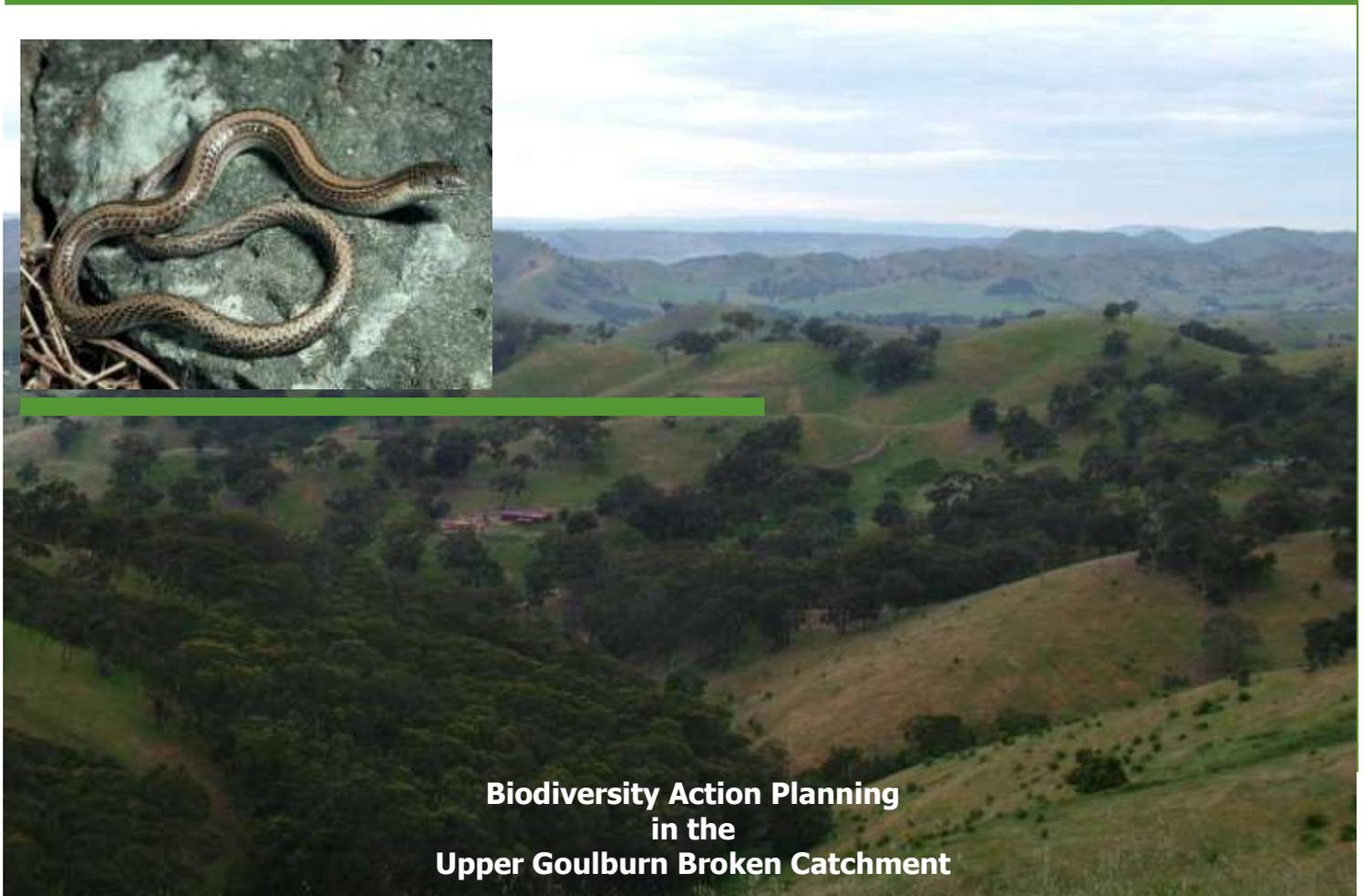


Conservation Plan for the Yea Landscape Zone



**Biodiversity Action Planning
in the
Upper Goulburn Broken Catchment**



Department of Sustainability and Environment
Department of Primary Industries



Developed By:

The Water and Biodiversity Group, 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).

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*Front cover: View towards Strath Creek from Murchison Gap. Photo Bronwyn Merritt
Inset: Striped Legless Lizard (Delma impar). Photo Peter Robertson*

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EXECUTIVE SUMMARY

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

To **translate objectives** from state to regional, catchment and local landscape level, Victoria was first divided on a bioregional basis (Bioregions) and then at a landscape level (landscape zones). The 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 outline biodiversity priorities at the bioregional level. This Yea Landscape Zone Conservation Plan has been developed at the local (landscape) level and is intended to assist government agencies (primarily extension staff) and the community, to work in partnership towards achieving catchment targets, 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 **Yea Goulburn Landscape Zone** is located within the Goulburn Broken Catchment of Victoria. The Zone, which is approximately 175,850 hectares, is within the Victorian Central Uplands and Highlands Northern Fall Bioregions and within the Local Government area of Mitchell and Murrindindi Shires. 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 790 **priority environmental sites** identified within the Yea Landscape Zone. The priority sites have been determined and ranked (low, medium, high or very high) based on factors such as, size, vegetation/habitat 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 Kinglake National Park. In general, many sites within the zone were found to have low understorey and fallen timber, a high component of pest plants and animals and few 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 define the attributes that must be present in a landscape, for these species to persist. Six focal species have been identified in the zone: Brush-tailed Phascogale, Sugar Glider, Long-nosed Bandicoot, Crested Shrike-tit, Sacred Kingfisher and Striped Legless Lizard.

The **Key Biodiversity Assets** approach is a method of grouping biodiversity assets (ie. birds, animals and plants) that use the same type of habitat. Seven Key Biodiversity Assets were identified for the Yea Landscape Zone: Grassy Woodlands, Grassy and Herb-rich Forests, Damp Forests, Riparian Systems, Wetlands and Swampy Riparian Woodland. The grouping of these assets will assist in targeting actions towards the very high value sites first, down to the lowest priority sites.

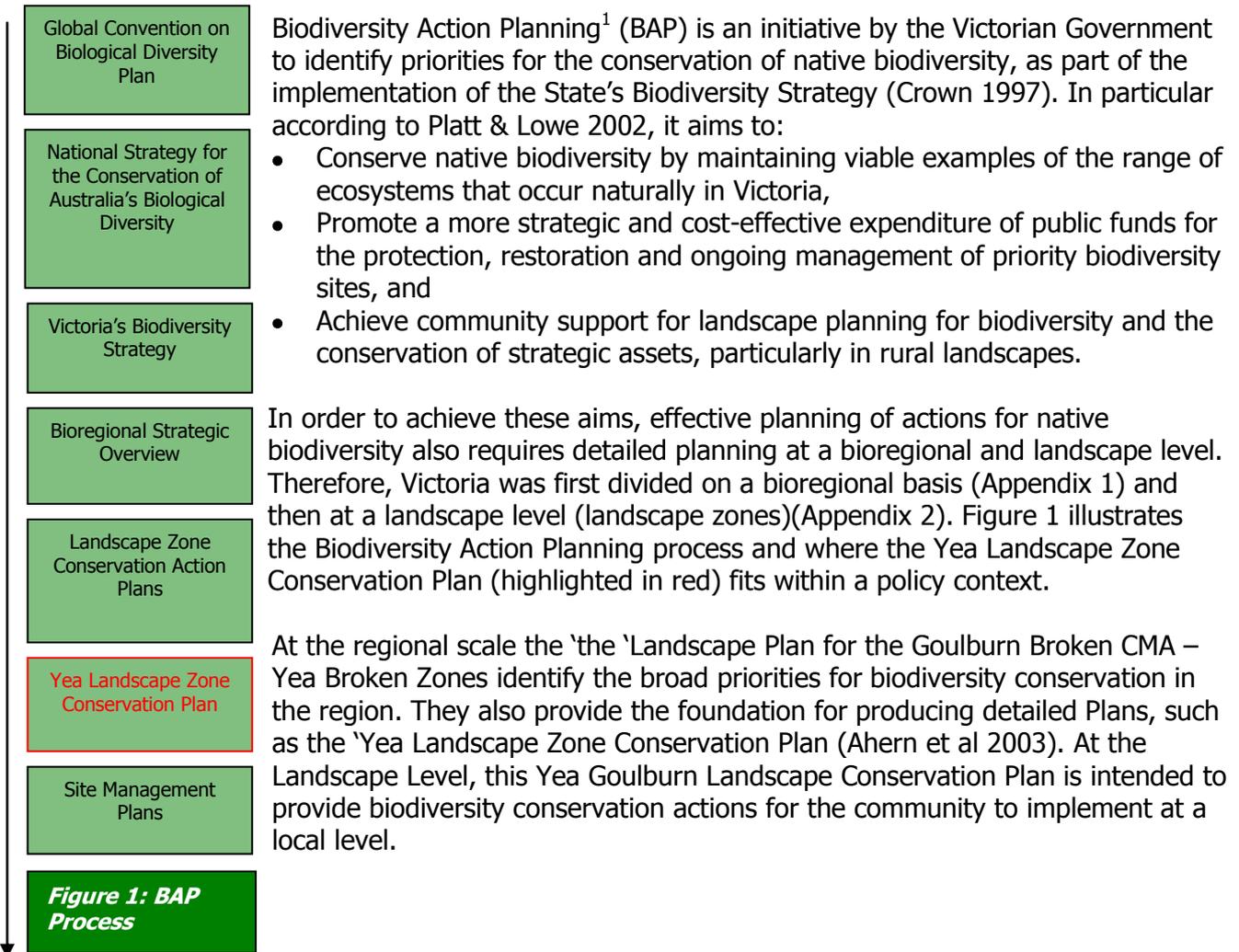
Management actions have been developed for the Yea Landscape Zone, based on the results of desktop analysis and surveying. It is intended that government agencies (primarily extension staff) and the community will work together to implement these actions, for the benefit of biodiversity conservation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

