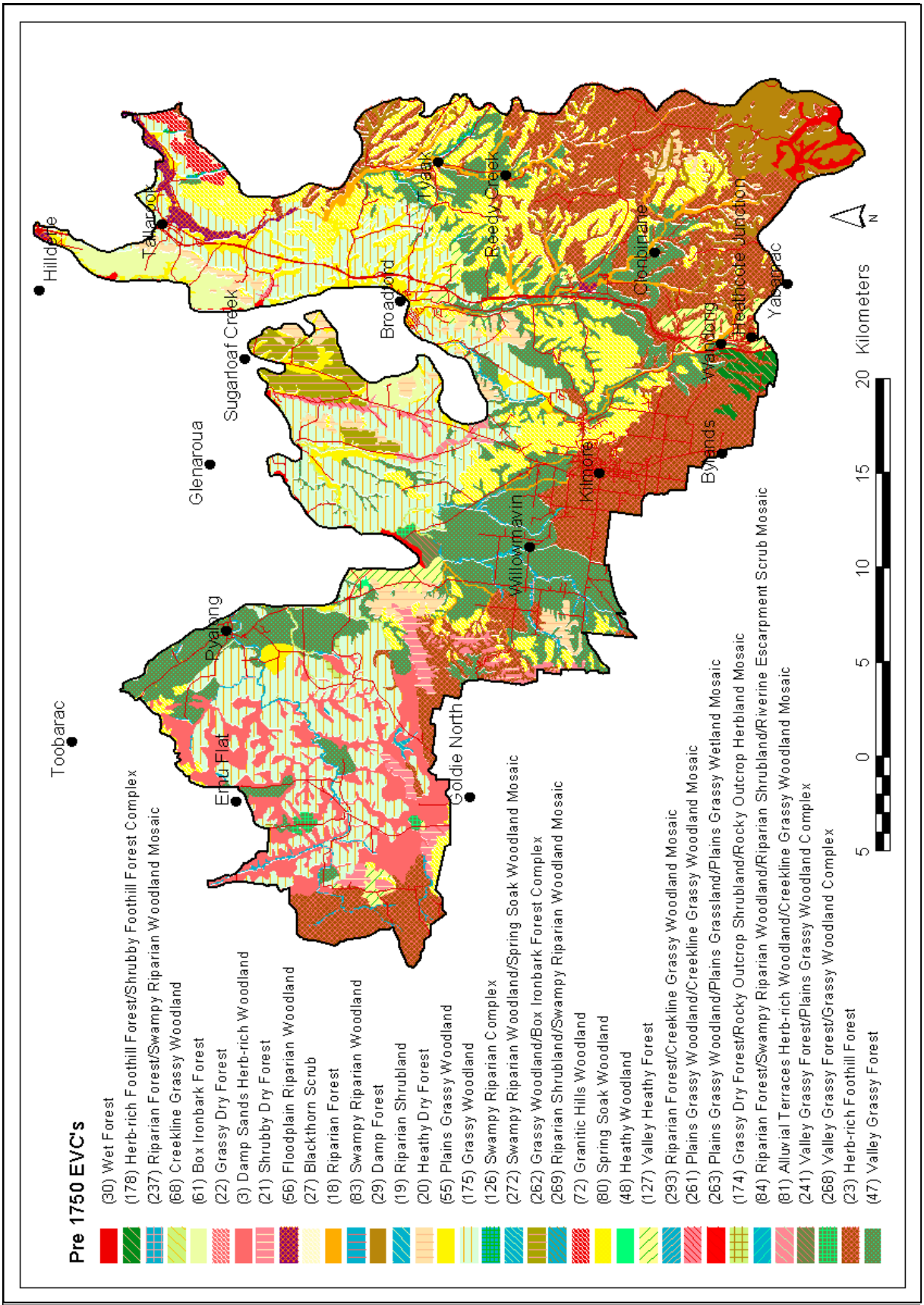


Figure 3: Pre-European Native Vegetation Cover – South West Goulburn Landscape Zone

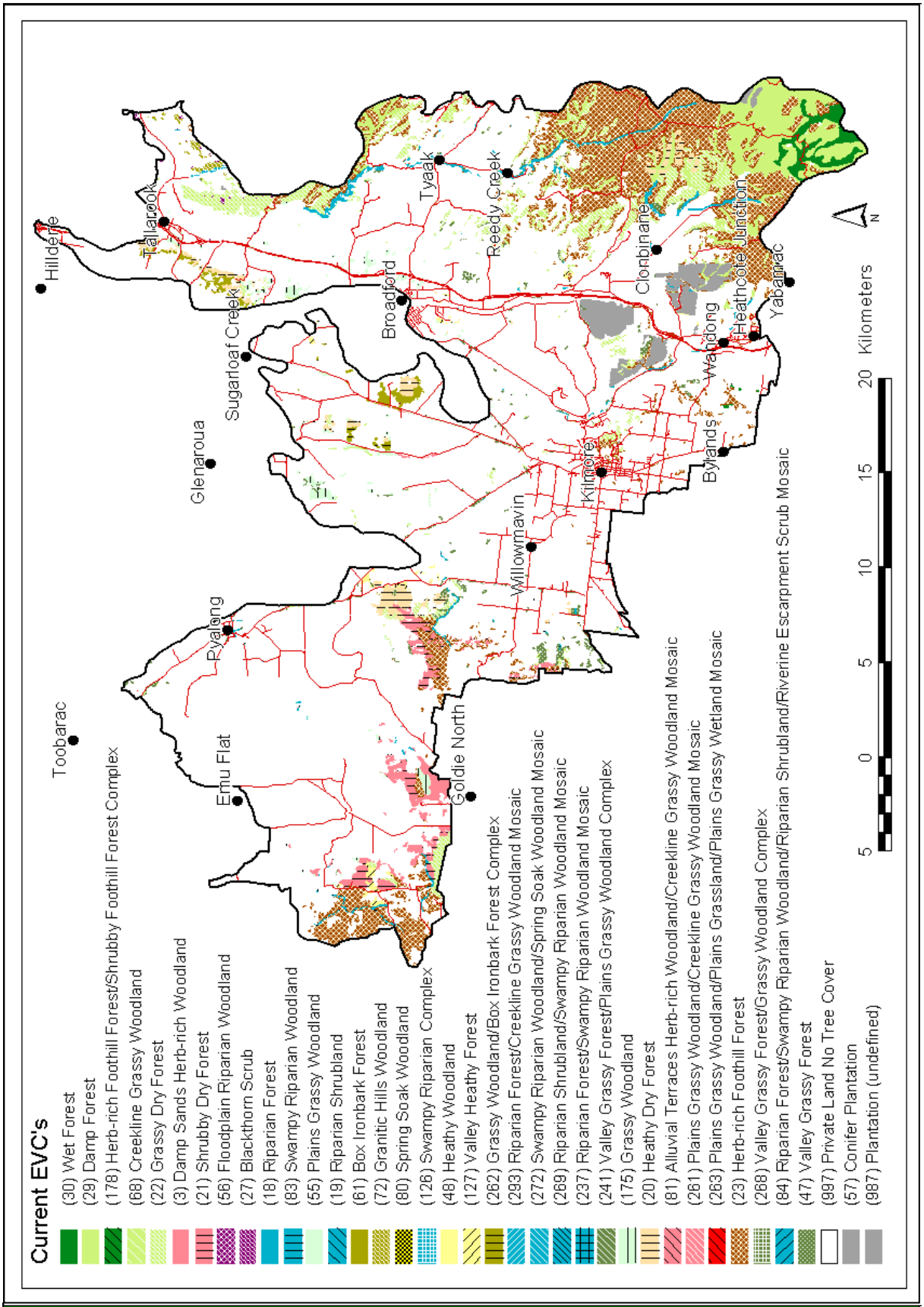


Figure 4: Current extent of Native Vegetation Cover– South West Goulburn Landscape Zone

Table 1 South West Goulburn 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)***
2	48	D	Heathy Woodland	21	10	47	3
4	61	V	Box Ironbark Forest	1631	336	20	245
4	262	E	Slopes Box Grassy Woodland/ Box Ironbark Forest Complex	1391	71	5	209
4	72	V	Granitic Hills Woodland	479	105	21	72
5	175	E	Grassy Woodland	15941	535	3.3	2391
5	271	E	Grassy Woodland/ Valley Grassy Forest Complex	157	0	0	24
5	80	E	Spring Soak Woodland	4	1	25	1
6	47	V	Valley Grassy Forest	15610	694	4.4	2342
6	22	D	Grassy Dry Forest	11041	2214	20	1656
6	23	D	Herb-rich Foothill Forest	7855	2817	35	1178
6	20	LC	Heathy Dry Forest	2085	667	31	313
6	21	LC	Shrubby Dry Forest	1301	736	56	195
6	127	E	Valley Heathy Forest	1209	199	16	181
6	241	V	Valley Grassy Forest/ Plains Grassy Woodland Complex	167	1	0.6	25
6	174	D	Grassy Dry Forest/ Rocky Outcrop Shrubland/ Herbland Mosaic	66	0	0	10
6	268	V	Valley Grassy Forest/ Slopes Box Grassy Woodland Complex	47	4	8.5	7
6	296	LC	Unclassified Foothill Forest	36	1	2.8	5
7	29	LC	Damp Forest	268	221	82	40
7	30	LC	Wet Forest	604	603	99	40
8	83	E	Swampy Riparian Woodland	295	83	28	44
8	126	E	Swampy Riparian Complex	176	38	22	26
8	269	E	Riparian Forest/ Swampy Riparian Woodland Mosaic	140	17	12	21
8	272	E	Swampy Riparian Woodland/ Spring Soak Woodland Mosaic	54	8	14.9	8
8	19	E	Riparian Shrubland	36	4	11	5
9	18	V	Riparian Forest	1190	308	25	179
9	237	V	Riparian Forest/ Swampy Riparian Woodland Mosaic	262	26	9.9	39
9	293	V	Riparian Forest/ Creekline Grassy Woodland Mosaic	155	3	1.9	23
9	84	V	Riparian Forest/ Swampy Riparian Woodland/ Riparian Shrubland/ Riverine Escarpment/Disturbed Mosaic	109	<1	<1	16
14	55	E	Plains Grassy Woodland	2967	128	4.3	445
14	261	E	Plains Grassy Woodland/ Creekline Grassy Woodland Mosaic	273	17	6.2	41
14	263	E	Plains Grassy Woodland/Plains Grassy Woodland Complex	173	1	0.5	26
15	56	E	Floodplain Riparian Woodland	564	11	1.9	85
15	68	E	Creekline Grassy Woodland	401	50	12	60
16	3	E	Damp Sands Herb-rich Foothill Forest	5657	437	7.7	849
16	81	E	Alluvial Terraces Herb-rich Woodland/Creekline Grassy Woodland Mosaic	254	28	11	38
21	27	R	Blackthorn Scrub	69	24	24.8	10
			Total	72688	10398	14.3	10852
99	987	NA	Plantation (undefined)	0	669	NA	NA
99	997	NA	Private Land No Tree Cover	0	61622	NA	NA
Table Information including column A & B from Ahern et al 2003				*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 (*rounded to unit ten)

NB: EVC names have altered since Way et al et al 2003, however area and extent remain the same

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 (eg. Central Victorian Uplands). 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).
- '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).
- Shaded EVCs refers to those that now cover less than 15% of their original extent.
- Catchment Target (ha) refers to the GBCRS targets of increasing vegetation to at least 15% of the original cover

2.3 SIGNIFICANT FLORA AND FAUNA

2.3.1 Flora:

Photo: Crimson Spider Orchid (Caladenia concolor) (Geoffrey Carr)

A range of native flora is found within the South West Goulburn Landscape Zone. Overstorey species include; River Red Gum (*Eucalyptus camaldulensis*), Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalytpus melliodora*), Narrow Leaf Peppermint (*Eucalyptus radiata*), Long-leaf Box (*Eucalyptus goniocalyx*), Messmate (*Eucalyptus obliqua*). The range of small trees and shrubs includes species such as Spreading Wattle (*Acacia genistafolia*), Hedge Wattle (*Acacia paradoxa*), Golden Wattle (*Acacia pycnantha*), Common Heath (*Epacris impressa*) and Drooping Cassina (*Cassinia arcuata*). The zone also contains a range of groundcover plants including; Wallaby Grass (*Austrodanthonia spp*), Kangaroo Grass (*Themeda triandra*), herbs such as Twining Glycine (*Glycine clandestina*) and Scaly Buttons (*Leptorhynchos* sp.) (DNRE 2001).

There are 12 species of threatened flora recorded within the South West Goulburn Landscape Zone (Ahern et al 2003). 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 (*Environment Protection and Biodiversity Act (EPBC) 1999*). Appendix 5 lists some species that are locally significant in the South West Goulburn Landscape Zone.

Examples of threatened plant species recorded in the South West Goulburn Landscape Zone include:

- Crimson Spider orchid (*Caladenia concolor*) (endangered in Victoria and vulnerable in Australia),
- Western Rat-tailed grass (*Sporobolus creber*) (vulnerable in Victoria),
- Yellow Star (*Hypoxis baginata var. brevistigmata*) (vulnerable in Victoria)
- Slender Bitter Cress (*Cardamine tenufolia*) (endangered in Victoria)
- Creeping Grevillea (*Grevillea repens*) (rare in Victoria and rare in Australia)
- Matted Flax Lily (*Dianella amoena*) (endangered in both Victoria and Australia)

2.3.2 Fauna:

Photo: Diamond Firetail (Stagonopleura guttata) (Ian McCann)

The fauna of the South West Goulburn Landscape Zone included mammals, birds, reptiles, amphibians, vertebrates and microfauna. For a landscape to function, all of these elements need to be present and interacting if we are to have long-term conservation and a sustainability within the zone.

There are 33 threatened fauna species recorded in the South West Goulburn Landscape Zone (refer to Appendix 6 for species, their threatened status and relevant acts) (Ahern et al 2003).

More than 150 bird species have been recorded in the Zone and, of these, the nine are considered threatened at State Level (FFG Act 1988), including:

- Barking Owl (*Ninox connivens*) (Threatened in Australia, endangered in Victoria)
- Powerful Owl (*Ninox strenua*) (vulnerable in Victoria)
- Diamond Firetail (*Stagonopleura guttata*) (vulnerable in Victoria)
- Speckled Warbler (*Chthonicola sagittata*) (vulnerable in Victoria)

Examples of threatened species predominantly associated with wetlands and waterways within the South West Goulburn Landscape Zone, include:

- Growling Grass Frog (*Litoria raniformis*) (endangered in Victoria, vulnerable in Australia)
- Great Egret (*Ardea alba*) (vulnerable in Victoria)
- River Blackfish (*Gadopsis marmoratus*) (threatened in Victoria) and
- Mountain Galaxias (*Galaxias olidus*) (Threatened in Victoria)

Other threatened species in the Zone include the Brush-tailed Phascogale (*Phascogale tapoatafa tapoatafa*) (Vulnerable in Victoria) and Golden Sun Moth (*Synemon plana*) (Endangered in Victoria, critically endangered in Australia). The Large Ant Blue Butterfly (*Acrodipas brisbanensis*) (Rare in Victoria) and Small Ant Blue Butterfly (*Acrodipsas myrmecophila*) (Endangered in Victoria) are a part of the Butterfly Community Number 1 that has been listed as a threatened community under the FFG Act.

There are large areas of the South West Goulburn Zone which lack flora and fauna records; this highlights the importance for the continuing surveys and research in this zone. It is also important that any findings are added to the relevant state databases.

Photo: Golden Sun Moth (Synemon plana) (Fabian Douglas/DNRE)

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 Potential BAP Sites,
3) Field Survey BAP sites,
4) Priorities BAP Sites,
5) Generate Focal Species List,
6) Generate Key Biodiversity Asset List,
7) Develop 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 (ie. 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, aerials); 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.

Step 2. Ground-Truthing of Potential BAP Sites
Involved surveying of the zone from the roadside, to compare desktop analysis data with the on-ground sites in regards to presence, type of vegetation and condition.

Step 3. Field Survey BAP Sites
Sites were prioritised for survey as per GBCMA (*in prep.*) (Appendix. This prioritisation method is shown in Appendix 6. One hundred of the sites requiring ground-truthing were field surveyed (on-site or from the nearest public land). This involved:
3.1) Bird surveys were undertaken in accordance with the Birds of Australia – Atlas Search Methods (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. box ironbark, herb-rich foothill forest, grassy woodlands) (Refer to Appendix 8).
3.3) Threat Identification – Whilst undertaking the Vegetation Quality Assessment, a list of threatening processes (eg. pest plants and animals) on the priority sites, were recorded.

Step 4. Prioritise BAP Sites
The 962 sites were given a 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). Sites not surveyed, were automatically given a ranked value (as per Appendix 7) to the lesser of the available options (until surveying occurs).

Step 5. Generate 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. Generate Key Biodiversity Asset List

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

Step 7. Develop Actions for Key Biodiversity Assets

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 determined in Step 6). Available information (eg. Actions for Biodiversity Conservation (ABC) database) (DSE 2005a) and the South West Goulburn Landscape Plan (Ahern et al 2003) were also used to compile the actions.

Step 8. Landscape Context Analysis

To achieve long-term viability of the priority sites, they need to be linked together to form a viable functioning landscape. The Landscape Context Model (LCM) (Ferwerder 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.

The Landscape Context Model identifies areas that have the highest (or least) probability of containing additional sites, of conservation interest (as per Step 1). The model is useful in identifying the areas of the landscape, that should be used to link and strengthen a network of conservation sites. The model can also be used to further determine the major linkages between BAP sites. The South West Goulburn Landscape Zone priority sites and Landscape Context overlay are shown in Appendix 9.

4.0 IDENTIFYING PRIORITY SITES

In the South West Goulburn Landscape Zone 962 sites have been identified as Biodiversity Action Planning 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 Mt Disappointment State Forest. One hundred of these BAP sites have been ground-truthed and surveyed (refer to Section 5.0 for further information on surveying).

In order to identify the BAP sites, each site was assigned a number that identifies its location (maps) and the associated data (attribute table). This unique number has been calculated using the map-index number (1:25,000 map) and a site number (eg. 1-962). An example of the site identification numbering system (how the site(s) are identified, using the site number system) is illustrated below (Figure 5). An example of the data that is contained in the database (attribute table), for each BAP site is detailed below (Figure 6).

The location of all of the 962 BAP sites (in map form) is available in hard copy (general map) and electronic form (CD - specific maps) (Appendix 12. Information relating to each site (eg. site number, asset type, conservation status, EVC, focal species), a bird list for every site surveyed and asset maps is can be provided by contacting DSE, Alexandra.

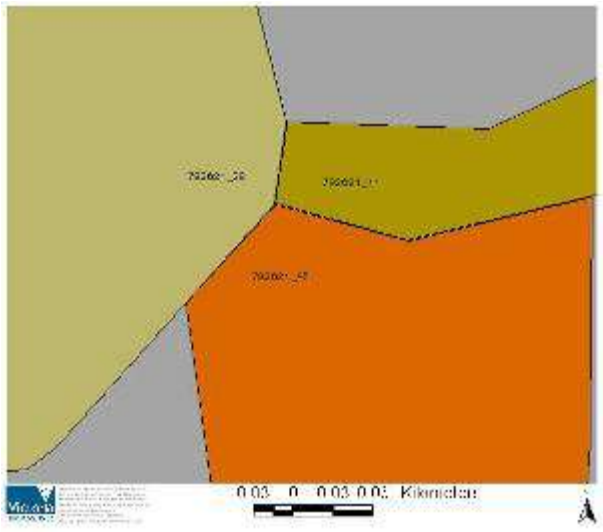


Figure 5– An example of the site identification numbering system

Site Number:	792331-57
Biodiversity Asset	Grassy Woodland (Section 6.0)
Conservation Status	Very High
Management Action	Protect
EVC	175 (section 2.2)
EVC status	E (Endangered)
Focal Species	Brush-tailed Phascogale (*Phascogale tapoatafa*)
Threatened Spp Record?	Yes (Y)
Buffered for Focal Species?	Y (Y)
Vegetation Quality Score	16/20 (Section 5.1)
Threats	Pest plants, land clearance

Figure 6– An example of the data contained in the database (attribute table)

5.0. SUMMARY OF PRIORITY SITE SURVEYING

5.1. VEGETATION QUALITY ASSESSMENTS

One hundred of the 962 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 (intact habitat). An example of the assessment sheet is provided in Appendix 8. Graphical illustration of the results is also provided in Appendix 10.

The sites in the South West Goulburn Landscape Zone scored between 4 and 17 (Appendix 10). The graphical results (Appendix 10) highlight some of the challenges for biodiversity conservation in the South West Goulburn Zone. In summary, the assessments identified that,

- Only 12% of sites scored the highest for large trees (more than 7 large trees/ha)
- Only 7% of sites scored adequate for understorey (more than 75% understorey cover)
- Only 6% of sites scored less than 25% for weed cover
- Only 35% of sites have adequate regeneration (25% or more of total species population)
- Only 5% of sites have adequate number of logs (25m/ha)
- Only 27% of sites were surrounded (1km radius) by more than 50% vegetation
- Only 31% of sites were less than 1km from a block of native vegetation greater than 50-hectares.

(Note: Scored in relation to the Ecological Vegetation Class Benchmarks for each EVC. Refer to Appendix 8 for further information on surveying).

Over the entire zone, the surveys show that there is very little understorey or regeneration, a high percentage of pest plants, a lack of connectivity, small sized remnants (2-10 hectares) and a limited number of large trees. These habitat elements should be targeted within the zone. The VQA scores for each of the surveyed sites provide a valuable monitoring system that can be repeated over time. It is also intended that the remaining 862 priority sites will also be assessed.

5.2 BIRD SURVEYS

One hundred of the 962 priority BAP sites had bird surveys completed. Fifty eight bird species were recorded in the zone (Appendix 11). Information on birds located at each of the 100 sites is provided in Appendix 10. Note that surveys were restricted in season, timing and duration and the list is not intended to represent the entire population of birds in the South West Goulburn Zone.

The threatened Hooded Robin (*Melanodryas cucullata*) was recorded during the bird surveys. A list of threatened fauna (including birds) recorded in the zone, is shown in Appendix 7.

5.3 CONSERVATION THREATS

Threats to the conservation values for the South West Goulburn Landscape Zone were identified, as:

- Land Clearance – (removal of native vegetation)
- Habitat Fragmentation – (isolation of remnants and species due to land clearance)
- Increased competition by Noisy Minors
- Grazing (inappropriate grazing regimes)
- Removal of habitat (eg. firewood collection, 'cleaning' up)
- Pest Plants
- Pest Animals (including soil disturbance)
- Adjacent Land Use Practices

Whilst some of the identified threats (eg. land clearance, habitat fragmentation, and changes in hydrology) are primarily a result of historical activities (wide spread clearing, dredging, construction of meander cut-offs), they continue to have impacts on the biodiversity in the zone.

Land clearance (a key threatening process under the *EPBC Act* 1999) (Wierzbowski et al 2002) continues to be a threat to conservation values within the zone. Land clearing has altered the landscape leading to a highly fragmented and modified landscape consisting of scattered patched of remnant vegetation, isolated paddock trees and narrow roadsides and streamside strips of vegetation.

Habitat fragmentation (a potentially threatening process for fauna in Victoria under the *FFG Act* 1988 (Wierzbowski et al 2002)), is usually the result of land clearance. A range of species such as the Diamond Firetail (*Stagonopleura guttata*) and Brush-tailed Phascogale (*Phascogale tapoatafa)* are detrimentally affected by habitat fragmentation, as it affects their ability to source food and suitable habitat required for their survival. Habitat fragmentation also favours native species such as Noisy Miners (*Manorina melanocephala*) (Bennett 1993). **Increased competition** from these aggressive species threatens biodiversity in the area, by the exclusion of less aggressive species (eg. Hooded Robin (*Melanodryas cucullata*)) from remnants.

Inappropriate grazing by introduced animals affects biodiversity conservation, through soil compaction, removal of vegetation (eg. reduced regeneration), and changed nutrient levels in and around native vegetation. Grazing contributes to tree dieback and results in competition with native animals for fodder and loss of tussocky grass required by small mammals for shelter (Wilson et al 2004). A large percentage of remnants (both fenced and unfenced) within the landscape are grazed, often resulting in minimal shrub or ground cover (only 7% of BAP sites had adequate understorey). A large number of isolated trees in paddocks are stressed and showing signs of dieback (eg. dead limbs, loss of trunk bark and compacted soils around bases).

The removal of fallen timber (or 'cleaning up') was evident along roadsides and within private remnants (see photograph below).Fallen timber provides shelter for regenerating seedlings. It also provides protection from fire and hollows for ground mammals and a wide variety of smaller organisms that provide food for mammals and birds. Removal of fallen timber results in a loss of habitat and food on which animals rely. Fallen timber provides shelter for regenerating seedlings and protection from fire and hollows for ground mammals.

Pest Plants (Weeds) are a major threat to biodiversity because they compete for space, light and nutrients with native species. Invasion of native vegetation by environmental weeds is listed as a potentially threatening process under the *FFG Act* 1988 (Wierzbowski et al 2002). Some of the environmental weeds evident in the zone include Gorse (*Ulex europaeus*), Sweet Briar Rose (*Rosa rubiginosa*), Broom (*Bromus spp.*), Blackberry (*Rubus spp.*), Phalaris (*Phalaris spp.*), Paterson's Curse (*Echium plantagineum*), Horehound (*Marrubium vulgare*), Peppercorns *(Schinus molle*), Boxthorn (*Lycium ferocissimum*), Bridal Creeper (*Myrsiphyllum asparagoides*), African Love-grass (*Eragrostis curvula*), Willows (*Salix spp*), Poplars (*Poplar spp*) and many more. Weeds are especially evident on roadsides, where disturbance and vehicles spread weed seed, and adjacent to farmland where agricultural weeds invade remnants.

Pest Animals are a major threat to the conservation values of the area. Predation of native wildlife by the cat (*Felis catus*) and by the introduced Red Fox (*Vulpes vulpes*) are listed as potentially threatening processes under the *FFG Act* 1988 (Wierzbowski et al 2002). Native animals such as the Brush-tailed Phascogale and Sugar Gliders are preyed upon by these species. The European Rabbit *(Oryctolagus cuniculus*) and European Hares (*Lepus europaeus*) compete for habitat, remove native vegetation and disturb soil structure. Although native Noisy miner (*Manorina melanocephala)* competition was also evident in the zone. They were often seen harassing other bird species, such as Hooded Robins.

Adjacent land use practices such as pasture improvement (such as sowing with Phalaris or application of fertilisers), herbicide use, cropping, inappropriate earthworks[6] and plantations are a threat to remnant vegetation. They can lead to the colonisation of areas by weeds, waterlogging of vegetation, high watertable depths, nutrient run-off and an increase in sediment input to rivers and streams (DPI 2005).

Photo: Firewood Collection in remnant vegetation
Photo: Rebecca Heard

[6] Inappropriate refers top purposeful movement of soil/vegetation without consideration of the natural landscapes (water flow)

6.0 CONSERVATION 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), which in turn, is envisaged to enhance enthusiasm for implementing works.

The seven focal species identified in the South West Goulburn Zone, and their ecological requirements (thresholds[9]) are identified below (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 (eg. 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 – South West Goulburn Landscape Zone

	**Brush-tailed Phascogale (*Phascogale tapoatafa*) – Threatened**	
	Minimum patch size (threshold)	100 ha
	Critical distance between patches	10 km
	Dispersal threshold	1.4 km (Rhind 2002)
	Ecological Vegetation Class	Grassy woodlands, Grassy forest BVT, Box Ironbark
	Some other requirements (general)	Hollows, mature rough barked Trees; good ground layer; fallen timber and litter
	**Sugar Glider (*Petaurus breviceps*)**	
	Minimum patch size (threshold)	6 ha
	Critical distance between patches	50 m
	Dispersal threshold	600 m (Suckling 1984)
	Ecological Vegetation Class	Grassy Woodlands, Box-Ironbark
	Some other requirements (general)	Needs tress with hollows; Wattle layer for food
	**Golden Sun moth (*Synemon plana*) – Endangered**	
	Minimum patch size (threshold)	Unknown
	Critical distance between patches	Unknown
	Dispersal threshold	Unknown
	Ecological Vegetation Class	Grassy woodlands
	Some other requirements (general)	Good quality Wallaby Grass grasslands with soil gaps between tussocks
	**Golden Whistler (*Pachycephala pectoralis*)**	
	Minimum patch size	1 ha
	Critical distance between patches	2 km
	Dispersal threshold	3 km
	EVC utilised	Riparian systems, Grassy Forests BVT, Herb-rich Foothill Forests
	Some other requirements (general)	Need native understorey especially Wattles
	**Crested Shrike-tit (Falcunculus frontatus)**	
	Minimum patch size (threshold)	5ha
	Critical distance between patches	1km
	Dispersal threshold	1km
	Ecological Vegetation Class	Riparian systems
	Some other requirements (general)	Prefer sites containing mature trees within patches of understorey or saplings
	**Hooded Robin (Melanodryas cucullata) – Near threatened**	
	Minimum patch size (threshold)	>20 ha
	Critical distance between patches	2 km
	Dispersal threshold	2 km
	Ecological Vegetation Class	Grassy Dry Forests
	Some Other requirements (general)	Needs fallen timber and native ground cover.

Habitat Requirement Source: Variety of Sources in GBCMA (in prep)
Photo Credits (NRE 2002f): Brush-tailed Phascogale (Peter Robertson), Sugar Glider (Petaurus breviceps), Golden Whistler and Crested Shrike-tit (Ian McCann), Golden Sun Moth (Fabian Douglas), Hooded Robin (Paul Gullan).

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. The approach of using 'Key Biodiversity Assets' has been used, to group together the birds, animals and plants that utilise the same type of habitat. As per the focal species approach, by protecting these assets, we are conserving habitat for a suite of threatened species associated with that habitat. For example, by choosing 'Grassy Woodlands' as a key biodiversity asset, it incorporates all of the species that live in, and use Grassy Woodlands, as well as the individual threatened species. Another benefit of this approach is that specific actions can be developed based on the requirements of each asset (eg. to counter threats and improve the status of the asset) (Section 7.0). Planning and implementation of on-ground works and actions that specifically target each of these assets, can then be undertaken (GBCMA *in prep*.)

Eight key biodiversity assets have been identified for the South West Goulburn Landscape Zone. The 962 BAP sites have been categorised according to the dominant asset type. For further information on each asset, along with threatened species examples, refer to Table 3.

Photo: The Speckled Warbler (Chthonicola sagittata) utilises the habitat at Mt Piper. Photo Ian McCann.