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1.0 BACKGROUND

1.1 INTRODUCTION



1.2 OBJECTIVES

The Yea 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 790 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 Yea Landscape Zone,
- Priority assets to be conserved, and the threats to these biodiversity values,
- Priority actions required to protect and restore the assets, and
- Further monitoring requirements for the zone (GBCMA in Prep).

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

1.3 CONTEXT FOR THE DEVELOPMENT OF THE YEA CONSERVATION PLAN

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

The RCS also identifies targets and priorities for the catchment (refer to Appendix 3 for further detail). 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 Yea 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 (refer to Appendix 4) 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. A communication strategy was also developed in order to guide the communication of this plan and its relating actions. 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.

2.1 LANDSCAPE

The Yea Landscape Zone is located within the Goulburn Broken Catchment of Victoria (Figure 2). The zone falls within the Victorian Central Uplands and Highlands Northern Fall Bioregions and the Local Government areas of Mitchell and Murrindindi Shires. The zone is bounded to the south by the interface between the Highlands – Northern Fall and Highlands-Southern Fall Bioregions in the Kinglake area. The northern boundary of the zone follows that of the Highlands-Northern Fall bioregion parallel to and northwest of the Goulburn River. To the west is the boundary with the South West Goulburn Landscape Zone which follows the Goulburn Broken CMA subcatchment boundary. To the east, the interface with the Lake Eildon Landscape Zone and Buxton Landscape Zone, bisecting the Mt Despair State Forest also follows subcatchment boundaries.

The major waterways running through this zone are the Goulburn River in the north and its tributaries the Yea and Murrindindi Rivers, the King Parrot and Strath Creeks in the south. Yea Landscape Zone is characterised by strongly dissected hilly terrain descending from the Kinglake Plateau in the south to the Goulburn Floodplain in the north. The Goulburn Valley Highway, Melba Highway and Whittlesea Road are the major arterials traversing the zone.

Private land covers approximately 60% of the zone. Much of the private land has been extensively cleared, particularly the fertile Goulburn River floodplain and the Grassy Woodlands. On private land, land degradation and habitat destruction from inappropriate grazing regimes, pasture improvement, clearing and erosion threatens habitat for native species. The remaining vegetation is highly fragmented and usually occurs in small or narrow linear remnants. This results in loss of habitat and an inability for the landscape to function in an ecologically sustainable way. For example, many species may not be able to move across open farmland, impeding gene exchange and increasing the risk that random events such as disease will wipe out sub-populations. Lack of habitat connectivity may mean that there is no sub population replacement at that site. Eventually, this results in decline and then extinction events.

Public land covers a large area (40%) of the zone. The majority of the public land is State Forest and National Park and is situated mainly in the head-water areas in the south of the zone. Smaller areas of public land scattered throughout the zone include water frontage, roadsides, and smaller conservation reserves. Threats to biodiversity on public land include sediment input beyond natural levels, feral animals, environmental and noxious weeds.



*Photo: Southeast view from Clarkes Road.
Yea. Photo credit: Bronwyn Merritt*

2.2 VEGETATION

Ecological Vegetation Classes (EVCs) are a vegetation classification system derived from groupings of vegetation communities based on floristic, structural and ecological functions. Mosaics (combinations of EVCs) are a mapping unit where the individual EVCs could not be separated at the scale of 1:100,000 (Berwick, 2003). Prior to European settlement, 21 EVCs² were known to have been present within the Yea Landscape Zone (Figure 3). Many of these EVCs are considered endangered or vulnerable within the Goulburn Broken Catchment.

Prior to European settlement (pre 1750) vegetation of the Yea Landscape Zone consisted of Floodplain Riparian Woodland and Grassy Woodlands in the lower parts of the landscape grading into Grassy Dry Forest, Herb-rich Foothill Forest and Damp Forest as elevation increases towards the upper end of the catchment. Changes to pre 1750 landscapes in the Yea Zone vary. There have been significant changes to vegetation on the floodplains and lower slopes. Grassy Woodland EVCs have been substantially cleared and or modified. In some cases woodland overstorey has been removed but grassy ecosystems persist while in elsewhere woodland overstorey remains as scattered paddock trees but the native grassland has been totally removed.

Original Floodplain Riparian Woodland is now confined to narrow strips along watercourses. Floodplain Riparian Woodland occurs along the Goulburn and Yea Rivers adjoining Plains Grassy Woodland and Grassy Woodland throughout the Goulburn floodplain. Some major watercourses such as King Parrot Creek and Yea Rivers have segments where almost all riparian vegetation has been removed. Of the riparian vegetation remaining, biodiversity continues to be compromised by weeds and over grazing. The floodplain riparian woodland was dominated by River Red Gum, Swamp Gum *E. ovata*, Silver Wattle and Blackwood. In higher elevation areas Riparian Forest is dominated by Manna Gum *E. viminalis*, Narrow-leaf Peppermint, Hazel Pomaderris *Pomaderris aspera*, Silver Wattle and Blackwood.

Grassy woodland communities occur on parts of the floodplain system and foothills in the north of the zone. They are dominated by Grey Box *Eucalyptus microcarpa*, Yellow Box, Red Stringybark and White Box. Ground cover in these woodlands consisted of grasses, sedges, lilies, orchids and herbs. With wattles providing a mid storey.

Box Ironbark Forests occurs along the north-western boundary of the zone and would have been dominated by Broad-leaf Peppermint, Long-leaf Box, Yellow Box, Red box and Red Ironbark *E. microcarpa*.

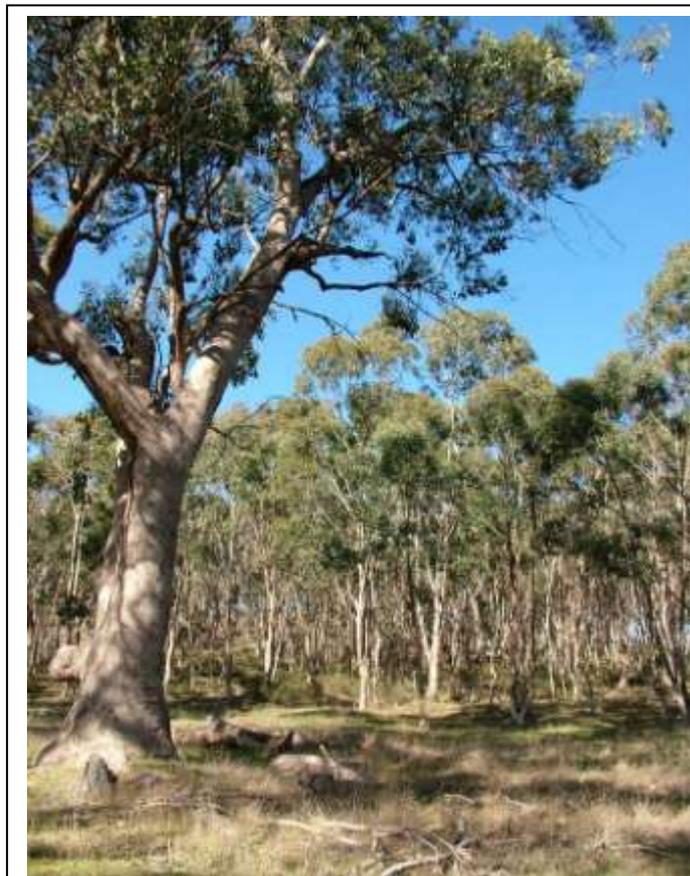
The southern half of the zone is dominated by Herb-rich Foothill Forest interspersed with Grassy Dry Forest on the dry slopes and ridges. Herb-rich Foothill Forests were dominated by Messmate *E. obliqua*, Narrow-leaf Peppermint *E. radiata*, Candlebark *E. rubida* and Silver Wattle *Acacia dealbata* and Blackwood *Acacia mearnsii*. The Grassy Dry Forests were dominated by Red Box Eucalyptus polyanthemos, Yellow Box *E. melliodora*, Red Stringybark *E. macrohyncha*, Long-leaf Box *E. goniocalyx*, White Box *E. albens* and Broad-leaf Peppermint *E. dives* as well as a range of understorey species. Swampy Riparian Complex was common around Glenburn in the south but has been significantly cleared and fragmented.