Table 3: Key Biodiversity Assets – South West Goulburn Zone

Key biodiversity values for South West Goulburn	Locally significant species
1) Grassy Woodlands Grassy Woodlands have been extensively cleared in the area with less than 5% remaining. Those areas remaining are mainly limited to road and rail reserves.	***Fauna***: Woodland bird community, such as Diamond Firetail, Hooded Robin, Speckled Warbler, Brown Tree Creeper. Other significant species include Common Dunnart, Brush-tailed Phascogale, Golden Sun Moth, Stripped Legless Lizard. ***Flora***: Ausfelds Wattle, Western Rat-tailed Grass, Yellow Star ***EVCs***: Grassy Woodland (175), Plains Grassy Woodland (55) and various mosaics
2) Grassy Dry Forests Group The grassy forests once covered large areas of the landscape. Some grassy forest EVC's have been substantially cleared; only 4% of Valley Grassy Forest remains and in some areas, others have also been extensively cleared.	***Fauna***: Brush-tailed Phascogale, Hooded Robin, Speckled Warbler, Scarlet Robin, Sugar Glider, Brush-tailed Phascogale, Fat-tailed Dunnart, Golden Sun Moth, Large Ant Blue Butterfly, Small Ant Blue Butterfly, Hooded Robin, ***Flora***: Fringed Sun Orchid, Slender Bitter Cress, Crimson Spider Orchid, Large Fruit Fireweed ***EVCs*** : Valley Grassy Forest (127), Grassy Dry Forest (22) and mosaics of these with grassy woodland EVC's (plus areas mapped as Herb-rich Foothill Forest (23) on basalt plains).
3) Granite Country Granite country west of Pyalong has been extensively cleared and modified, particularly the grassy woodland EVC's, Damp-sands Herb-rich Woodlands, and some boggy areas. Most granite outcrops have been cleared and modified, and are now isolated islands surrounded by farmland. The outcrops are important habitat for a numerous species, in particular reptiles.	***Fauna***: Common Dunnart, Cunninghams Skink. ***EVCs***: Granitic Grassy Woodlands (175-62), Damp-sands Herb-rich Woodland (3), Valley Grassy Forest (47), Granitic Hills Woodland (72).
4) Box Ironbark Although Box Ironbark Forest historically only accounted for a small area of the zone (3.8%) it provides important habitat for a range of species and connects with more extensive areas of Box Ironbark Forest to the north of the zone.	***Fauna***: Diamond Firetail, Hooded Robin, Scarlet Robin, Speckled Warbler, Buff-rumped Thornbill, Sugar Glider, Brush-tailed Phascogale, Grey-crowned Babbler, Swift Parrot, Barking Owl, Cunninghams Skink. **EVCs** such as Box Ironbark Forest (61), Slopes Box Grassy Woodland/Box Ironbark Forest Complex (261).
5) Damp Forests (including Herb-rich Foothill Forest) Damp forests, and especially Herb-rich Foothill Forests on the wetter sedimentary country, cover a substantial area of the zone. Large areas of Forest are still present in the State Forests.	***Fauna***: Powerful Owl, Sooty Owl, Dwarf Silver Wattle, Slender Bitter Cress, Crimson Spider Orchid. ***Flora***: Silky Golden Tip, Tussock Sedge, Creeping Grevillea ***EVCs***: Herb-rich Foothill Forest (23, on sedimentary geology only), Damp Forest (29) and Wet Forest (30)

6) Riparian Systems Riparian vegetation has been extensively cleared, especially Floodplain Riparian Woodland with only 1.9% remaining. As well as being important linkages, they provide habitat for a wide variety of species found within the zone and their protection also has the potential to improve down stream environments by improving water quality as well as the local environment.	***Fauna***:Growling Grass Frog, Mountain Galaxias, River Blackfish, Eastern Horse-shoe Bat, Powerful Owl, Waterbirds. ***Flora***: Western Rat-tailed Grass, Yellow Star ***EVCs***: listed in Table 1, Groups 8, 9 and 15.
7) Mt Piper Mt Piper is virtually an 'island' of remnant vegetation surrounded by largely cleared grazing land but linked to some significant north and south corridors. Mt Piper and immediate vicinity is the only known occurrence of the Butterfly Community No. 1 listed under the FFG Act. Mt Piper also provides important habitat for numerous other plants and animals in the area.	***Fauna***: Butterfly community No. 1 contains 20 species of butterflies including the Large Ant Blue Butterfly, Small Ant Blue Butterfly. Golden Sun Moth, Brush-tail Phascogale, Sugar Glider, Speckled Warbler, Diamond Firetail, Hooded Robin. ***Flora***: Slender Bitter Cress ***EVCs***: Box Ironbark Forest (61), Heathy Dry Forest (20) and adjoining grassy woodlands.

* The numbering of the Key Biodiversity Assets (1-7) is only intended to assist with the identification of the assets throughout the remainder of the report. Scientific names listed only once.

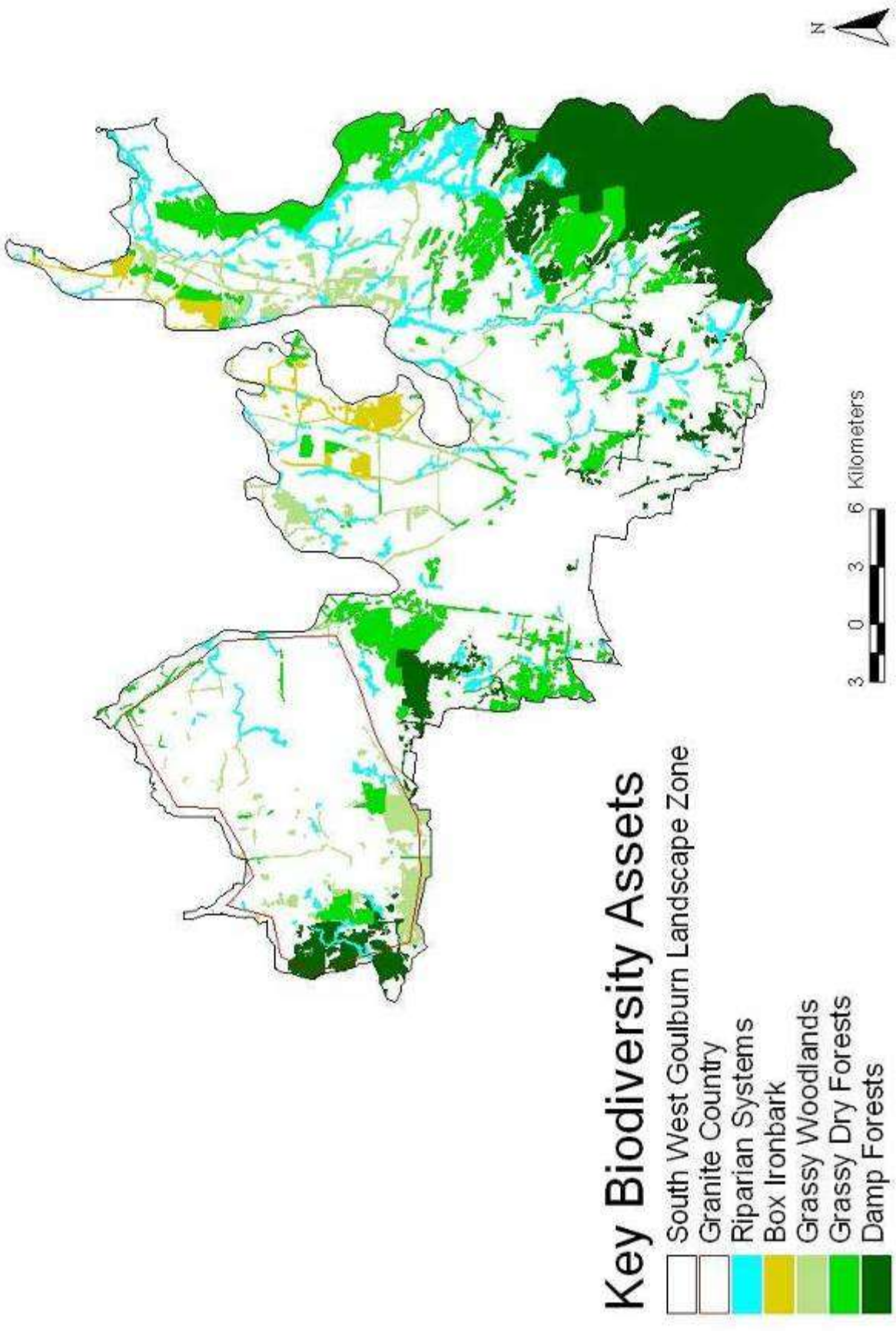


Figure 7 – Location of Key Biodiversity Assets – South West Goulburn Landscape Zone

7.0 PRIORITY ACTIONS FOR KEY BIODIVERSITY ASSETS

For each of the 7 key biodiversity assets (1-7), the following pages identify:
A) An introduction to the asset in the South West Goulburn 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 Ahern et al 2003).

Priority actions for the South West Goulburn Landscape Zone have been developed and grouped based on each 'Key Biodiversity Asset' (eg. Grassy Woodlands) (refer to Section 6.2 and Table 3). Priority actions for the key biodiversity assets were developed based on the following factors: size/extent, condition and landscape processes (eg. habitat connectivity, hydrological regimes). The condition 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'.

It is proposed that the community and agencies in the South West Goulburn Zone investigate options for implementing these actions in to existing projects/policies. For example, BAP sites 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).

Photo: Focal Species Hooded Robin (Melanodryas cucullata) - reliant on the Key Biodviersity Asset of Grassy Dry Forests Group. By Paul Gullan.

7.1 KEY BIODIVERSITY ASSETS – GRASSY WOODLANDS

A) Introduction – Grassy Woodlands:

Grassy Woodlands comprise three main and usually adjoining communities: Grassy Woodlands (EVC 175) occur on lower slopes of foothills and low rounded hills above plains and floodplains, at elevations of 150-500m, and 500-750mm annual rainfall. They are predominantly open grassy Box woodlands with a variety of grasses, including Kangaroo Grass (*Themeda triandra*), Red-leg Grass (*Bothriochloa macra*), Wallaby Grasses (*Danthonia spp.*) and Spear Grasses (*Stipa spp.*) plus sedges, lilies, orchids and herbs. The overstorey usually consists of Box species (mainly Grey Box (*Eucalyptus microcarpa*), or White Box (*E. albens*) with Red Box (*E. polyanthemos*)) and Red Gum (*E. camaldulensis*), and Drooping Sheoak (*Allocasuarina verticillata*) in the rockier areas. The medium to low scattered shrub layer has characteristic species of local wattles (Golden Wattle (*Acacia pycnantha*), Spreading Wattle (*A. genistifolia*), Gold-dust Wattle (*A. acinacea*), Varnish Wattle (*A. verniciflua*)), and Sweet Bursaria (*Bursaria spinosa*), with Narrow-leaf Bitter-pea (*Daviesia mimosoides*) and Smooth Parrot-pea (*Dillwynia glaberrima*).

Plains Grassy Woodland (EVC 55) occurs on the secondary or non-active alluvial terrace and basalt plateaus. They are predominantly open woodlands with a dense suite of grasses, sedges, lilies, orchids and herbs as the ground layer. These include Kangaroo Grass, Spear grasses, Common Wheat-grass (*Elymus scaber*), Lemon Beauty Heads (*Calocephalus citreus*), Chocolate Lillies (*Arthropodium fimbriatum*), Milkmaids (*Burchardia*) and Yellow Rush-lily (*Tricoryne elatior*). The scattered wattle and pea shrub layer includes Gold-dust Wattle, Spreading Wattle, Golden Wattle and Showy Parrot-pea. The overstorey can range from Red Gum, Grey Box and Yellow Box (*Eucalyptus melliodora*) dominated woodlands.

Grassy Woodlands (both Grassy Woodland and Plains Grassy Woodland EVCs) often merge with Creekline Grassy Woodland (EVC 68 or 261). Creekline Grassy Woodland occurs along the banks of many of the smaller ephemeral streams on the plains and lower slopes of foothills at elevations of 100-200m with an annual rainfall of 400-700m. These open woodlands have an overstorey usually of dominated on the plains by River Red Gum. Manna Gums (*Eucalyptus viminalis*) occasionally found on the lower slopes of the foothills. There is usually a medium open shrub layer of Silver Wattle (*Acacia dealbata*) and Blackwood (*Acacia melanoxylon*). Seasonal inundation provides good moisture availability to fertile soils supporting a grassy ground layer of Common Tussock-grass (*Poa Sp.*), Weeping Grass (*Microleana stipoides*) and Common Wheat-grass with rushes and sedges.

Grassy woodlands were one of the dominant vegetation types in the zone, once covering 17.5% of the zone. It has since been substantially cleared; more than 97% of Grassy Woodlands and 96% of Plains Grassy Woodlands in the Goulburn Broken Catchment have disappeared or been highly modified since European settlement. Many of the plants and animals that rely on this habitat are now also threatened and some are extinct. Large increases in extent are required in order to sustain healthy populations of the fauna that rely on it and to maintain a functioning landscape Over 81% of what remains is on private land Therefore the support of private landholders is essential for the ongoing conservation of Grassy Woodlands..,

High value Grassy Woodlands in the zone include the Tallarook Bushland Reserve, the Melbourne-Albury Rail reserve, and road reserves along the Hume and Northern Highways, Three Chain, Selection, Kilmore-Glenaroua, Strath Creek and Elliotts Roads, and Jeffrey's and School House Lanes.

The main threats affecting Grassy Woodlands in the zone, are past and present land clearing, inappropriate grazing regimes, firewood removal and "tidying up", and pest plants and animals. The actions identified below are intended to assist in the protection of the remaining Grassy Woodlands within the South West Goulburn Landscape Zone. However, these actions are specific to the zone and are by no means comprehensive for the region.

B) Photographic Example – Grassy Woodlands:

Example of a Grassy Woodland BAP Site of Good Condition

The site (792343-76) pictured below is a Flora and Fauna Reserve and is an example of Grassy Woodlands for the zone as it has a diverse and largely intact groundcover with few weeds. It has some fallen timber and some old trees, although is lacking older hollow-bearing trees. If protected in should over time develop a more open structure and will have a more hollow bearing trees and large woody debris. The young age of the trees and their density suggests that this site has been cleared in the past and has regenerated.

Photo: Grassy Woodlands (EVC 175) – A Key Biodiversity Asset – South West Goulburn Landscape Zone. Photo Bronwyn Merritt

C) Actions – Grassy Woodlands:

Size/Extent:

- **Increase the extent of existing remnants** by establishing plantations of indigenous species of trees and shrubs, particularly adjacent to the remnants
- **Establish buffer zones** of unimproved, uncultivated pasture around grassy woodlands.
- **Protect and manage** significant roadsides, such as the Hume and Northern Highways, Three Chain, Selection, Kilmore-Glenaroua, Strath Creek, Elliotts, Davis, Dockerys, Upper Goulburn Roads and Jeffrey's, School House, Longs and Smiths Lanes and high priority sites identified through the mapping process.

Condition:

Education/Extension:

- Organise **community education activities** relating to the importance of Grassy Woodlands and associated flora and fauna species, specifically targeting high priority remnants in paddock environments.
- **Promote** the protection of sites from threatening processes, to improve overall condition, through extension principles and/or incentives.
- Identify a **demonstration site** (show casing a very high value site) for educational purposes.
- **Negotiate and educate** current land managers to protect any remnant grasses in the Kilmore Cemetery through altered slashing methods.
- **Encourage** Shire/CFA staff and adjoining landholders(especially roadside maintenance crews as well as construction and other contractors) to be are aware of significant roadsides when conducting routine maintenance, fuel control burning and/or slashing in a manner conducive to the conservation of remnant grasses.
- **Encourage** the retention of all fallen timber.

On-ground Works:

- **Protect** high priority sites, notably all Grassy Woodland remnants, through covenants or incentives.
- **Identify** additional native grassland paddocks for protection and restoration
- Maintain and improve **condition** of all identified high value sites by encouraging the retention of fallen timber and hollow bearing trees, and managing regionally listed weeds.
- **Manage grazing** practices to benefit the grassy woodland (such as exclude all domestic grazing stock in remnants to allow plants to set seed and regenerate. Timed light grazing to remove biomass, might be appropriate after natives have established.
- **Enhance** sites with shrubs and other species if overstorey regeneration has not occurred following fencing (eg. no existing seed source).
- **Re-establish native** grass stratum and/or use appropriate fire or grazing regimes to favour native grasses and herbs over introduced pasture species.

Pest Plants and Animals:

- **Implement ongoing control of foxes and feral cats** for the protection of threatened species, for example the Brush-tailed Phascogale.
- Encourage landholders to undertake **rabbit control programs** in all very high and high value remnants.
- **Target priority weeds** throughout all grassy woodland sites, (e.g. grassy weeds such as Phalaris).
- **Control the spread** of pasture grasses from adjacent cropping land.