Damp Forest occurs in the higher and wetter areas of the zone such as in the Kinglake National Park and Black Range State Forest Shrubby Foothill Forest becomes the dominant EVC into the foothills of Kinglake but has essentially been cleared and fragmented.

The current extent of native vegetation in the Yea Zone has dramatically reduced (Figure 3) since European settlement due to clearing. Table 1 identifies the Pre 1750-EVCs in the Yea 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).

² For further information on each EVC, refer to the Department of Sustainability and Environment website at www.dse.vic.gov.au

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 applicable³) EVCs to at least 15% of their pre-European vegetation cover by 2030” (GBCMA 2003). The majority of EVCs within the Yea 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).



*Photo: The Grassy Woodland of Constitution Hill, Yea.
Photo credit: Bronwyn Merritt*

³ Applicable to Ecological Vegetation Classes that are ‘Vulnerable’ and are below 15%

Pre-European vegetation cover

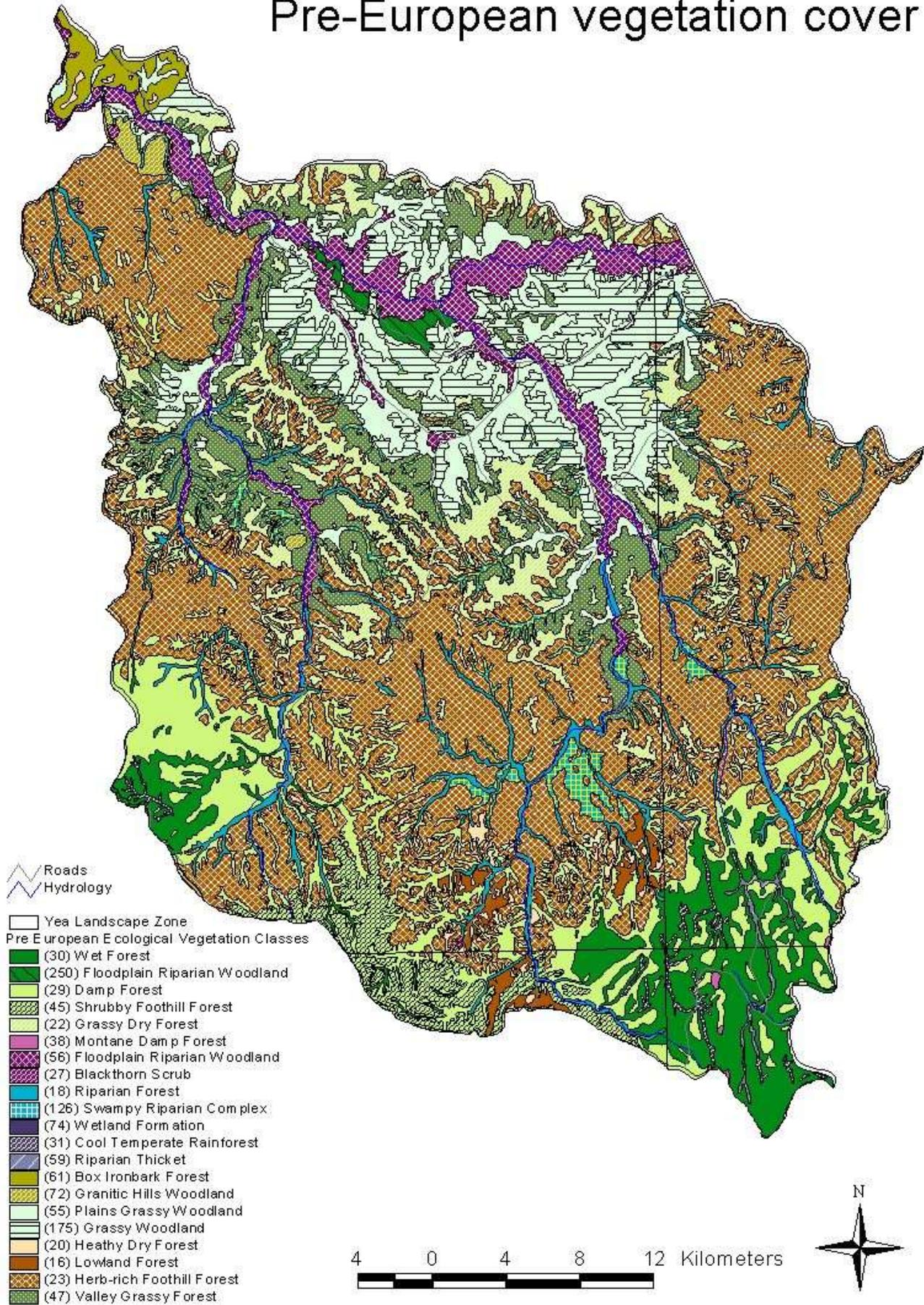


Figure 3: Pre-European Native Vegetation Cover – Yea Landscape Zone

Current extent of native vegetation

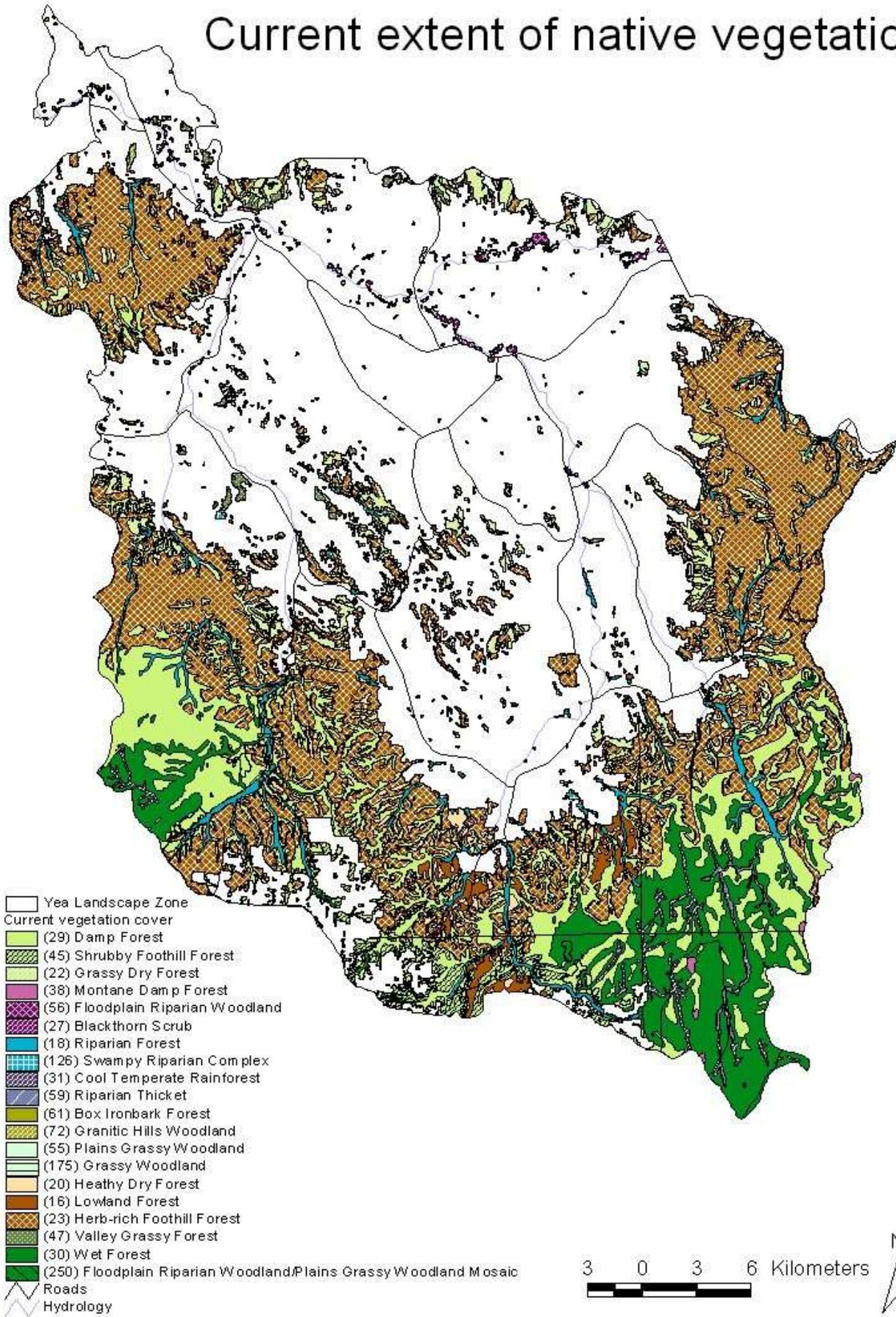


Figure 4: Current Native Vegetation Cover – Yea Landscape Zone

Table 1: Yea Zone Ecological Vegetation Classes (pre-1750 and current)
NB: EVC names have altered since Way et al et al 2003, however area and extent remain the same

EVC Group	EVC Number	EVC Bioregional Cons. Status	EVC Zone Cons. Status	EVC Name	Pre 1750 Area (ha)	Current Area (ha)	% Current Cover	15% pre-1750 Target
3	16	LC*	LC	Lowland Forest	1364	1029	75.4	204.6
4	72	LC*	D	Granitic Hills Woodland	61	28	45.9	9.2
4	72	V^	V	Granitic Hills Woodland	577	65	11.3	86.6
4	61	V^	E	Box Ironbark Forest	1598	32	2.0	239.7
5	175	D*	X	Grassy Woodland	8	0	0.0	1.2
5	175	E^	E	Grassy Woodland	12098	76	0.6	1814.7
6	47	E*	E	Valley Grassy Forest	466	44	9.4	69.9
6	47	V^	E	Valley Grassy Forest	13452	562	4.2	2017.8
6	22	LC*	LC	Grassy Dry Forest	4190	2899	69.2	628.5
6	22	D^	V	Grassy Dry Forest	12154	3063	25.2	1823.1
6	23	LC*	LC	Herb Rich Foothill Forest	53759	35395	65.8	8063.9
6	23	D^	D	Herb-rich Foothill Forest	7461	2505	33.6	1119.2
6	45	LC*	D	Shrubby Dry Forest	3546	1315	37.1	531.9
6	20	LC*	LC	Heathy Dry Forest	976	1121	114.9	146.4
6	20	LC^	X	Heathy Dry Forest	116	<1	0.0	17.4
7	29	LC*	LC	Damp Forest	21106	19142	90.7	3165.9
7	30	LC*	LC	Wet Forest	11174	10774	96.4	1676.1
7	38	LC*	LC	Montane Damp Forest	106	106	100.0	15.9
7	29	LC^	LC	Damp Forest	204	136	66.7	30.6
8	59	V*	LC	Riparian Thicket	518	518	100.0	77.7
8	126	V*	E	Swampy Riparian Complex	1654	82	5.0	248.1
8	126	E^	E	Swampy Riparian Complex	2312	133	5.8	346.8
9	18	LC*	LC	Riparian Forest	4982	3357	67.4	747.3
9	18	V^	V	Riparian Forest	829	149	18.0	124.4
10	31	V*	LC	Cool Temperate Rainforest	756	732	96.8	113.4
14	55	E^	E	Plains Grassy Woodland	11369	102	0.9	1705.4
15	56	E*	D	Floodplain Riparian Woodland	8	3	37.5	1.2
15	56	E^	E	Floodplain Riparian Woodland	8125	721	8.9	1218.8
15	250	E^	E	Floodplain Riparian Woodland/Plains Grassy Woodland Mosaic	704	6	0.9	105.6
19	74	E^	X	Wetland Formation	24	0	0.0	3.6
21	27	R*	D	Blackthorn Shrub	29	10	34.5	4.4
21	27	R^	E	Blackthorn Scrub	34	3	8.8	5.1
Total					175794	84108	47.8	26369.1
99	58	NA	NA	Cleared Severely Disturbed	0	23		
99	987	NA	NA	Plantation (undefined)	0	2096		
99	997	NA	NA	Private Land No Tree Cover	0	89572		
99	999	NA	NA	Unknown/Unclassified	0	34		

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)

Explanation of Terms:

- EVC Bioregional Conservation Status refers to the threatened status of the EVC in the bioregion (eg. Highlands-Northern Fall). 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).
- EVC Number refers to the unique number attributed to that EVC
- * Signifies EVCs from the Highlands Northern Fall Bioregion, ^ signifies EVCs from the Central Victorian Uplands bioregion.

2.3 SIGNIFICANT FLORA AND FAUNA

2.3.1 Flora:



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

Common Wheat-grass (*Elymus scaber*) and Weeping Grass (*Microlaena stipoides*).

A range of native flora is found within Yea Landscape Zone. Some of the most common overstorey species include—Red Stringybark (*Eucalyptus macrorhyncha*), Yellow Box (*Eucalyptus melliodora*), Red Box (*Eucalyptus polyanthemos*), Blue Gum (*Eucalyptus globulus*), Messmate (*Eucalyptus obliqua*) and Narrow-leaf Peppermint (*Eucalyptus radiata*). The range of small trees and shrubs includes species such as, Mountain Beard-heath (*Leucopogon hookeri*), Sweet Bursaria (*Bursaria spinosa*), Pickly Pattot-pea (*Dillwynia juniperina*) and Slender Rice-flower (*Pimelea linifolia*). The zone also contains a range of groundcover plants including Wallaby-grass (*Austrodanthonia spp*), Black anther Flax-lilly (*Dianella revouta*), Kangaroo Grass (*Themeda triandra*),

Eleven species of threatened flora are known from the Yea Landscape Zone. All of these records, except one Golden Dodder record, are found in the State Forests and National Parks. 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*).

Examples of threatened plant species recorded in the Yea Landscape Zone include:

- Golden Dodder (*Cuscuta tasmanica*) (rare in Victoria)
- Creeping Grevillea (*Grevillea repens*) (rare in Victoria and rare in Australia)
- Buxton Gum (*Eucalyptus crenulata*) (Endangered in both Victoria and Australia)
- Tree Geebung (*Persoonia arboea*) (Vulnerable in Victoria)
- Round-leaf Pomderris (*Pomaderris vacciniifolia*) (Vulnerable in Victoria)

2.3.2 Fauna:



Photo: Striped Legless Lizard (*Delma impar*) (Peter Robertson)

The fauna of the Yea 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.

More than 217 bird species have been recorded in the zone, and of these the following 37 are considered threatened at State Level (FFG Act 1988) Examples of some of the threatened birds recorded in Yea Landscape Zone include:

- 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)
- Regent Honeyeater (*Xanthomyza phrygia*) (Endangered in both Victoria and Australia)
- Blue-billed Duck (*Oxyura australis*) (vulnerable in Victoria)
- Great Egret (*Ardea alba*) (vulnerable in Victoria)
- Musk Duck (*Biziura lobata*) (vulnerable in Victoria)

There are 22 other threatened fauna species recorded in the Yea Landscape Zone (refer to Appendix 5 for species, their threatened status and relevant acts) (Ahern et al 2003).

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

- Growling Grass Frog (*Litoria raniformis*) (endangered in Victoria, vulnerable in Australia)
- River Blackfish (*Gadopsis marmoratus*) (threatened in Victoria)
- Mountain Galaxias (*Galaxias olidus*) (Threatened in Victoria)
- Brush-tailed Phascogale (*Phascogale tapoatafa tapoatafa*) (Vulnerable in Victoria)
- Leadbeaters Possum (*Gymnobelideus leadbeateri*) (Endangered in both Victoria and Australia)
- Striped Legless Lizard (*Delma Impar*) (Endangered in Victoria and Vulnerable in Australia)
- Macquarie Perch (*Macquaria australasica*) (endangered in Victoria)



Photo: Leadbeaters Possum (*Gymnobelideus leadbeateri*) (DNRE)

There are, however, large areas of the Yea Landscape Zone that lack any 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.