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

- **Increase connectivity** using the Landscape Context Model as a guide, by linking to other remnants, important reserves such as Tallarook Bushland Reserves and Melbourne Albury Rail Reserves.
- **Enhance linkages** between remnant vegetation such as roadsides, rail reserves and waterways.

7.2 KEY BIODIVERSITY ASSET – GRASSY DRY FORESTS

A) Introduction - Grassy Dry Forests:

Historically one of the dominant vegetation groups, once covering a substantial area of the zone. Some of the vegetation types within this group have been substantially cleared.

Grassy Dry Forests (EVC 22) occur on hills, generally with very shallow soils, at elevations at 230-900m and an annual rainfall of 500-1000mm. Grassy Dry Forests occur in protected aspects at low rainfall and on steeper north facing aspects at higher rainfall and altitude. These are typically open forests of Red Stringybark (*E.macrorhyncha*) and Long-leaf Box (*E. goniocalyx*) at lower altitudes. The shrub layer consists of few medium and low shrubs such as Guinea-flowers, Wattles and peas. The diverse grassy understorey occurs on more protected south-east slopes with species such as Red Anther Wallaby-grass (*Joycea pallida*), Tussock-grasses (*Poa spp.*), Plume Grass (*Dichelachne spp.*), Common Wheat-grass (*Elymus scaber*) and Wallaby-grasses. There is often sparse but diverse range of herbs, lilies and orchids.

Valley Grassy Forest (EVC 47) occurs on broad, gently sloping valleys of the surrounding dry foothills at elevations of 150-400m, with and annual rainfall 650-800mm. It supports an open forest of Yellow Box, Candlebark (*Eucalyptus rubida*), Narrow-leaf Peppermint (E.*radiata*) and Messmate (*E. obliqua*). The tall open shrub layer is typically Silver Wattle and Blackwood. Characteristically a dense layer of Weeping Grass and in season, a rich array of herbs, lillies, grasses and sedges dominate the ground layer, such as Chocolate Lily, Kidney Weed (*Dichondra repens*), Ivy-leaf Violet (*Viola hederaea*), Slender Tick-trefoil (*Desmondium spp.*), Stinking Pennywort (*Hydrocotyle laxifloa*) and Austral Cranesbill (*Geranium solanderi*).

Also included in *Grassy Dry Forests* are the basalt plains around Kilmore. Although classed as Herb-rich Foothill Forest, they are more a mosaic of Grassy Dry Forest, Valley Grassy Forest and Plains Grassy Woodland. This area has been extensively cleared and modified for agriculture.

More than 48% of Grassy Dry Forests in the Goulburn Broken Catchment have been cleared since European settlement. It is important to protect the remaining area for the continued survival of the species that rely on it and for the ecological services these forests provide. Of the balance 38% remains on private land. The support of private landholders is essential for the ongoing conservation of Grassy Dry Forests.

B) Photographic Example - Grassy Dry Forests:

Site 792333-2 Example of a Grassy Forest in good condition for the South West Goulburn

The site pictured below is a very good example of Grassy Forests in the zone as it has a diverse and largely intact structure. It has a good, mixed understorey cover and fallen timber. It lacks many large trees as it has had a history of being selectively logged. This site is located close to Mt Disappointment State park and could be used as a stepping stone to link the Park to other remnant vegetation.

Photo: Grassy Forest – A Key Biodiversity Asset -South West Goulburn Landscape Zone. Photo Simon Pickup

C) Actions – Grassy Dry Forests:

Size/Extent:

- **Create buffers**, through revegetation, on freehold land abutting roadside remnants or reserves to widen the habitat.
- **Increase connectivity** to remnants and reserves such as Tallarook State Forest, Mt Piper, Tyaak, Monument Hill, High Camp and Broadford-Kerrisdale Reserves.
- **Protect** significant roadsides such as the Northern Highway, Back Creek, Forbes-Moranding, Diggings, McHargs, Lancefield-Kilmore, Kilmore-Broadford, Broadford-Kilmore East, Saunders, Spur, Strath Creek Roads.

Condition:

Education/Extension

- **Encourage** landholders to increase the size of existing remnants, to establish new areas of indigenous species of trees and shrubs, and to retain or establish buffer zones of revegetation or unimproved, uncultivated pasture around woodland.
- **Encourage** the planting of alternative timber supplies, especially in the higher population areas such as Clonbinane, Wandong and Heathcote Junction, to reduce firewood collection impact on roadsides and remnants.
- **Liase** with Parks Victoria, DSE, committees of management and adjacent landholders, regarding the current management of the reserves and state forests.
- **Encourage protection** (fencing) of all Grassy Dry Forest remnants and manage grazing practices to benefit the grassy woodland (such as exclude all domestic grazing stock in remnants to allow plants to set seed and regenerate. Manage stock grazing to benefit the native vegetation once plants have set seed).
- Organise **community education** activities relating to the importance of Grassy Dry Forests and associated flora and fauna species, specifically targeting high priority remnants in paddock environments.
- Further **promote** the benefits of protecting and enhancing remnant patches through extension and voluntary programs, such as Environmental Management Incentives.
- **Encourage** retention of fallen timber in privately owned Grassy Dry forest Sites and making sure that fallen timber is not removed illegally from public land.

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.
- **Minimise disturbance** at high value sites at high value sites to prevent erosion and minimise weed invasion.
- **Ensure** clusters or individual specimens of large, hollow-bearing trees and dead standing trees are retained and protected throughout the zone.
- **Enhance** high value sites with shrubs and other species if regeneration has not occurred following fencing (eg. no existing seed source).
- **Identify** additional native grassland paddocks for protection and restoration, where artefact grasslands were once grassy forests.

Threatened Species

- **Install nest boxes** where hollows are deficient to increase the number of nesting hollows for animals, such as the Brush-tailed Phascogale and Sugar Gliders.

Pest Plant and Animals

- Continue ongoing **control of foxes and feral cats** for the protection of threatened species and focal species such as Brush-tailed Phascogales, Sugar Gliders Golden Whistlers and Hooded Robins.

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

- **Increase connectivity** to important reserves such as Tallarook State Forest, Mt Piper,Tyaak, Monument Tower, High Camp, Broadford-Kerrisdale Reserves should be linked up to other vegetation and managed to protect and enhance their biodiversity values.
- **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 – GRANITE COUNTRY

A) Introduction – Granite Country:

Granite occurs in the east and west of the South West Landscape Zone. The granite country to the west, at the top of the Mollisons Creek Catchment upstream from Pyalong, has communities unique in the South West Goulburn Zone. Most of this area has been cleared and modified for agriculture. The significant components of the Granite Country are:

Granite outcrops form islands through the area. The upper slopes below the outcrops are predominantly Granitic Grassy Woodland (EVC 175-62), with a plant community different from other Grassy Woodlands. Most of this community has been cleared, apart from a few roadsides. Granitic Grassy Woodland has a large and medium shrub layer and diverse ground layer of grasses and herbs.

Lower slopes become increasingly damp, and support a Damp-sands Herb-rich Woodland (EVC 3) and patches of Valley Grassy Forest (EVC 47) and Grassy Woodlands. Boggy areas are evident but the whole area has been severely modified and original communities are difficult to identify. The Damps Sands Herb-rich Woodland occurs on relatively well drained, deep sandy or loamy topsoils over heavier duplex subsoils. It is a low, grassy or bracken (*Pteridium esculentum*) dominated Eucalypt forest or open woodland, with a large shrub layer and ground layer rich in herbs, grasses and orchids.

B) Photographic Example – Granite Country:

Example of the Granite Country for the South West Goulburn Zone

This photo shows an example of some granite outcrops typical of the granite country. The area is grazed but the rocky outcrops provides protection for some remnant vegetation.

Photo: View of some granite outcrops along the Pyalong-Null vale Road. Photo: Bronwyn Merritt

C) Actions – Granite Country:

Size/Extent:

- **Encourage** landholders to increase the size of existing remnants, to establish new areas of indigenous species of trees and shrubs, and to retain or revegetate to establish buffer zones or unimproved, uncultivated pasture around granite outcrops.
- **Work** with the Nullavale Pyalong Landcare group and to protect and revegetate remnants and corridors.
- **Increase connectivity** (through revegetation) by linking areas of remnant granitic hills vegetation.

Condition:

Education/Extension

- **Encourage** (eg. community education activities) landholders to leave all rocks, fallen branches and woody debris on the ground.
- **Promote** the benefits/uniqueness and management requirements of diverse granite country vegetation

On-ground Works

- **Exclude grazing** to protect remaining patches of trees and native vegetation and encourage regeneration and to avoid pugging of the damp areas.
- **Minimise disturbance** at high value sites to prevent erosion and minimise weed invasion.
- **Maintain** all rocks as structural habitat.
- **Encourage all landholders** to protect sites for the long-term (e.g. covenants)
- **Support** landholders and community groups in the protection of all sites (e.g. Environmental Incentives, extension).
- **Improve habitat quality** by leaving fallen timber, logs and branches on the ground and by leave dead trees standing as they provide hollows used by many wildlife species.
- **Restore structural diversity** by revegetating patches trees with indigenous shrubs and ground cover.

Pest Plan and Animals

- **Continue ongoing control of foxes and feral cats** for the protection of threatened species and focal species such as brush-tailed Phascogales, Sugar Gliders Golden Whistlers and Hooded Robins.
- **Undertake active weed control** at all BAP sites.

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

- **Support** Nulla Vale Pyalong West Landcare Group with their Forest Link Project linking between the Cobaw and Tooborac Forests, and also linking with a similar project by Baynton Sidonia Landcare Group.
- **Link high value sites** with roadsides. Investigate the linking sites by the creation of corridors between sites.

7.4 KEY BIODIVERSITY ASSET – BOX IRONBARK

A) Introduction – Box Ironbark Forests:

Box Ironbark Forests are open forests that occur on low hills at altitudes between 150-230m, with an annual rainfall between 500-650mm. The skeletal sandy loam to clay loam soils are often gravelly, and are of low fertility with a poor moisture holding capacity. In the south west landscape zone they occur from Mt Piper area north and north west towards Seymour. The overstorey is dominated by Red Box, Red Stringybark (*Eucalyptus macrorhyncha*), Long-leaf Box, Yellow Box and Red Ironbark (*E. tricarpa*). The understorey is a scattered shrub layer which includes Golden Wattle, Spreading Wattle, Daphne Heath (*Brachyloma daphnoides*), Grey Everlasting (*Ozothamnus obcordatus*) and Sweet Bursaria (*Bursaria spinosa*). The sparse ground layer includes Wallaby Grasses, Spear Grasses, Red Anther Wallaby Grass (*Joycea pallida*), Black Anther Flax Lily (Dianella revoluta), Shiny Everlasting (*Bracteantha viscosa*) and Chocolate lily.

Over 60% of the Box Ironbark Forest in the Goulburn Broken Catchment has been lost since European settlement. Of the 40% that remains, most has been disturbed at some stage and is degraded. Many of the plants and animals that relied on this habitat are also threatened. The main threats include: inappropriate grazing regimes, mining, isolation, lack of understorey and ground layer, lack of natural regeneration, weed invasion, pest animals and loss of old trees through harvesting and loss of fallen timber.

4B) Photographic Example – Box Ironbark:

Example (site 792344-12) of a Box Ironbark Forest BAP Site of Good Condition for the South West Goulburn Zone

This site is part of a large patch of Box Ironbark vegetation (over 90ha); it is also in an area of well-connected and high quality roadsides. There are some large trees but limited of fallen timber. The native understorey is patchy with large areas of bare ground which is a feature of the Box Ironbark Forest.

Photo: Box Ironbark Forest – A Key Biodiversity Asset - South West Goulburn.
Photo: Bronwyn Merritt

C) Actions – Box Ironbark

Size/Extent:

- **Encourage landholders to increase the size** of existing remnants, to establish new areas of indigenous species of trees and shrubs, and to retain or establish buffer zones with revegetation or fence out and allow regeneration around Box Ironbark forest.
- **Protect significant roadsides** such as the Three Chain, Selection, Glenaroua-Broadford, Dwyers, Broadford-Sugarloaf, Kilmore-Glenaroua Roads.

Condition:

Extension/Education

- **Organise community education activities** relating to the importance of Box Ironbark Forests and associated flora and fauna species, specifically targeting high priority remnants in paddock environments.
- 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 in privately owned Box Ironbark Forest sites.

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.
- **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.
- **Restore structural diversity** by revegetating degraded remnants with indigenous shrubs and ground cover, if regeneration has not occurred following fencing (eg. no existing seed source).

Pest Plant and Animals

- **Minimise disturbance** at high value sites to prevent erosion and minimise weed invasion.
- **Continue ongoing contro**l 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):

- **Increase connectivity to important reserves and remnants** such as Mt Piper, Kerrisdale Reserves.
- **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 – DAMP FORESTS

A) Introduction – Damp Forests:

Medium to tall open forests (25m to 30m tall). Occurs on relatively fertile, moderately well-drained soils on an extremely wide range of geological types and in areas of moderate to high rainfall at elevations from 200-1200m. The overstorey commonly consists of Narrow-leaf Peppermint and Candlebark (*E. rubida*). The small tree layer of Silver Wattle (*A. dealbata*) occurs over a sparse to dense shrub layer including Prickly Currant-bush (*Coprosma quadrifida*), Handsome Flat-pea (*Platylobium formosum*) and Hop Bitter-pea (*Daviesia latrifolia*). The understorey contains a high cover and diversity of herbs and grasses in the ground layer, such as Kidney-weed (*Dichondra ripens*), Pennywort (*Hydrocotyle sp.*), Mat-rush (*Lomandra sp.*), Austral Bear's-ears (*Cymbonotus lawsonianus*), Mountain Clematis (*Clematis aristata*), Weeping Grass (*Microlena stipoides*), Common Tussock-grass, Forest Wire Grass (*Tetrarrhena juncea*) and Common Wheat-grass. Austral Bracken (*Pteridium esculentum*) may tend to dominate following frequent disturbance, particularly by fire and grazing.

B) Photographic Example – Damp Forests:

Example of a Damp Forest BAP Site of Good Condition for the South West Goulburn Zone

The site (792333-2) pictured below is located close to the Mt Disappointment State Park and could be used to link the Park to other remnant vegetation. This is a very good example of Herb-rich Foothill Forest, as it has a diverse and largely intact structure, but lacks large old trees. It does have some fallen timber.

Photo: Damp Forest – A Key Biodiversity Asset - South West Goulburn Landscape Zone. Photo Simon Pickup

C) Actions – Damp Forests:

Size/Extent:

- **Encourage** landholders to increase the size of existing remnants, to establish new areas of indigenous species of trees and shrubs, and to retain or establish buffer zones of unimproved, uncultivated pasture around woodland.
- **Work with** VicRoads, local government and Landcare groups to protect significant roadsides, such as the Northern Highway, Quinns, McHargs, Feeneys Roads, and Arkells Lane.
- **Protect and manage** reserves such as Tallarook State and Mt Disappointment State Forest, Goldie Flora and Dabyminga Flora Reserves and linked them, through revegetation, to other vegetation.

Condition:

Education/Extension

- **Encourage** (eg. community education activities) landholders to leave fallen branches and large woody debris on the ground.
- **Liase** with Parks Victoria, DSE, committees of management and adjacent landholders, regarding the current management of the reserves and state forests.

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.
- **Install nest boxes** to provide hollows, where hollow bearing trees are deficient.
- **Retain both live and dead hollow bearing trees**, stags for Powerful and Sooty Owl habitat.

Pest Plant and Animals

- Continue **active weed management** throughout forest remnants, particularly around the perimeter to control encroachment from private land. Encourage adjacent landowners to participate in Weed Action Groups and Rabbit Action Groups.
- Active **weed management** to control and prevent weed infestation. Control small isolated infestations first. Burning weedy, open areas in autumn, could be an option (perhaps too risky at other times of the year for landholders). Soon after fire spot spray weedy grasses with species specific herbicide, avoiding native grasses.
- **Minimise disturbance** to reduce the risk of further weed invasion and revegetate or encourage regeneration of areas where weeds are removed.
- **Implement control of foxes and feral cats** for the protection of native animals with threatened and focal species sites (brush-tailed Phascogales, Sugar Gliders Golden Whistlers) being the highest priority.

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

- **Support** Nulla Vale Pyalong West Landcare Group with their Forest Link Project linking between the Cobaw and Tooborac Forests, and also linking with a similar project by Baynton Sidonia Landcare Group.
- **Target drainage lines**, freehold remnants and roadsides remnants for revegetation to enhance connectivity with forest blocks. Particularly investigate the potential restore linkages between State Forest and Public Land Water Frontage Reserves along Reedy/Dabyminga Creek.
- **Identify and prioritise** potential sites for habitat expansion and improved connectivity, using the Landscape Context map as a guide.

7.6) KEY BIODIVERSITY ASSET – RIPARIAN SYSTEMS

A) Introduction – Riparian Systems:

Riparian systems, such as rivers, streams and creeks provide essential corridors for species movement and provide habitat, food and shelter for a range of species. Riparian systems in the South West Goulburn vary from Floodplain Riparian Woodland, Riparian Forest to Creekline Grassy Woodland, and from relatively well drained sites to soaks, swamps and bogs.

Floodplain Riparian Woodland occurs along the northern end of the banks of the Dabyminga Creek where it regularly flooded terrace. The overstorey consists of predominantly River Red Gum. There is a typically medium to tall shrub layer of Silver Wattle, with Tree Violet and Blackwood. The ground layer varies between Common Tussock Grass on the drier elevated banks, and Common Reed and various rushes and sedges occur on the wetter, lower areas. The Creekline Grassy Woodland occurs along the banks of the smaller ephemeral (seasonal) streams on the plains and lower slopes of the foothills at elevations of 100-200mm with an annual rainfall of 400-700mm. These open woodlands are also dominated by River Red Gum. Manna Gums are also occasionally found on the lower slopes of the foothills. There is a medium open shrub layer of Silver Wattle and Blackwood. Seasonal inundation provides good moisture availability to fertile soils supporting ground layer of Common Tussock-grass, Weeping Grass and Common Wheat Grass with rushes and sedges.

Riparian Forest grows along river banks, the larger creeks and associated alluvial terraces in areas with an annual rainfall of 900-1800mm. The overstorey forms a tall forest typically of Manna Gums, with a mixture of species such as Narrow Leaf Peppermint. Blackwoods, Silver Wattles, Hazel Pomaderris (*Pomaderris aspera*) and Tree Lomatia (*Lomatia fraseri*) typically occur as a well developed secondary tree layer. The understorey is dominated by dense patches of Prickly Currant-bush (*Comprosma quadrifida*) with a ground layer rich in grasses, ferns and herbs.

A number of other threats to riparian systems include land clearing, adjacent land use practices (eg. nutrient run-off), hydrological cycle changes and pest plants and animals. The actions identified below are intended to assist with the conservation of Waterways within the South West Goulburn Landscape Zone. However, these actions are specific to the zone and are by no means comprehensive for the region. Other strategies, such as the Victorian River Health Strategy (NRE 2002b) and the Draft GB River Health Strategy (GBCMA 2004b), provide a framework for managing and restoring rivers, streams and floodplains in Victoria and are overarching strategies for all areas.

B) Photographic Example – Riparian Systems:

Example of a Riparian BAP Site of Good Condition for the South West Goulburn Zone
The site (792342-62) pictured below is a very high value site. It runs along the Dabyminga Creek and forms an important corridor in the landscape. Many Riparian sites in the zone are in moderate to poor condition. This riparian vegetation is still grazed. There are large hollow bearing trees, but little fallen timber.

Photo: Waterways – A Key Biodiversity Asset -South West Goulburn Landscape Zone. Photo Bronwyn Merritt

C) Actions – Waterways:

Size/Extent:
• In consultation with GBCMA and adjacent landholders **buffer** creeks and rivers, revegetating or allowing regeneration, using waterway/environmental incentives or covenanting. • **Encourage** direct seeding to increase cost efficiency and time of creating linkages between private remnants and waterways. •
Condition:
Education/Extension • **Consult** with licensees of waterways, to fence the creeklines, through waterway incentives and encourage the removal of stock, especially during set times to allow regeneration. • **Further 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, such as Environmental Incentives. • **Encourage** the planting of alternative timber supplies, to reduce firewood collection impact on roadsides, remnants and waterways. • In **consultation** with Goulburn Broken CMA, develop habitat management plans for streamside on freehold, with particular emphasis upon protecting and expanding habitat (eg creekline/roadside intersections). • In **partnership** with GB Waterways team liaise with landholders on the section of to fence the waterway and exclude grazing.

On-ground Works

- **Establish off stream watering points** for all affected sites on waterways, where required.
- Negotiate with landholders the **fencing (and grazing exclusion)** of unused roadsides and creeklines associated with their properties, and which contain remnants.
- Concentrate **revegetation and weed control** efforts in areas adjacent to streamside reserves.
- **Encourage** retention of fallen timber on all waterways and adjoining remnants.

Pest Plant and Animals

- **Continue** the good work of Landcare groups (Dabyminga Catchment Co-operative) who have already undertaken stream fencing around Tallarook and extensive weed removal up Reedy Creek.
- Continue ongoing **control of foxes and feral cats** for the protection of threatened species including brush-tailed Phascogales, Sugar Gliders Golden Whistlers and Hooded Robins
- Continue ongoing **weed control**, focussing on blackberries and gorse along waterways

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

- **Investigate** the potential of freehold remnants to complement native remnant vegetation on Public Land Frontage and Streamside Reserves along Dabyminga (Reedy), Sunday, Dr, Mollisons and Deep Creeks.
- **Increase linkages** between Mt Disappointment State Forest and Tallarook State Forest and Dabyminga Creek.
- **Revegetate and link** Mollisons and Kurkurac Creeks to other remnant vegetation.

7.7) KEY BIODIVERSITY ASSET – MOUNT PIPER AREA

A) Introduction – Mount Piper Area:

Mt Piper near Broadford is the central feature of the Mt Piper Nature Conservation Reserve covering approximately 100ha. Mt Piper rises steeply from 230m to 440m above the surrounding plain of private grazing properties, between the Tallarook and Mt William ranges.

Mt Piper's habitat supports a unique assemblage of flora and fauna characterised by a high diversity of butterflies. Three rare butterfly species, the Large Ant Blue (*Acrodipsas brisbanensis*), Small Ant Blue (*A. myrmecophila*) and the Azure butterfly (*Ogyris genoveva genoveva*), 37 other butterfly species and nine moth species including the nationally critically endangered Golden Sun Moth (*Synemon plana*) occur at Mt Piper (O'Dwyer & Attiwill 2000). Mt Piper is the only known site where these species co-occur. This butterfly association, known as Butterfly Community No. 1, is listed as a threatened community under the Flora and Fauna Guarantee Act 1988. Mt Piper also provides important habitat for a variety of local and migratory native wildlife including threatened and uncommon species such as the Brush-tailed Phascogale, Diamond Firetail, Hooded Robin, Speckled Warbler, Regent Honeyeater and Swift Parrot. An old mineshaft at Mt Piper also provides roosting sites for the Common Bent-wing Bat (*Miniopterus schreibersii*).

The different vegetation communities of Mt Piper vary with changing aspects and altitudes. The vegetation of Mt Piper is a mosaic of open forest and woodland (Cameron *et al* 1992), dominated by Broad-leaf Peppermint (*Eucalyptus dives*), Lond-leafed Box (*E.goniocalyx*), Red Stringybark (*E. macrorhyncha*) and Messmate (*E. obliqua*) occurring around the summit. The understorey comprises of a variety of shrubs and herbs being dominated by Golden Wattle (*Acacia pycnatha*), Heath Teatree (*Lepidospermum myrsinoides*) and Common Heath (*Epacris impressa*) with several species of orchids and various native grasses and sedges (O'Dwyer & Attiwill 2000). The EVCs occurring at Mt Piper are Heathy Dry Forest on the dry rocky hilltops, Box Ironbark Forest on the upper slopes, and Grassy Woodland and Plains Grassy Woodland on the lower slopes and surrounding farmland.

B) Photograph of Mount Piper:

Photo: Mount Piper and surrounding farmland. Photo Bronwyn Merritt

C) Actions – Mount Piper Area:

Size/Extent:

- Investigate with adjacent landholders or other managers any possible options to increase **connectivity or buffering** of Mt Piper.
- **Promote** appropriate grazing management on adjacent farmland to encourage Wallaby grass for the Golden Sun Moth.

Condition:

Education/Extension

- **Establish a Friends Group** of Mt Piper and area group through Parks Victoria. This group can assist with conservation management projects.
- Liase with landholders to **decrease use of barbed wire** to reduce the risk of entanglement for fauna such as Sugar Gliders and Squirrel Gliders.
- Prioritise the production and implementation of a **Mt Piper Management Plan**.

On-ground Works

- **Replant Lightwood** (*Acacia implexa*) on and around the summit to replace dead *A.implexa*.
- **Encourage regeneration and revegetate** with indigenous ground cover plants and scarify soil surfaces to promote natural regeneration and minimise compaction at Mt Piper to benefit the Small and Large Ant-blue Butterfly as outlined by Jelinek (1991)
- **Continue erosion control** and revegetation particularly on vehicle tracks throughout the reserve.

Threatened Species

- **Maintenance and management** of *Austrodanthonia* grasslands to benefit the Golden Sun Moth by undertaking:
  - **Removal of Golden Wattle**. To occur in grassland area where the Golden Sun Moth occurs,
  - **Periodic grazing** of grasslands in Spring to maintain grasslands.
  - **Monitor Wallaby** Grass *Austrodanthonia* spp. density.
- **Monitor Golden Sun Moth populations** at Mt Piper and near by Jefrey's grassland.
- **Monitor hill topping butterflies** on suitable days during November to February with a focus on Small and Large Ant Blue Butterflies.

Pest Plants and Animals

- **Continue to undertake pest plants and animal** (eg. Goats, foxes and rabbits) eradication and control.

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

- **Increase the connectivity** around Mt Piper through revegetation.

For further advice on all of these management actions contact Parks Victoria, Kinglake.

8.0 FURTHER INFORMATION - PRIORITY SITES

Priority Site Data:
Information on the 962 priority BAP sites within the South West Goulburn 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 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 organisational, agency 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 their 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 9), 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 actions. 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 Water and Biodiversity Group, Department of Sustainability and Environment, Alexandra on (03) 5772 0200.

9.0 LANDHOLDER ASSISTANCE

There is a range of assistance available to 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 Upper Goulburn Broken Region. Also included are some of the programs within the community that will benefit from the information provided in this plan.

LOCAL AREA PLANS	WHOLE FARM PLANS
These Conservation Plans will provide an extra resource for Local Area Planning groups, in relation to their Local Area Plans. It can assist groups with both implementation and in the provision of further information for conducting biodiversity planning in their area.	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.

Advice and Information:
Please contact your local Department of Primary Industries/Department of Sustainability and Environment Office, the Goulburn Broken Catchment Management Authority or the South West Goulburn Landcare Network (DPI, Broadford) 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, ground water 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 Upper Goulburn Broken Region for catchment works; including,

- Environmental incentives to assist with the protection and/or enhancement of remnant vegetation, including wetlands and grasslands,
- Native Grasses Management, area available to fence areas of native grasses to allow strategic grazing management, *contact the Department of Primary Industries, Benalla.*
- Whole Farm Planning, to assist with the development of Whole Farm Plans,
  For the above points, contact the Department of Primary Industries, Broadford.
- Waterways Incentives – for on-ground works along rivers and creeks.
  For the above point, contact the Goulburn Broken Catchment Management Authority, Yea.

Management Arrangements:
Programs such as Carbon Tender, Bush Returns, EcoTender and Bush Broker, may provide incentives and advice, for long-term conservation management on properties. *Contact the Goulburn Broken Catchment Management Authority, Yea or Benalla office for further information.*

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. *Trust for Nature (Vic) is the managing organisation in regards to Conservation Covenants; visit the website at www.tfn.org.au*

Other Assistance:

- 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 internet site at* www.dse.vic.gov.au*.*
- Local Government (Mitchell and Murrundindi) – managing authority for native vegetation statutory planning requirements. Landcare in the South West Goulburn – Landcare groups can provide local advice and contacts, and often have funding for works. *Contact Landcare Coordinator at DPI Office, Broadford*

10.0 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 (GBCMA *in prep.*). The following table (Table 4) provides a basis for monitoring in the South West Goulburn 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, Yea, or the Department of Primary Industries and Department of Sustainability and Environment Offices, Alexandra, 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 – South West Zone

Key Biodiversity Asset	Key indicators for monitoring	Frequency/Intensity
Grassy Forests	Refer to "All Key Biodiversity Sites" below	See below
Grassy Woodlands	Refer to "All Key Biodiversity Sites" below	See below
Damp Forest	Refer to "All Key Biodiversity Sites" below	See below
Box Ironbark	Refer to "All Key Biodiversity Sites" below	See below
Granitic Hills Outcrops	Refer to "All Key Biodiversity Sites" below	See below
Riparian Systems	Trends in environmental flows and in-stream habitat condition (as measured by ISC)	Five yearly* ISC assessments
	Trends in water quality – Waterwatch program run through Goulburn Valley Water Authority and Local Landcare Groups.	Once yearly as part of EPA monitoring: five yearly as part of ISC: at least 30 sites (GBCMA 2004b)
	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
	Surveying of mean habitat width of waterways in Zone	Every 5 years, all sites (or in accordance with existing waterways monitoring), aerial photography
	Overlay of on-ground works areas against this plans mapping data	Once yearly, all sites

Mt Piper	Monitoring of Golden Sun Moth populations at Mt Piper Conservation Reserve and Ron Jeffrey's grassland	Survey annually early December from 2006-2008 and every 3-5 years after that.
	Monitoring of Wallaby Grass *Austrodanthonia* sp. Measurement of density: establishment of permanent photo points and quadrats/transects.	2005-2008 and every 3-5 years after that.
	Grazing by shorn wethers in Spring (shorn wethers must be quarantined prior to entry)	Three grazing seasons 2006-2009
	Review of results of grazing strategy	2008
	Monitoring of hill-toping butterflies on suitable days during November to February with a focus on Large and Small Ant Blue Butterflies (refer to Jelinek 2005 for details)	Annual 2006-2007
	Monitor lower slopes of Mt Piper for Coconut Ant, Large and Small Blue Ant Butterflies and other target butterflies during November - January	Annual 2006-2008
	Monitoring of threatened fauna – Brush-tailed Phascogale, Common Bet Wing Bat, Regent Honeyeater, Swift Parrot	Every 5 years.
All Key Biodiversity sites see comments in HC Plan	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)
	Trends in vegetation condition (resurvey the 100 sites using VQA assessments) (this includes threats data)	Every 5 years - 30 sites
	Trends in bird survey data (resurvey the 100 sites using bird survey method)	Every 5 years – 30 sites
	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, all new information; all sites
	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
	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
	Monitoring of threatened species, against current records	Every 2 years: across the zone

	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
	Trends in plants of special concern (eg. undertake monitoring of River Swamp Wallaby-grass in the zone to further determine management requirements)	Once; then as required
	Trends in connectivity and characteristics of sites within landscape (eg. size of remnants)	Every 5 years; aerial photography
	Overlay of on-ground works areas against the mapping data in this BAP zone plan: 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)

11.0 REFERENCES

Ahern, L.D., Lowe, K.W., Berwick, S., Robinson, D. & Handley, K. (2003b). Biodiversity Action Planning: landscape plans for the Goulburn Broken CMA- Shepparton Irrigation Region – North Zones. Department of Sustainability and Environment, Victoria.