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 (eg. threatened under State or Commonwealth legislation). This involved desktop analysis of data (eg. literature review; spatial data (eg EVC, trees cover, wetlands, flora and fauna records, 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 (CGDL 2005).

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 the 'Goulburn Broken Biodiversity Action Planning Developer's Manual' (GBCMA *in prep.*). This prioritisation method is shown in Appendix 7. 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 (ie. box ironbark, herb-rich foothill forest, grassy woodlands) (Refer to Appendix 7).

3.3) Threat Identification – Whilst undertaking the Vegetation Quality Assessment, a list of threatening processes (ie. pest plants and animals) on the priority sites, were recorded.

Step 4. Prioritise BAP Sites

The 790 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 6) 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

This step involved the development of a list of actions aimed at protecting and enhancing the biodiversity values in the Zone, by reducing the identified threats for each key biodiversity asset (as determine in Step 6). Available information (eg. Actions for Biodiversity Conservation (ABC) database) (DSE 2005a) and the Yea 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 'BAP' sites, they need to be linked and/or increased in size and total tree cover, to form a viable functioning landscape. The Landscape Context Model (LCM) (Ferwerda 2003) uses a model of "known habitat" (based on mapping for tree cover, wetland, and major watercourses) to identify large remnants, key remnant clusters and the key linkages between them. However, because of potential limitations of the input data, areas of conservation significance (particularly grasslands and sparse woodlands) may not be identified. Similarly, areas with minimal conservation significance may be included, because habitat quality data is not included in the model.

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

4.0 IDENTIFYING PRIORITY SITES



In the Yea Landscape Zone 790 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 Kinglake National Park. 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 (ie. 1-790). 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 790 BAP sites (in map form) is available, in hard copy (general map) and electronic form (CD - specific maps). Information relating to each site (eg. site number, asset type, conservation status, EVC, focal species), a bird list for every site and asset maps is also provided.

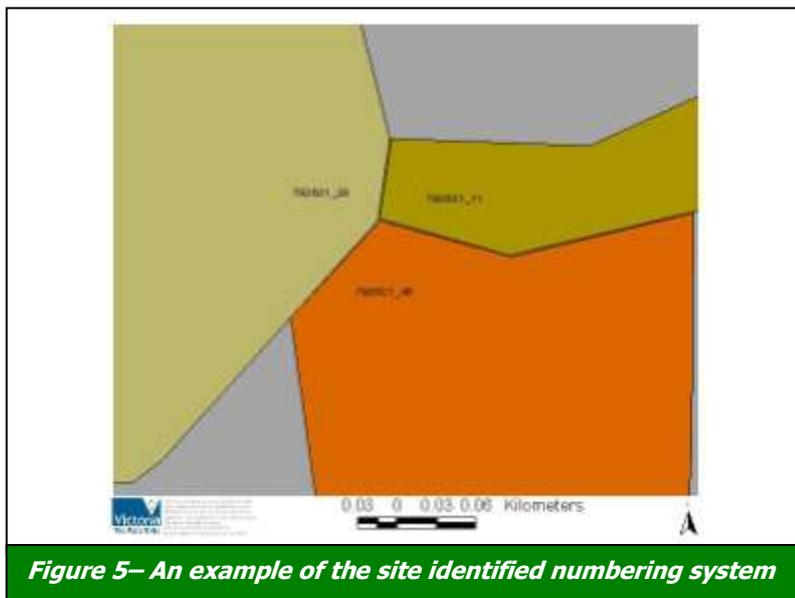


Figure 5– An example of the site identified numbering system

Site Number:	792331-57
Biodiversity Asset	Grassy Woodland (Section 6.0)
Conservation Status	Very High
Management Action	Protect
EVC	175Section 2.2)
EVC status	E (Endangered)
Focal Species	Brush-tailed Phascogale (<i>Phascogale tapoatafa</i>)
Threatened Spp Record?	Yes (Y)
Buffered for Focal Species?	Y (Y)
Vegetation Quality Score	16/20 (Section 5.1)
Management	Private
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 790 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 7. Graphical illustration of the results is also provided in Appendix 9.

The sites in the Yea Landscape Zone scored between 2 and 18 (Appendix 10). The highest scored site was in the Koonoomoo area (north of the zone). The lowest scored site was at the south-western corner of the zone, which is highly modified and fragmented.

The graphical results (Appendix 9) highlight some of the challenges for biodiversity conservation in the Yea Zone. In summary, the assessments identified that,

- Only 10% of sites scored high for large trees (more than 7/ha),
- 77% of the sites scored the highest for canopy cover (more than 50%),
- Only 6% of sites scored adequate for understorey (more than 75%),
- Only 9% of sites scored less than 25% for weed cover,
- Only 64% of sites have adequate regeneration (25% or more of total species population),
- 61% of sites have adequate cover of organic litter (more than 5% total),
- Only 9% of sites have an adequate number of logs (25m/ha),
- Only 15% of sites were surrounded (1km radius) by more than 50% vegetation, and
- 13% of sites were less than 1km from a block of native vegetation greater than 50-hectares.

(Note: Scored in relation to requirements for Ecological Vegetation Class Benchmark. Refer to Appendix 7 for further information on surveying).

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 overall of large trees. These habitat elements should be targeted within the zone.

The VQA scores for each of the sites provide a valuable monitoring system that can be repeated over time. It is also intended that the remaining 962 priority sites will also be assessed over time.

5.2 BIRD SURVEYS

One hundred of the 790 priority BAP sites had bird surveys completed. Fifty-seven bird species were surveyed in the zone (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 Yea Zone.

A list of threatened fauna (including birds) recorded in the zone, is shown in Appendix 5. Further information on threatened birds in the Yea Landscape Zone can also be obtained from the BAP site attribute table (Appendix 11).

5.3 CONSERVATION THREATS

Threats to the conservation values for the Yea Landscape Zone were identified, as:

- Land Clearance – (removal of native vegetation)
- Habitat Fragmentation – (isolation of remnants and species due to land clearance)
- Elevated competition by Noisy Miners
- Changes in hydrology (inappropriate wetting/drying/flow regimes)
- Grazing (by introduced animals)

- Removal of habitat (eg. firewood collection, 'cleaning' up)
- Pest Plants
- Pest Animals (including soil disturbance)
- Adjacent Land Use Practices (eg. irrigation, laser grading)

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 patches 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 species such as Noisy Miners (*Manorina melanocephala*) (Simpson et al 1993). **Elevated competition** from these aggressive species threatens biodiversity in the area, by the exclusion of less aggressive species (eg. Hooded Robin (*Melanodryas cucullata*)) from remnants.

Changes in hydrology (eg. wetting/dry/flow regimes) are a threat for native vegetation, particularly for wetlands, which have evolved to function with the natural cycles of flood and drought. Alteration to natural flow regimes of rivers and streams is listed as a threat to Victorian waterways under the *FFG Act 1988* (Wierzbowski et al 2002). A change in water regimes can dramatically alter wetland and waterway appearance and functioning, disrupt natural productivity cycles and cause changes in vegetation and habitat, which in turn affects fauna that rely on wetlands (ie. for resources and breeding) (Howell 2002).

Grazing by introduced animals affects biodiversity conservation, through, soil compaction; removal of vegetation (ie. regeneration); changed nutrient levels in and around native vegetation; contributes to tree dieback; and results in competition for fodder by native animals and small mammals that require tussocky grass for shelter. 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 (ie. 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). Removal of fallen timber results in a loss of habitat, soil and fauna on which animals rely. Fallen timber provides shelter for regenerating seedlings. It also provides protection from fire and hollows animals such as Striped Legless Lizard, and a wide variety of smaller organisms that provide food for mammals and birds.

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 weeds evident in the zone include Paterson's Curse (*Echium plantagineum*), Horehound (*Marrubium vulgare*), Olives (*Olea europaea*), Peppercorns (*Schinus molle*), Boxthorn (*Lycium ferocissimum*), Bridal Creeper (*Myrsiphyllum asparagoides*), African Love-grass (*Eragrostis curvula*), Willows (*Salix spp*) and Poplars (*Poplar spp*). Weeds are especially evident on roadsides, where edge effects and machinery create disturbance and vehicles spread weed seed throughout the area. Pest plants invading remnants is also a result of adjacent land practices (eg. agricultural weeds).

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). Species such as the Bush-stone Curlew 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. Noisy miner (*Manorina melanocephala*) competition was also evident in the zone. They were often seen chasing other bird species, such as Hooded Robins.



Adjacent land use practices such as cropping, irrigation and plantations, are a threat to remnant vegetation, as 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).