Berwick, S (2003). Map Unit Descriptions of Lower Goulburn Broken (draft). State of Victoria, Melbourne.

Birds Australia (2001). Bird Surveying Techniques. Available at: http://www.birdsaustralia.org.au.

CGDL (2005). Corporate Geographical Database Library. State of Victoria, Melbourne.

Cogger, H. G (1994) Reptiles and Amphibians of Australia 5th Edition. Reed Books Chatswood, NSW Australia

Coman, B. (2002). An interim fox-control strategy for the Broken-Boosey State Park. Report to Parks Victoria.

Crown (1997). Victoria's Biodiversity: Directions in Management. State of Victoria, Melbourne.

DPI (2005). Dairying for Tomorrow: Dairy Sat- The Guide. State of Victoria, Melbourne.

DSE (2004). Environmental Management in Agriculture: Worksheet Series 1-8. State of Victoria, Melbourne.

DSE (2005a). Actions for Biodiversity Conservation Database (ABC). Department of Sustainability and Environment. State of Victoria, Melbourne.

DSE (2005b). Murray-Darling Basin Salinity Management Strategy. State of Victoria, Melbourne.

Ferwerda, F. (2003). Landscape Context Model. State of Victoria, Melbourne.

GBCMA (2000). Goulburn Broken Native Vegetation Plan. GBCMA, Shepparton. Available at: http://www.gbcma.vic.gov.au.

GBCMA (2003). Goulburn Broken Regional Catchment Strategy. Goulburn Broken Catchment Management Authority, Shepparton. Available at: http://www.gbcma.vic.gov.au.

GBCMA (2004a), Developers Manual for Biodiversity Action Planning in the Goulburn Broken Catchment. Goulburn Broken Catchment Management Authority, Shepparton.

GBCMA (2004b). Goulburn Broken River Health Strategy (draft). Goulburn Broken Catchment Management Authority, Shepparton. Available at: http://www.gbcma.vic.gov.au.

Howell, M. (2002). Wetland Directions Paper for the Goulburn Broken Catchment. Goulburn Broken Catchment Management Authority, Shepparton. Available at: http://www.gbcma.vic.gov.au.

Lambeck, R.J. (1997). Landscape planning for biodiversity conservation in agricultural regions. Biodiversity Technical paper No. 2. Commonwealth of Australia, Canberra.

LCC (1983). Murray Valley Area Investigation – Descriptive Report. Land Conservation Council, Victoria.

Lunt, I. (1998). Protecting our wonderful woodland remnants. Charles Sturt University, Thurgoona, NSW.

Lyon, J, Schreiber, E.S.G. & Butcher, R.J. (2002). Prioritising wetlands for management of biodiversity conservation. Report to Goulburn Broken Catchment management Authority. Freshwater Ecology, DNRE, Arthur Rylah Institute for Environmental Research.

NRE (2002a). Victoria's Native Vegetation Management: a Framework for Action. Department of Natural Resources and Environment, Victoria.

NRE (2002b). Healthy rivers, healthy communities and regional growth: the Victorian River Health Strategy. Department of Natural Resources and Environment, Victoria.

NRE (2002c). Victorian Flora Site Database – May 2002. Department of Natural Resources and Environment, Victoria.

NRE (2002d). Atlas of Victorian Wildlife. March 2002. Department of Natural Resources and Environment, Victoria.

Platt, S.J. (2002). How to plan wildlife landscapes: a guide for community organisations. State of Victoria, Melbourne.

Platt, S.J. & Lowe, K.W. (2002). Biodiversity Action Planning: planning for native biodiversity at multiple scales – catchment, bioregional, landscape, local. Department of Natural Resources and Environment, State of Victoria, Melbourne.

PV, (2005). Broken-Boosey State Park and Nathalia, Numurkah, Tungamah and Youarang Natural Features Reserves Draft Management Plan, Parks Victoria, Melbourne.

Robinson, D. (in prep). A monitoring, evaluation and reporting strategy for the Longwood Plains Biodiversity Project. Trust for Nature & Department of Sustainability and Environment, Benalla.

Robinson, D. & Mann, S. (1996). Natural values of the public lands along the Broken, Boosey and Nine Mile Creeks of northern Victoria. Unpublished report to Australian Heritage Commission. Goulburn Valley Environment Group, Shepparton.

Simpson, K., Day, N. & Trusler, P. (1993). Field Guide to the Birds of Australia (4th ed.). Penguin Books, Ringwood, Australia.

Viridians (2005). Victorian Fauna Database. Viridians Pty Ltd Bentleigh east, Victoria Australia3165

Wilson, J.A & Lowe, K.W. (2002). Planning for the conservation of native biodiversity within catchments using biophysical modelling. Department of Natural Resources and Environment, State of Victoria, Melbourne.

Wierzbowski, P., Lowe, K.W., Handley, K, Berwick, S., Robinson, D. & Ahern, L.D. (2002). Biodiversity Action Planning: Strategic Overview for the Victorian Riverina Bioregion. Department of Natural Resources and Environment, State of Victoria, Melbourne.

12.0 ACKNOWLEDGMENTS

This project is funded as part of the Goulburn Broken Catchment Management Authority Regional Catchment Strategy, in the Upper Goulburn Broken Region and is provided with support and funding from the Australian and Victorian Governments. This project is delivered primarily through partnerships between the Goulburn Broken Catchment Management Authority (GBCMA), Department of Primary Industries (DPI), Department of Sustainability and Environment (DSE), Trust for Nature (Vic) (TfN) and other community bodies. Personnel from these agencies provided generous support and advice during the development of this plan.

We also thank numerous Landholders, Landcare Groups, Local Area Planning Groups, Agency representatives and individuals, who provided generous support, advice, information and assistance. This included, guidance, technical knowledge, attendance at meetings, plan review, provision of literature and survey data, and property access.

Thank-you also to person's who have provided photographs. Photographer credit (names) are included under each photograph throughout the report.

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)
Smith, Stephen – Senior Flora and Fauna Officer, DSE (Upper) (current)
Edmonds, Tobi – Threatened Flora Projects Officer, DSE (Lower) (current)
Wilson, (Dr) Jenny – Biodiversity Projects Officer, DSE (Dryland) (current)
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)

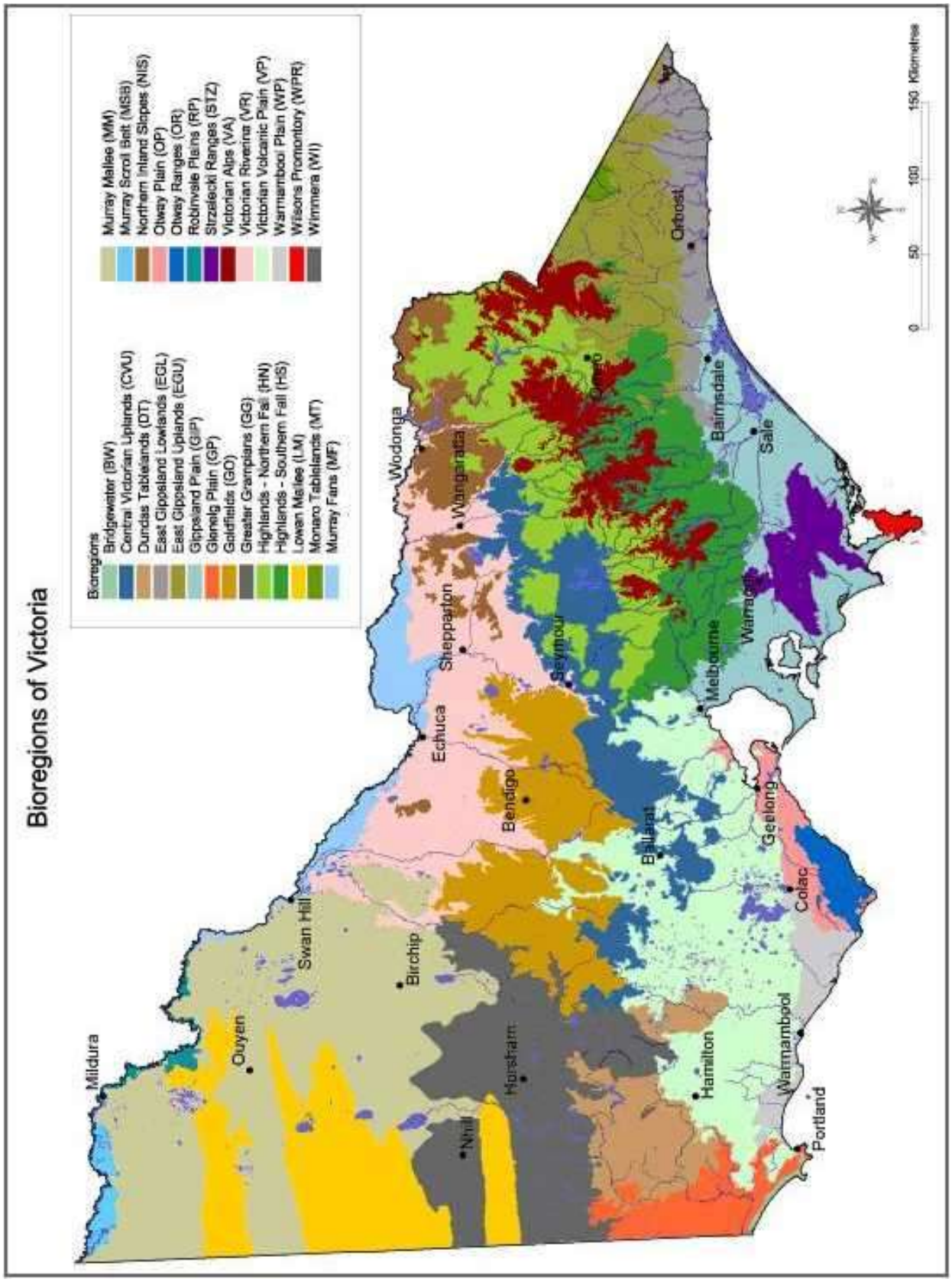
Biodiversity Action Planning Contributors:

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

13.0 APPENDICES

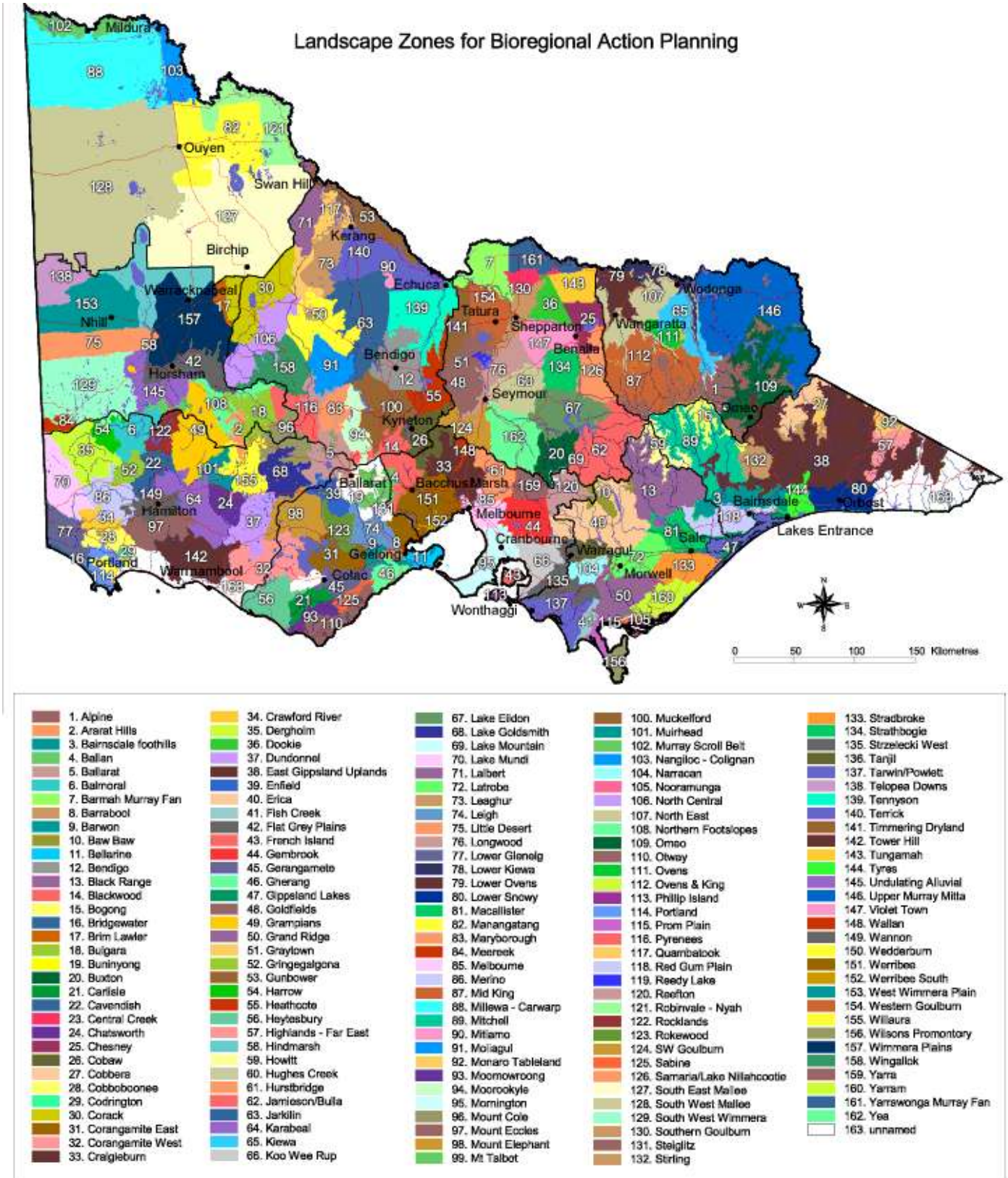
APPENDIX 1 – VICTORIAN BIOREGIONS

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 2003a.

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 2003a 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 2003a).

APPENDIX 4 – THREATENED FLORA

List of threatened flora and their conservation status in the South West Goulburn Landscape Zone (NRE 2002e). Table from Ahern et al 2003.

Scientific Name	English Name	Australian Status	Victorian Status	FFG Listed	Recovery Plan	FFG Action Statement No.	BNA Unassessed (CVU)	BNA Unassessed (HNF)	Species No.
Cardomine paucifuga	Annual Bittercress		V				Un	Un	5035
Acacia ausfeldii	Ausfeld's Wattle		v	x			Un	Un	4583
Glycine latrobeana	Clover Glycine	Vul	v	L			Un	Un	1456
Grevillea repens	Creeping Grevillea		r				Un	Un	1549
Arachnorchis concolor	Crimson Spider-orchid	Vul	e	L		143		Un	4347
Acacia nano-dealbata	Dwarf Silver Wattle		r				Un	Un	617
Thelymitra luteocilium	Fringed Sun-orchid		r				Un	Un	64
Diuris behrii	Golden Cowslips		V				Un	Un	1061
Senecio macrocarpus	Large-fruit Fireweed	Vul	e	L				Un	3375
Solanum cinereum	Narrawa Burr		k				Un	Un	643
Dianella amoena	Matted Flax-Lily	End	e				Un	Un	5084
Helichrysum aff. Rutidolepis	Pale Swamp Everlasting		v				Un	Un	4655
Goodia lotifolia var. pubescens	Silky Golden-tip		r			68	Un	Un	3116
Cardamine tenuifolia	Slender Bitter-cress		k				Un	Un	13
Carex iynx	Tussock Sedge		k			143	Un	Un	4347
Sporobolus creber	Western Rat-tail Grass		v				Un	Un	617
Hypoxis vaginata var. brevistigmata	Yellow Star		k				Un	Un	4600

* Australian (denoted by capital letter) Status of Species: E= Endangered, V= Vulnerable (in order highest to lowest)
* Victorian (denoted by lower case) Status of Species: e= endangered, v= vulnerable, r= rare k= poorly known
* FFG (Flora Fauna Guarantee Act 1988) taxon: L= listed (individual species only - not if part of listed communities)
* BNA (Bioregional Network Analysis) Assessment: Un = Unassessed. Ranking refers to the required response level for each taxon (determined through the occurrence of the species in the bioregion, in different land tenures, occurrence ranking, risk ranking and priority level).
* Species Number: State identification number/code attributed to individual species.

APPENDIX 5 – LOCALLY SIGNIFICANT SPECIES

The following plants have been listed as locally significant species (as distinct from those classed as Victorian or Australian rare or threatened species).

Scientific Name	**English Name**
Allocasuarina littoralis	Black Sheoak
Cheiranthera cyanea	Blue Finger Flower
Thysanotus tuberosus	Common Fringe-lily
Calytrix tetragona	Common Fringe-myrtle
Brachyscome multifida	Cut-leaf Daisy
Derwentia derwentiana	Derwent Speedflower
Dillwynia cinerascens	Grey Parrot-pea
Caleana major	Large Duck-orchid
Lepidosperma curtisiae	Little Sword-sedge
Dianella longifolia	Pale Flax-lily
Acacia gunnii	Ploughshare Wattle
Calotis scabiosifolia var. integrifolia	Rough Burr-dairy
Prostanthera denticulata	Rough Mint-Bush
Helichrysum leucopsideum	Satin Everlasting
Thelymitra megcalyptra	Scented Sun-orchid
Allocasuarina paludosa	Scrub Sheoak
Podolepis jaceoides	Showy Poplepsis
Banksia marginata	Silver Banksia
Olearia glandulosa	Swamp-daisy Bush
Dianella tasmanica	Tasman Flax-lily
Melichrus urceolatus	Urn Heath
Acacia verticillata	Varnish Wattle
Eucalyptus albens	White Box
Acacia retinoides	Wirilda
Microseris sp. 3	Yam Daisy

APPENDIX 6 – THREATENED FAUNA

List of threatened fauna and their conservation status in the South West Goulburn Landscape Zone (NRE 2002f). Table from Ahern et al 2003.

Latin name	Common Name	Australian Status	Victorian Status	FFG Listed	Recovery Plan	FFG Action Statement No.	BNA Unassessed (CVU)	BNA Unassessed (HNF)	Species No.
Ninox connivens connivens	Barking Owl		EN	L				Un	246
Falco subniger	Black Falcon		VU				Un	Un	238
Oxyura australis	Blue-billed Duck		EN	L			Un	Un	216
Phascogale tapoatafa tapoatafa	Brush-tailed Phascogale		VU	L		79			1017
Miniopterus schreibersii	Common Bent-wing Bat		VU	L					1341
Sminthopsis murina murina	Common Dunnart		VU					Un	1061
Stagonopleura guttata	Diamond Firetail		VU				Un	Un	652
Bettongia gaimardi gaimardi	Eastern Bettong		XT	L		14	Un	Un	1182
Rhinolophus megaphyllus megaphyllus	Eastern Horseshoe Bat		VU	L					1303
Sminthopsis crassicaudata	Fat-tailed Dunnart		NT				Un	Un	1072
Plegadis falcinellus	Glossy Ibis		NT				Un	Un	178
Synemon plana	Golden Sun Moth	CE	End	L		106		Un	5021
Ardea alba	Great Egret		VU	L			Un	Un	187
Pomatostomus temporalis temporalis	Grey-crowned Babbler		EN	L		34	Un	Un	443
Litoria raniformis	Growling Grass Frog	Vul	EN				Un	Un	3207
Aythya australis	Hardhead		VU				Un	Un	215
Melanodryas cucullata cucullata	Hooded Robin		NT				Un	Un	385
Acrodipsas brisbanensis	Large Ant Blue		R/R	L		70		Un	5006
Egretta garzetta nigripes	Little Egret		EN				Un	Un	185
Anseranas semipalmata	Magpie Goose		VU				Un	Un	199
Galaxias olidus	Mountain Galaxias		DD	L				Un	4036
Biziura lobata	Musk Duck		VU				Un	Un	217
Nycticorax caledonicus hillii	Nankeen Night Heron		NT				Un	Un	192
Phalacrocorax varius	Pied Cormorant		NT				Un	Un	99
Pedionomus torquatus	Plains-wanderer	Vul	CR			66	Un	Un	20
Ninox strenua	Powerful Owl		VU	L		92			248
Xanthomyza phrygia	Regent Honeyeater	End	CR	L	Y	41	Un	Un	603
Gadopsis marmoratus	River Blackfish		CR	L					4127
Platalea regia	Royal Spoonbill		VU				Un	Un	181
Acrodipsas myrmecophila	Small Ant Blue		End	L		71		Un	5007
Tyto tenebricosa tenebricosa	Sooty Owl		VU	L			Un	Un	253
Chthonicola sagittata	Speckled Warbler		VU				Un	Un	504
Lophoictinia isura	Square-tailed Kite		VU						230
Lathamus discolor	Swift Parrot	End	EN	L	Y	169	Un	Un	309

* Australian Status of Species: End= Endangered, Vul= Vulnerable (in order highest ranking to lowest ranking)
* Victorian Status of Species: CR= critically endangered, EN= endangered, VU= vulnerable
* FFG (Flora Fauna Guarantee Act) taxa: L= listed (individual species only - not if part of listed communities)
* BNA (Bioregional Network Analysis) Assessment: Un = Unassessed
* Species Number: State identification number/code attributed to individual species.

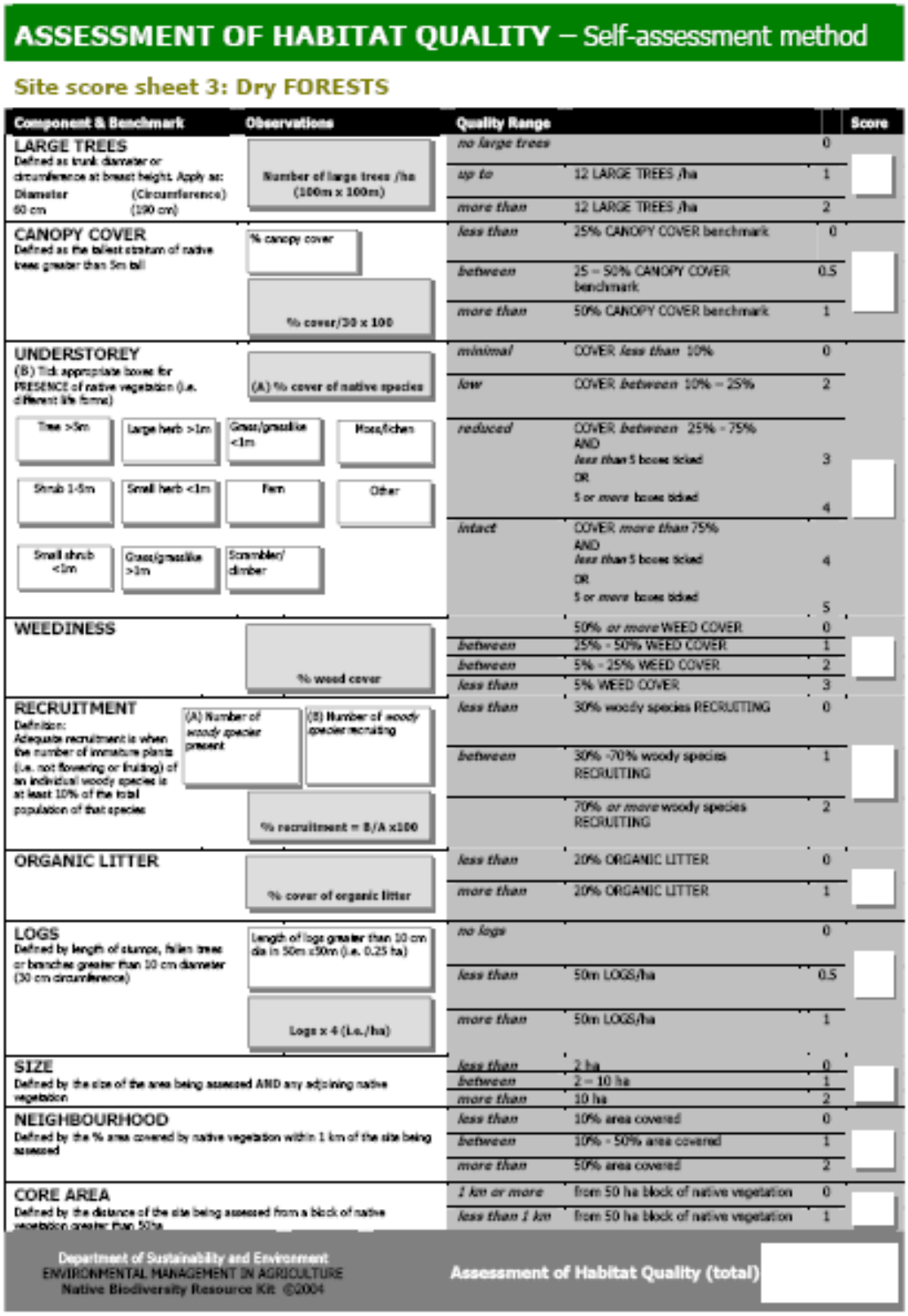
APPENDIX 7 – SITE PRIORITISATION METHOD

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 8 –VEGETATION QUALITY ANALYSIS (VQA) ASSESSMENT FORM

There are several survey forms for vegetation types in the South West Goulburn Landscape Zone (eg. grassy woodlands or forests). The example below is the dry forests sheet. 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.



ASSESSMENT OF HABITAT QUALITY – Self-assessment method

Site score sheet 3: Dry FORESTS

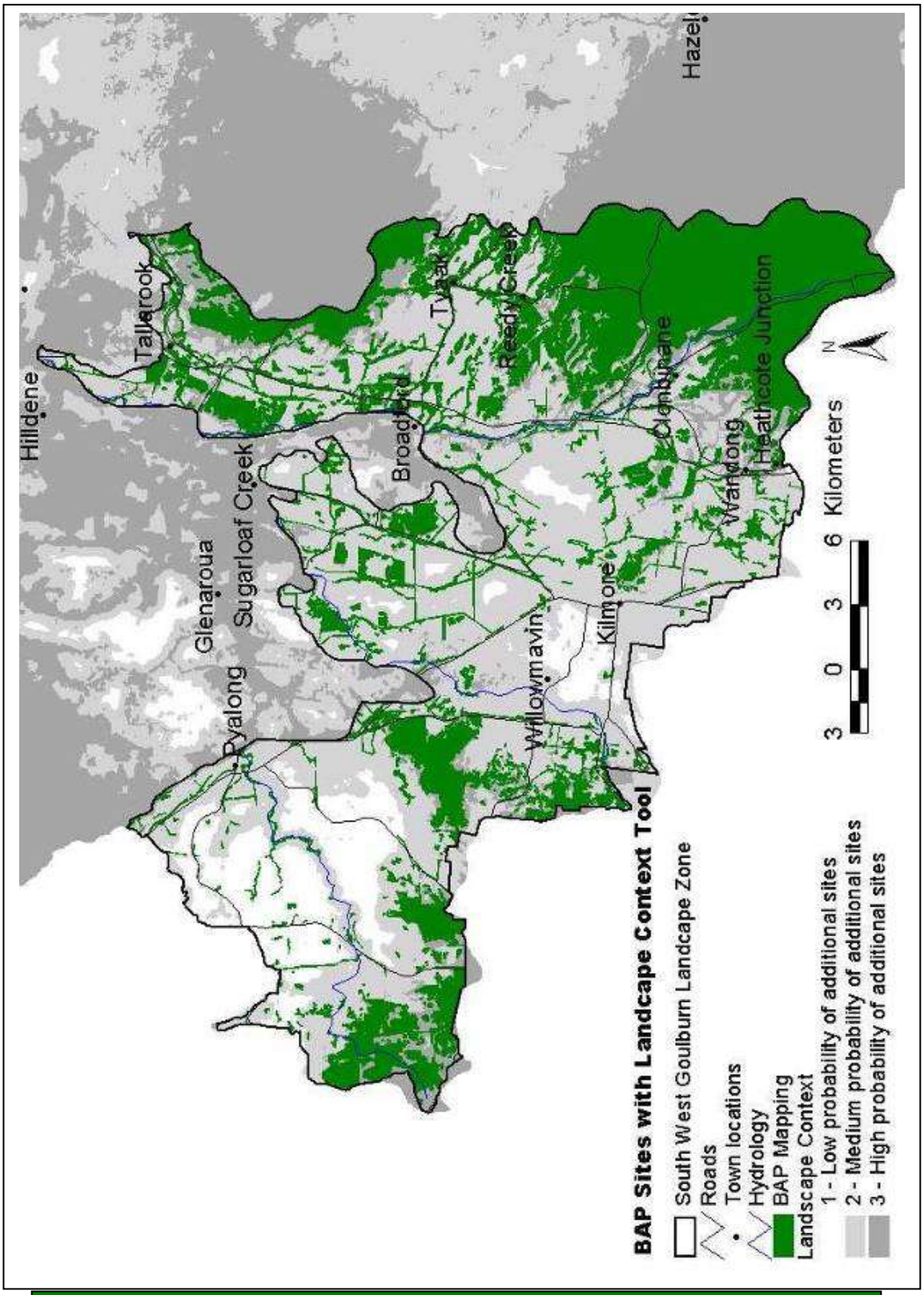
Component & Benchmark	Observations	Quality Range			Score
LARGE TREES Defined as trunk diameter or circumference at breast height. Apply as: Diameter 60 cm (Circumference) (190 cm)	Number of large trees /ha (100m x 100m)	*no large trees*		0	
		up to	12 LARGE TREES /ha	1	
		more than	12 LARGE TREES /ha	2	
CANOPY COVER Defined as the tallest stratum of native trees greater than 5m tall	% canopy cover % cover/30 x 100	*less than*	25% CANOPY COVER benchmark	0	
		between	25 – 50% CANOPY COVER benchmark	0.5	
		more than	50% CANOPY COVER benchmark	1	
UNDERSTOREY (B) Tick appropriate boxes for PRESENCE of native vegetation (i.e. different life forms) Tree >5m; Large herb >1m; Grass/grasslike <1m; Moss/lichen; Shrub 1-5m; Small herb <1m; Fern; Other; Small shrub <1m; Grass/grasslike >1m; Scrambler/ climber	(A) % cover of native species	*minimal*	COVER *less than* 10%	0	
		low	COVER *between* 10% – 25%	2	
		reduced	COVER *between* 25% – 75% AND *less than* 5 boxes ticked OR 5 or *more* boxes ticked	3 4	
		intact	COVER *more than* 75% AND *less than* 5 boxes ticked OR 5 or *more* boxes ticked	4 5	
WEEDINESS	% weed cover		50% *or more* WEED COVER	0	
		between	25% – 50% WEED COVER	1	
		between	5% – 25% WEED COVER	2	
		less than	5% WEED COVER	3	
RECRUITMENT Definition: Adequate recruitment is when the number of immature plants (i.e. not flowering or fruiting) of an individual woody species is at least 10% of the total population of that species	(A) Number of *woody species* present (B) Number of *woody species* recruiting % recruitment = B/A x100	*less than*	30% woody species RECRUITING	0	
		between	30% –70% woody species RECRUITING	1	
			70% *or more* woody species RECRUITING	2	
ORGANIC LITTER	% cover of organic litter	*less than*	20% ORGANIC LITTER	0	
		more than	20% ORGANIC LITTER	1	
LOGS Defined by length of stumps, fallen trees or branches greater than 10 cm diameter (30 cm circumference)	Length of logs greater than 10 cm dia in 50m x50m (i.e. 0.25 ha) Logs x 4 (i.e./ha)	*no logs*		0	
		less than	50m LOGS/ha	0.5	
		more than	50m LOGS/ha	1	
SIZE Defined by the size of the area being assessed AND any adjoining native vegetation		*less than*	2 ha	0	
		between	2 – 10 ha	1	
		more than	10 ha	2	
NEIGHBOURHOOD Defined by the % area covered by native vegetation within 1 km of the site being assessed		*less than*	10% area covered	0	
		between	10% – 50% area covered	1	
		more than	50% area covered	2	
CORE AREA Defined by the distance of the site being assessed from a block of native vegetation greater than 50ha		*1 km or more*	from 50 ha block of native vegetation	0	
		less than 1 km	from 50 ha block of native vegetation	1	

Department of Sustainability and Environment
ENVIRONMENTAL MANAGEMENT IN AGRICULTURE
Native Biodiversity Resource Kit ©2004

Assessment of Habitat Quality (total)

APPENDIX 9 – LANDSCAPE CONTEXT MODEL

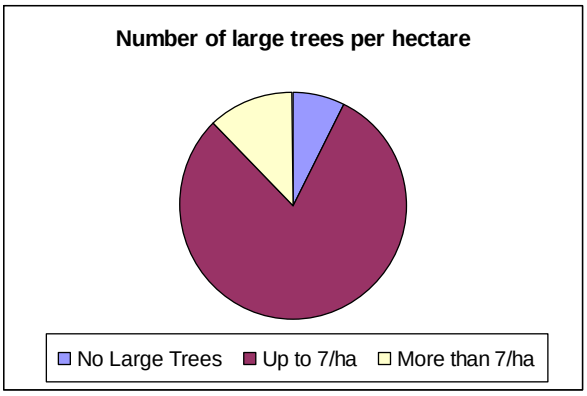
The Landscape Context Model Mapping is now also contained on the BAP CD (Version 1, January 2008)* or on the GBCMA website (www.gbcma.vic.gov.au). This mapping can be used in conjunction with the BAP mapping and this Conservation Plan.