Land Development and subdivision As land becomes subdivided for development, property sizes become smaller leaving less space for native regeneration and increasing the risk of clearing areas of trees and grassland for housing. Increasing the population density can also affect hydrology by increasing the area of hard surfaces and hence the rate of water runoff during high rainfall events, and increasing storage on farms and hence reducing runoff into waterways at other times. However, it should also be noted that small properties can also attract "lifestyle" property owners who may be interested in restoring native vegetation rather than engaging in primary.

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.

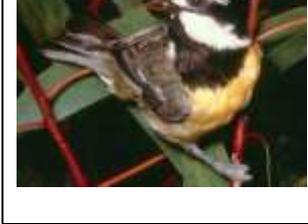
The seven focal species identified in the Yea Zone, and their ecological requirements (thresholds⁴) are identified below (Table 2). A definition of the ecological terms used include:

- 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.

⁴ 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 – Yea Landscape Zone

	Brush-tailed Phascogale (<i>Phascogale tapoatafa</i>) – Threatened	
	Minimum patch size (threshold) Critical distance between patches Dispersal threshold Ecological Vegetation Class Some other requirements (general)	100 ha 10 km 1.4 km (Rhind 2002) Grassy woodlands, Grassy forest BVT, Box Ironbark Mature rough barked Trees; good ground layer; fallen timber and litter
	Sugar Glider (<i>Petaurus breviceps</i>)	
	Minimum patch size (threshold) Critical distance between patches Dispersal threshold Ecological Vegetation Class Some other requirements (general)	6 ha 50 m 600 m (Suckling 1984) Grassy Woodlands, Box-Ironbark Needs tress with hollows; Wattle layer for food
	Long-nosed Bandicoot (<i>Perameles nasuta</i>)	
	Minimum patch size (threshold) Critical distance between patches Dispersal threshold Ecological Vegetation Class Some other requirements (general)	3 ha 400 m Unknown Grassy Forests, Herb-rich Foothill Forests, Riparian Forests Dense ground or shrub cover
	Sacred Kingfisher (<i>Todiramphus sanctus</i>)	
	Minimum patch size Critical distance between patches Dispersal threshold EVC utilised Some other requirements (general)	> 10 ha Migratory Migratory Riparian vegetation Hollow bearing trees
	Crested Shrike-tit (<i>Falcunculus frontatus</i>)	
	Minimum patch size (threshold) Critical distance between patches Dispersal threshold Ecological Vegetation Class Some other requirements (general)	5 ha 1 km 1 km Riparian systems Prefer sites containing mature trees within patches of understorey or saplings
	Striped Legless Lizard (<i>Delma impar</i>) - Endangered	
	Minimum patch size (threshold) Critical distance between patches Dispersal threshold Ecological Vegetation Class Some Other requirements (general)	5 ha ⁵ 50 m ⁶ 200m ⁷ Grassy Woodlands Good ground cover of tussock grasses and surface rocks and logs

Habitat Requirement Source: Variety of Sources in GBCMA in Prep

Photo Credits (NRE 2002f): Brush-tailed Phascogale (Peter Robertson), Sugar Glider (Ian McCann), Long-nosed Bandicoot and Crested Shrike-tit (Ian McCann), Sacred Kingfisher (Wendy Opie), Striped Legless Lizard (Peter Robertson).

⁵ The minimum patch size needed to sustain a sub population is still unknown, however it is believed that 5 ha would provide enough habitat to maintain a genetically diverse sub population

⁶ This distance has not been researched but it is known that Striped Legless Lizard will not cross large areas of open ground without the protection of grass cover

⁷ This distance has not been researched but is thought to be very low

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 (Section 7.0), based on the requirements of each asset (eg. to counter threats and improve the status of the asset). Planning and implementation of on-ground works and actions that specifically target each of these assets, can then be undertaken (GBCMA *in prep.*)

Five key biodiversity assets have been identified for the Yea Landscape Zone. The 790 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.

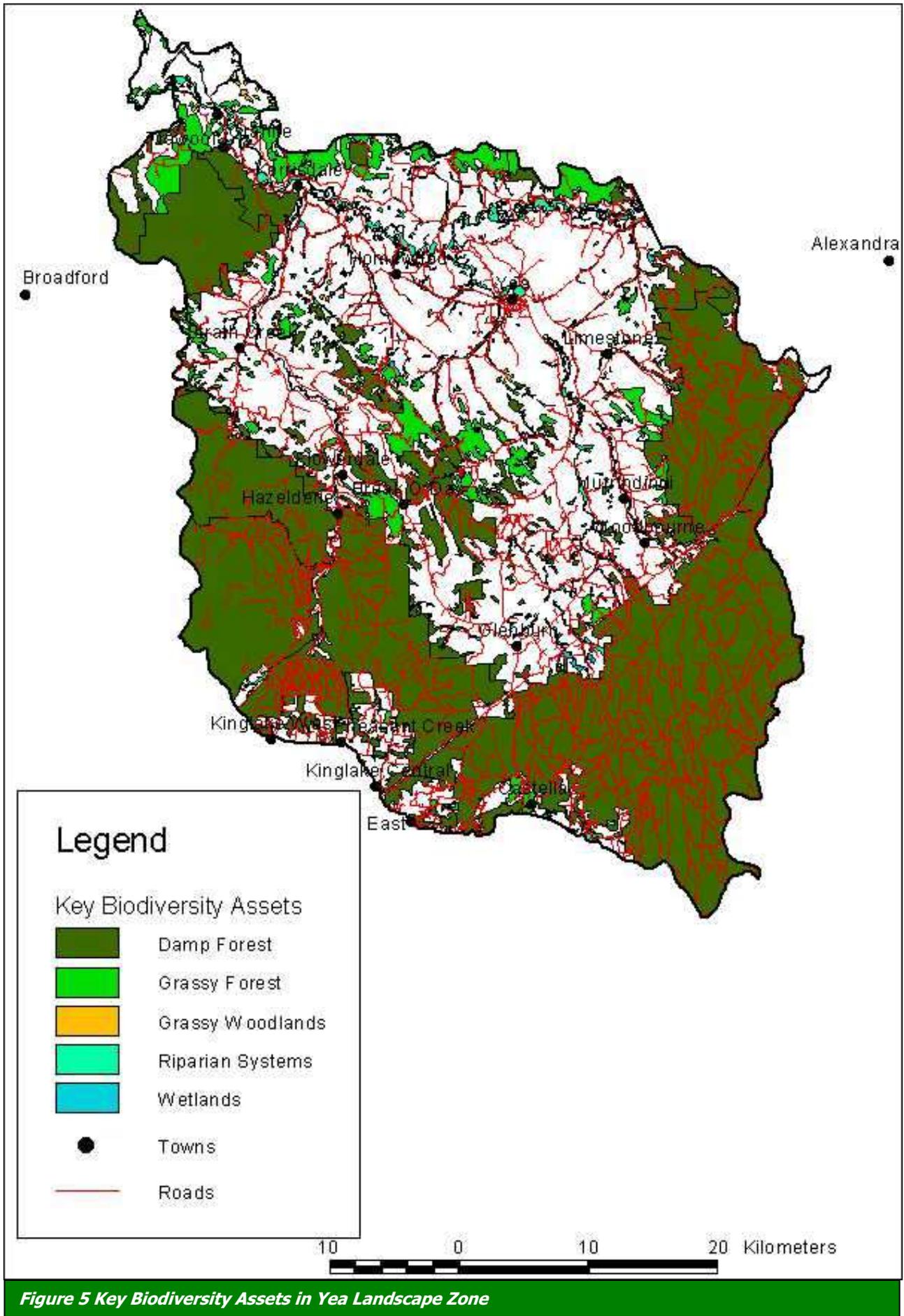


*Photo: The Sooty Owl (Tyto tenebricosa tenebricosa) utilises damp forests.
Photo Len Robinson.*

Table 3: Key Biodiversity Assets – Yea Zone

Key biodiversity values for Yea	Locally significant species
<p>1) Grassy Woodlands Grassy Woodlands once covered 14% of the zone, but have now been almost completely cleared with only 0.8% remaining intact and in reasonable condition.</p>	<p>Fauna: Woodland bird community, Golden Sun Moth, Striped Legless Lizard, Brush-tailed Phascogale Flora: EVCs: Grassy Woodland (175), Plains Grassy Woodland (55) and various mosaics</p>
<p>2) Grassy Dry Forests Group (including Herb-rich Foothill Forest) Historically the most dominant vegetation group in the zone. With Herb-rich Foothill Forests originally covering 35% of the zone, it now accounts for 50% of remaining vegetation cover left. Other EVCs in this group been substantially cleared such as Valley Grassy Forest which only has 4.3% remaining.</p>	<p>Fauna: Brown Quail, Powerful Owl, Regent Honeyeater, Brush-tailed Phascogale, Eastern Horseshoe Bat, Southern Myotis. Flora: Creeping, Buxton Gum, EVCs: Valley Grassy Forest (127), Grassy Dry Forest (22) and mosaics of these with grassy woodland EVCs and Herb-rich Foothill Forest (23).</p>
<p>3) Damp Forests Damp Forests historically covered 12% of the zone. Over 90% of their original cover remains and they are mainly located in Kinglake National Park and the Mt Despair and Toolangi State Forest.</p>	<p>Fauna: Barking Owl, Powerful Owl, Sooty Owl, Spot-tailed Quoll, Leadbeaters Possum, Long Nosed Bandicoot, Common Bent Wing Bat, Broad-toothed Rat. Flora: Forest Sedge, Tree Geebung, Long Pink Bells, Green Scentbark, Water Pocket Moss EVCs listed in Table 2, Group 7</p>
<p>4) Wetlands and Swampy Riparian Woodland Numerous wetlands along the Goulburn Valley Floodplain providing habitat for a range of species and are particularly vulnerable to degradation. Swampy Riparian vegetation plays a vital role in the hydrological cycle, having an important filtering effect. They support a wide range of plant and animal species, including several threatened species.</p>	<p>Fauna: Waterbirds, Growling Grass Frog, Hemiphysalis Damsel, Fly, EVCs listed in Table 1 and 2, Group 8</p>
<p>5) Riparian Systems Riparian systems are highly significant habitat links. They provide habitat for a wide variety of species found within the zone. Most the riparian vegetation has been fragmented or degraded.</p>	<p>Fauna: Waterbirds, Mountain Galaxias, Flat-headed Galaxias, Macquarie Perch, River Blackfish, Spiny Murray Cray, Long Nosed Bandicoot, Flora: Wiry Bossiaea, Forest Sedge, Golden Dodder, Round-leaf Pomaderris EVCs listed in Table 1 and 2, Group 9 and 15</p>

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



7.0 PRIORITY ACTIONS FOR KEY BIODIVERSITY ASSETS



For each of the seven Key Biodiversity Assets (1-5), the following pages identify:

- A) An introduction to the Asset in the Yea Landscape Zone,
- B) Photographic example of the Asset in good condition in the zone, and
- C) The Actions for each of the Assets in the zone (broader actions are also identified for the Yea Landscape Zone in Ahern et al 2003).

Priority actions for the Yea Landscape Zone have been developed and grouped based on each of the 'Key Biodiversity Assets' (Section 6.2). Priority actions for the key biodiversity assets were developed based on the following factors: size/extent, condition and landscape processes (eg. habitat connectivity, appropriate water regimes). The condition section was 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 intended that the community and agencies in the Yea Landscape Zone area, will work together to plan and implement works in relation to the identified actions for the Key Biodiversity Assets. Within each Asset there will be several BAP sites. These BAP sites should be targeted in order of priority (Very High, High, Medium to Low) (Appendix 11). 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). The location of the Assets (maps) and the photographic examples of the condition of the Assets will assist with the planning and implementation of the actions.



Photo: Focal Species the Striped Legless Lizard (Delma impar) - reliant on the Key Biodiversity Asset of Grassy Woodland Group. By Steve Smith.

1) KEY BIODIVERSITY ASSETS – Grassy Woodlands

1A) Introduction – Grassy Woodlands:

Grassy Woodlands comprise two 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.

More than 97% of Grassy Woodlands in the Goulburn Broken Catchment have disappeared since European settlement. Over 81% of what remains is on private land. Many of the plants and animals that rely on this habitat are now also threatened, and some are extinct. Therefore, the support of private landholders is essential for the ongoing conservation of Grassy Woodlands. Grassy woodlands were one of the dominant vegetation types in the zone once covering 14% of the zone. It has since been substantially cleared, with less than 1% remaining, and requires large increases in extent in order to sustain healthy populations of the fauna that rely on it (see Table 3).

High value Grassy Woodlands in the zone include the Goulburn Valley highway, Whittlesea –Yea, Clarkes, Dairy Creek, Tea-tree Creek, Murrindindi, Langs, Native Dog, Ghin Ghin, Larnoo, Switzerland and Creamery Hill Roads. The disused railway reserve, especially around the Cheviot Tunnel area, also has high value grassy woodlands.

The main threats affecting Grassy Woodlands in the zone, are land clearing, inappropriate grazing regimes, firewood removal, and pest plants and animals. The actions identified below are intended to assist in the protection of the remaining Grassy Woodlands within the Yea Landscape Zone. However, these actions are specific to the zone and are by no means comprehensive for the region. Other strategies (eg. Victoria's Native Vegetation Management framework (DNRE 2002), provide a framework for net gain and are overarching strategies for the State and Goulburn Broken Catchment.

1B) Photographic Example – Grassy Woodlands:

Site 792312-85. An example of a Grassy Woodland BAP Site of Good Condition

This grassy woodland site is a linear corridor running along a disused railway line. The site has a relatively intact grassy layer with a regenerating overstorey, there are some large hollow bearing trees. It does lack some shrubby layer and is under threat from weeds such as phalaris. The site could with some revegetation link the Black Range State Forest to Yea River floodplain.



Photo: Grassy Woodlands – A Key Biodiversity Asset – Yea Landscape Zone. Photo Bronwyn Merritt

1C) Actions – Grassy Woodlands:

Size/Extent:

- **Increase the extent of existing remnants**, by establishing new areas of indigenous species of trees and shrubs, and revegetate to establish buffer zones or unimproved, uncultivated pasture around grassy woodland.
- Investigate options to protect and enhance native vegetation communities on the Albury-Melbourne **railway reserve**.
- **Protect and manage** significant roadsides and rail reserves such as Goulburn Valley Highway, Whittlesea –Yea, Clarkes, Dairy Creek, Tea-tree Creek, Murrindindi, Langs, Native Dog, Ghin Ghin, Larnoo, Switzerland, Creamery Hill Roads and the disused railway line.

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.
- **Encourage** Shire/CFA staff (especially roadside maintenance crews as well as construction and other contractors) to be 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, through covenants or incentives
- 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.
- Encourage **protection** (fencing) of all Grassy Woodland 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** (e.g. timed light grazing to remove biomass) to benefit the native vegetation once plants have set seed).
- **Enhance** sites with shrubs and other species if overstorey regeneration has not occurred following fencing (eg. no existing seed source).
- **Identify** additional native grassland paddocks for protection and restoration.
- **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 and fox 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 (ie. hydrological regime, habitat connectivity):

- **Increase connectivity** by linking to other remnants through revegetation.
- **Enhance linkages** between remnant vegetation such as degraded roadsides, rail reserves and waterways.

2) KEY BIODIVERSITY ASSET – Grassy Dry Forests

2A) 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 soil, 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 an 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, lilies, grasses and sedges dominate the ground layer, such as Chocolate Lily, Kidney Weed (*Dichondra repens*), Ivy-leaf Violet (*Viola hederacea*), Slender Tick-trefoil (*Desmodium spp.*), Stinking Pennywort (*Hydrocotyle laxifloa*) and Austral Cranesbill (*Geranium solanderi*).

Herb-rich Foothill forest (EVC 23), is a medium to tall type of open forest which is usually found on easterly and southerly aspects of lower slopes and gullies. It occurs on relatively fertile, moderately well-drained soils and covers a wide range of geological types and in areas of moderate to high rainfall. The overstorey commonly consists of Narrow-leaf Peppermint and Candlebark and Blue Gum 'Eurabbie'. The small tree layer of Silver Wattle occurs over a sparse to dense shrub layer including Prickly Currant-bush, Handsome Flat-pea, Hop Bitter-pea and Pink Bells. The understorey contains a high cover and diversity of herbs and grasses in the ground layer, such as Kidney-weed, Pennywort, Mat-rush, Austral Bear's-ears, Mountain Clematis, Weeping Grass, Common Tussock-grass, Common Hedgehog grass and Common Wheat-grass. Austral Bracken may tend to dominate following frequent disturbance, particularly by fire and grazing (Way *et al.*, 2003).