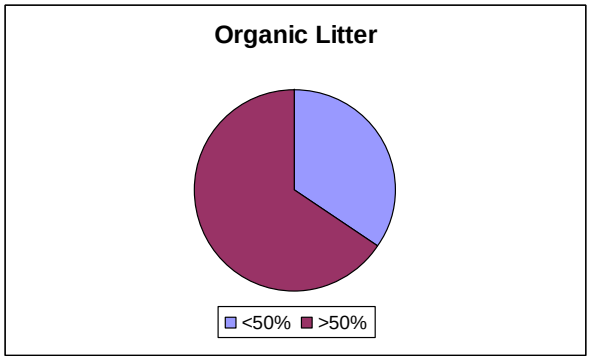


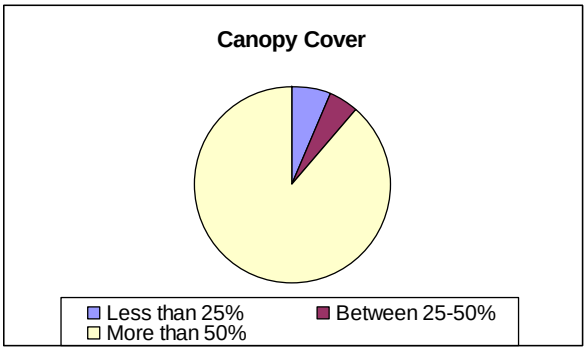
South West Goulburn Broken Landscape Context Model

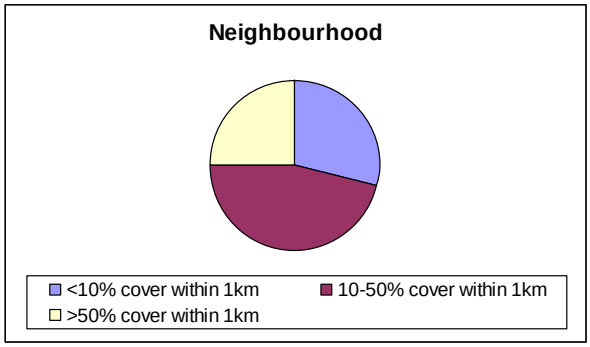
To obtain copies of the BAP CD (Version 1, January 2008), or for further information on BAP, please contact bap@gbcma.vic.gov.au OR the Biodiversity Action Planning Officer, Department of Sustainability and Environment (DSE) Benalla at Ph: (03) 57 611 611

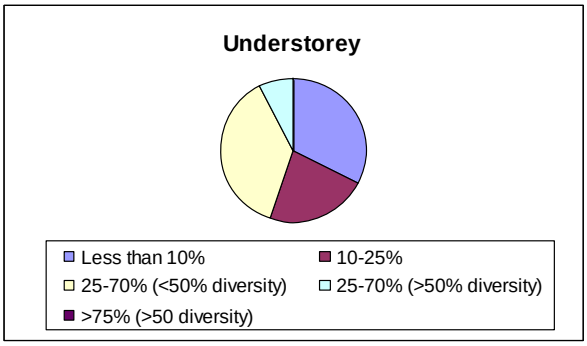
APPENDIX 10 – VEGETATION QUALITY ASSESSMENT RESULTS

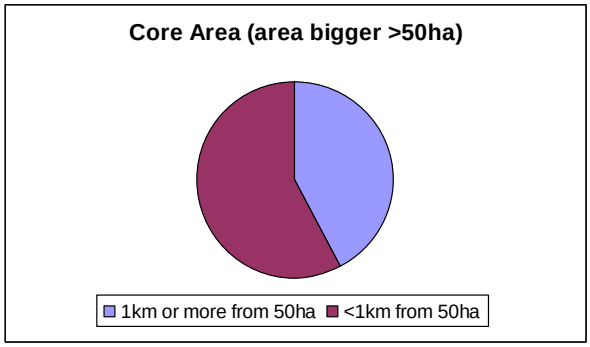


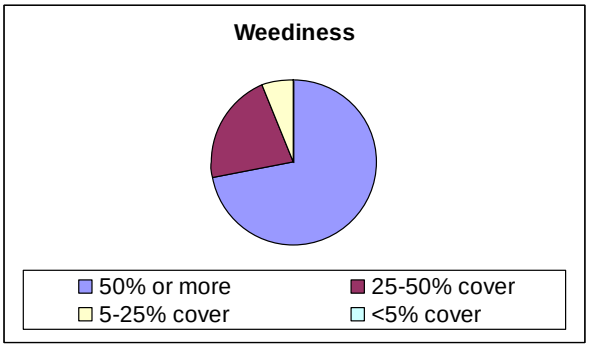


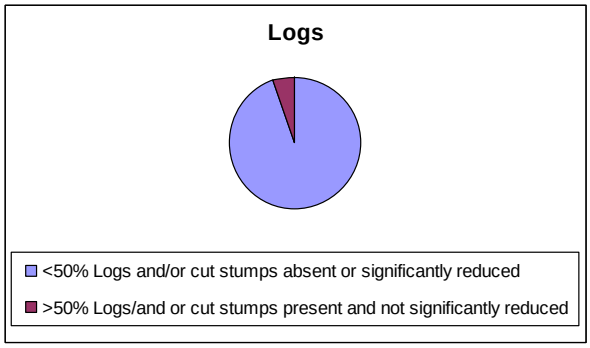


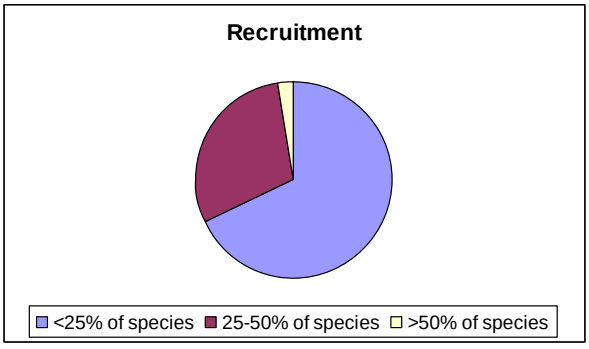


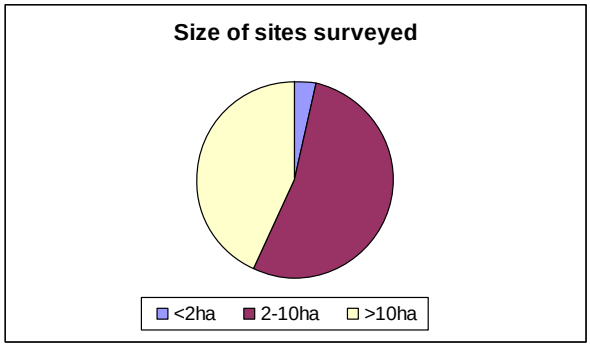












APPENDIX 11 – BIRD LIST

List includes birds surveyed during 100 site (20 minute) surveys. It is not intended to represent the entire bird population in the South West Goulburn Landscape Zone.

English Name	Scientific Name
Australian Raven	*Corvus coronoides*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Black-faced Woodswallow	*Artamus cinereus*
Butcher Bird	*Cracticus nigrogularis*
Brown-headed Honeyeater	*Melithreptus brevirostris*
Brown Thornbill	*Acanthiza pusilla*
Brown Treecreeper	*Climacteris picumnus*
Common Bronzewing	*Phaps chalcoptera*
Common Blackbird	*Turdus merula*
Crested Shrike-tit	*Falcunculus frontatus*
Crested Pigeon	*Ocyphaps lophotes*
Crimson Rosella	*Platycercus elegans*
Eastern Rosella	*Platycercus eximius*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Eastern Yellow Robin	*Eopsaltria australis*
Galah	*Cacatua roseicapilla*
Grey Currawong	*Strepera versicolor*
Grey Fantail	*Rhipidura fuliginosa*
Grey Shrike-thrush	*Colluricincla harmonica*
Golden Whistler	*Pachycephala pectoralis*
Hooded Robin	*Melanodryas cucullata*
Jacky Winter	*Microeca fascinans*
Laughing Kookaburra	*Dacelo novaeguineae*
Long-billed Corella	*Cacatua tenuirostris*
Magpie	*Gymnorhina tibicen*
Magpie Lark	*Grallina cyanoleua*
New Holland Honeyeater	*Phylidonyris novaehollandiae*
Noisy Miner	*Manorina melanocephala*
Pacific Black Duck	*Anas superciliosa*
Pied Currawong	*Strepera graculina*
Red-browed Finch	*Neochmia temporalis*
Red-rumped Parrot	*Psephotus haematonotus*
Red Wattlebird	*Anthochaera carunculata*
Restless Flycather	*Myiagra inquieta*
Rufous Whistler	*Pachycephala rufiventris*
Sacred Kingfisher	*Todiramphus sanctus*
Scarlet Robin	*Petroica phoenicea*
Spotted Pardalote	*Pardalotus punctatus*
Striated Pardalote	*Pardalotus striatus*
Striated Thornbill	*Acanthiza lineata*
Sulphur Crested Cockatoo	*Cacatua galerita*
Superb Fairy Wren	*Malurus cyaneus*
Varied Sittella	*Daphoenositta chrysoptera*
Welcome Swallow	*Hirundo neoxena*
Wedge-tailed Eagle	*Aquila audax*
White-browed Scrubwren	*Sericornis frontalis*
White-eared Honeyeater	*Lichenostomus leucotis*
White-faced Heron	*Egretta novaehollandiae*
White-naped Honeyeater	*Melithreptus lunatus*
White-plumed Honeyeater	*Lichenostomus penicillatus*
White-throated Treecreeper	*Cormobates leucophaeus*
White-winged Chough	*Corcorax melanorhamphos*
Willie Wagtail	*Rhipidura leucophrys*
Wood Duck	*Chenonetta jubata*
Yellow-faced Honeyeater	*Lichenostomus chrysops*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Yellow-tailed Black Cockatoo	*Calyptorhynchus funereus*
Yellow Thornbill	*Acanthiza nana*

APPENDIX 12 – PRIORITY SITE INFORMATION (MAPPING):

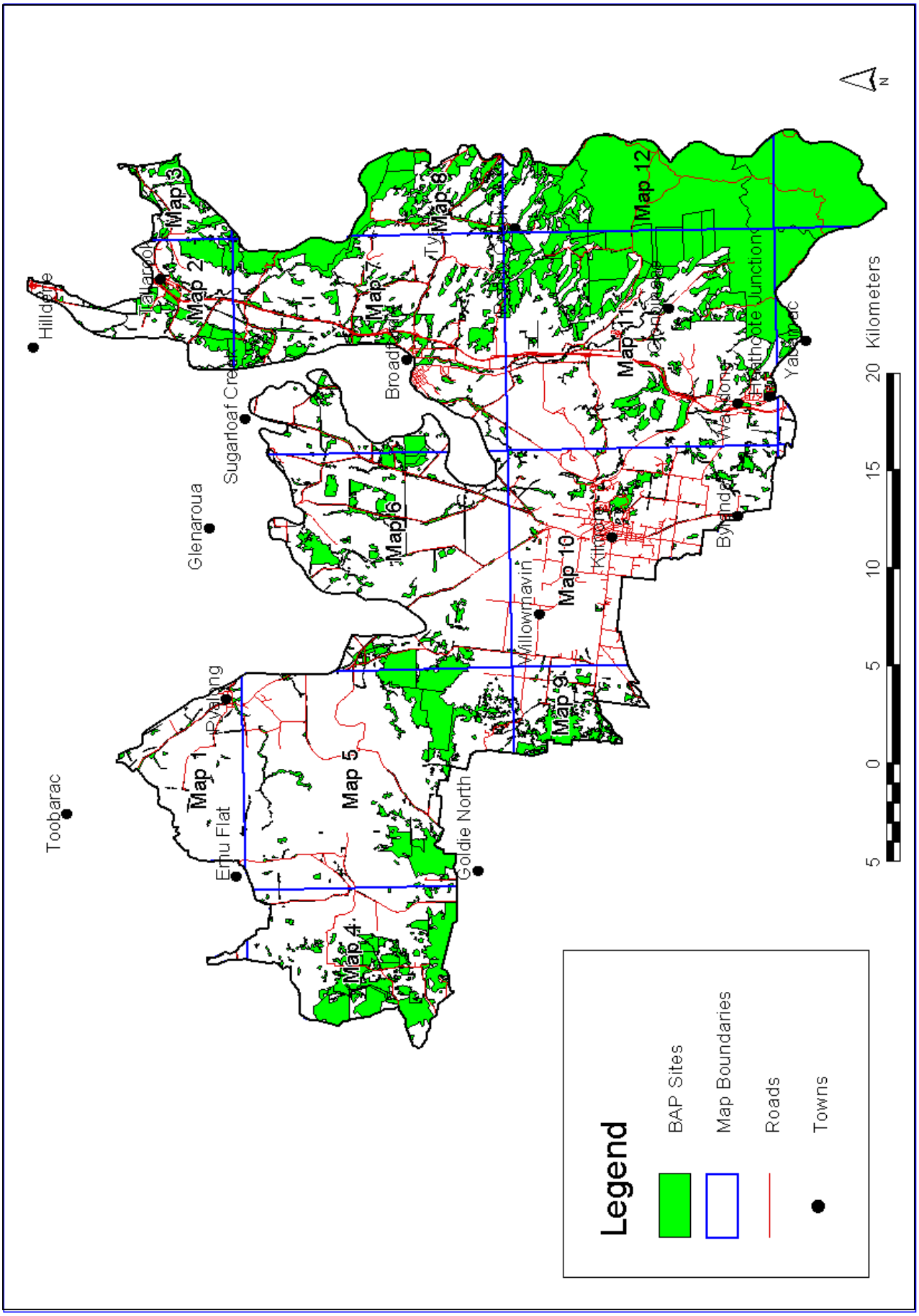
Mapping and accompanying information for each of the 'priority BAP sites' is now contained on the BAP CD (Version 1, January 2008) or on the GBCMA website (www.gbcma.vic.gov.au). This mapping data is designed to be used in conjunction with this Conservation Plan to assist users to obtain further information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



South West Goulburn Landscape Zone Map – Subset maps refer to attached CD for correlating Maps.