High quality remnants include Goulburn Valley Highway, Whittlesea-Yea, Tea-tree Creek Roads, and reserves such as Tallarook, Kinglake, Toolangi, Black Range State Forest, Kinglake National Park, Switzerland Nature Reserve

Many species rely on these forests and the ecological services they provide more broadly to the environment. More than 48% of Grassy Dry Forests and 36% of the Herb-rich Foothill Forests in the Goulburn Broken Catchment have disappeared 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% of Grassy Dry Forests and 21% of Herb-rich Foothill Forests remains on private land. The support of private landholders is essential for the ongoing conservation of Grassy Dry Forests.

2B) Photographic Example - Grassy Dry Forests:

Site 792321-46 Example of a Grassy Forest in good condition – Yea Landscape Zone

This is a good example of Grassy Forests in the zone; it has a relatively diverse ground layer dominated by native grasses. There are some large hollow bearing trees present. It is an important and wide roadside reserve, being approximately 100m wide.



Photo: Grassy Forest – A Key Biodiversity Asset -Yea Landscape Zone. Photo Bronwyn Merritt

2C) Actions – Grassy Dry Forests:

Size/Extent:

- **Create buffers**, through revegetation, on freehold land abutting roadside remnants or reserves to widen the habitat.
- **Protect significant roadsides** such as Protect significant roadsides, such as the Goulburn Valley Highway, Whittlesea-Yea, Tea-tree Creek Roads.
- **Protect and increase connectivity** to significant reserves such as Tallarook, Kinglake, Toolangi, Black Range State Forest, Kinglake National Park, Switzerland Nature Reserve.

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 forest.
- **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 Forests (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.
- **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.
- **Ensure** clusters or individual specimens of large, hollow-bearing trees and dead standing trees are retained and protected throughout the zone.
- **Minimise disturbance** at high value sites at high value sites to prevent erosion and minimise weed invasion.

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 (ie. hydrological regime, habitat connectivity):

- **Increase connectivity** to important reserves Tallarook, Kinglake, Toolangi, Black Range State Forest, Kinglake National Park and Switzerland Nature Reserve.
- **Identify and prioritise potential** sites for habitat expansion and improved connectivity as identified by the landscape context tool and maps provided in this document.

3) KEY BIODIVERSITY ASSET – DAMP FORESTS

3A) Introduction – Damp Forests:

Damp Forests (EVC 29) and West Forests (EVC 30) are medium to tall open forest (25m to 30m tall). It 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 (*Davesia latrifolia*). The understorey contains a high cover and diversity of herbs and grasses in the ground layer, such as Kidney-weed (*Dichondra ripens*), Pennywort (*Hyrocotyle 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.

3B) Photographic Example – Damp Forests:

Example of a Damp Forest BAP Site of Good Condition – Yea Landscape Zone

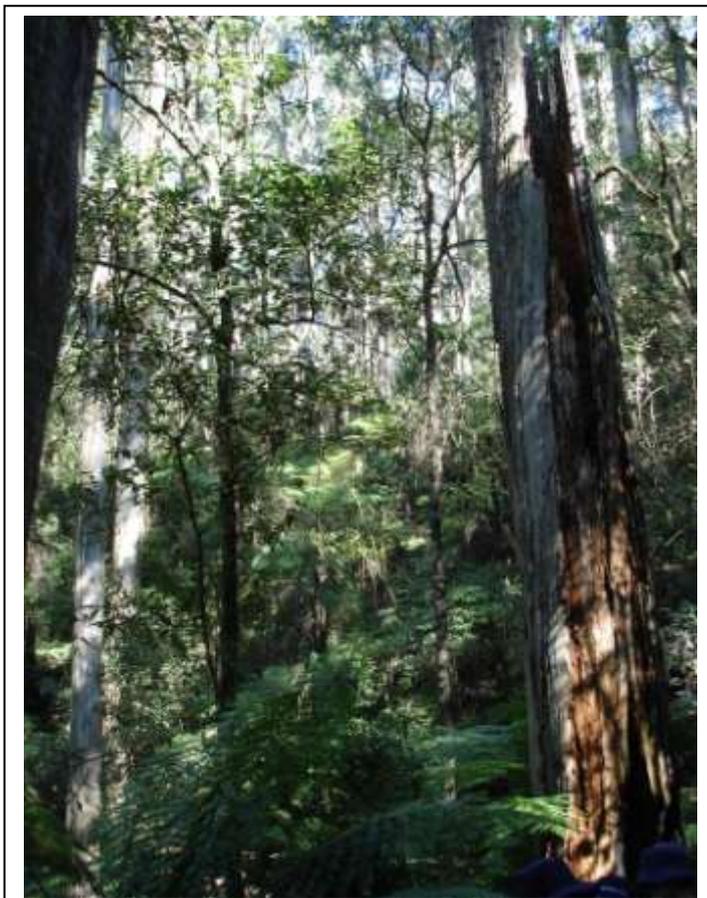


Photo: Damp Forest – A Key Biodiversity Asset - Yea Landscape Zone. Photo Di Miller

3C) 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 Kinglake National Park, Black Range, Toolangi and Murrindindi State Forest for biodiversity, and link through revegetation, to other vegetated sites.

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.
- **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, particularly regionally listed weeds. 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 Phascogale, Sugar Gliders Golden Whistlers) being the highest priority.

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

- Encourage landholders to **maintain and enhance** habitat linkages to large patches such as Kinglake National Park, Black Range, Toolangi and Murrindindi State Forests.

4) KEY BIODIVERSITY ASSET – RIPARIAN SYSTEMS

4A) 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 Yea vary from Floodplain Riparian Woodland to Riparian Forest, and from relatively well drained sites to soaks, swamps and bogs.

Floodplain Riparian Woodland occurs along the northern end of the banks of the Goulburn and Yea Rivers 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 Tussock0-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 (*Comprosmia 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 (reduced and accelerated runoff) and pest plants and animals. The actions identified below are intended to assist with the conservation of Waterways within the Yea 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 Goulburn Broken 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.

4B) Photographic Example – Riparian Systems:

Site 792312-53 Example of a Riparian BAP Site of Good Condition – Yea Landscape Zone

This site runs along the Yea River. It forms an important corridor in the landscape that would inhibit fauna movement between patches. This site has a relatively diverse understorey, although it does not contain many large hollow bearing trees. The understorey is reduced in diversity and cover, but does contain wattles, tree violet and prickly current bush.



*Photo: Waterways – A Key Biodiversity Asset -Yea Landscape Zone.
Photo Bronwyn Merritt*

4C) Actions – Riparian Systems:

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 nodes (ed creekline/roadside intersections).
 - **Encourage** retention of fallen timber on all waterways and adjoining remnants
-
- 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.
 - **Support** with works and incentives the revegetation and stream fencing programs by Landcare Groups (eg. Strath Creek Landcare Group)
-
- Pest Plant and Animals
 - **Continue** the work of Landcare groups (eg. Strath Creek Landcare Group controlling gorse and blackberries along King Parrot 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
 - **Control predators** (e.g. Brown Trout and Redfin) and exclude grazing from riparian zones to benefit Mountain Galaxias

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

- **Investigate** the potential of freehold remnants to complement native remnant vegetation on Public Land Frontage and Streamside Reserves along Yea, Murrindindi and King Parrot Creek.
- **Increase linkages** between Tallarook State Forest and King Parrot Creek.
- **Revegetate and link** King Parrot, Dairy, Boundary and Limestone Creeks to other remnant vegetation.

5) KEY BIODIVERSITY ASSET – Wetlands

5A) Introduction – Wetlands

Wetlands exist in the interface between land and water and play a key role in the maintenance of the hydrological, physical and ecological health of a river. They perform vital functions including water purification, nutrient processing, flood management and maintenance of the watertable. They provide refuge and breeding (nursery areas) for many common and threatened species (e.g. Growling Grass Frog and Hemiphysalis Damsel).

The majority of the wetlands (73%) in the Goulburn Broken Catchment are on private land (Howell 2002). In the Yea zone wetlands occur on the Goulburn, Yea and Murrindindi floodplains. An important wetland in the area is the Yea wetlands. On the edge of the Yea Township these wetlands not only showcase a relatively high quality wetland but also provide an important area for education about the importance of wetlands in the area. The vegetation of wetlands are generally have a woodland overstorey consists predominantly of 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 elevation banks and Common Reed and various rushes and sedges occur on the wetter, lower areas.

In the Yea zone, Swampy Riparian Woodland occurs in poorly drained sections of streams and rivers, especially in the Glenburn area. Annual rainfall is 900-1500mm at elevations of 300-800m. The overstorey (typically Mountain Swamp Gum), has a woodland structure. The understorey consists of a range of large and medium shrub species, including Oven Wattle, Tea-tree, Prickly Tea-tree, Burgan, Blackwood and Prickly Currant Bush. The ground layer is normally dense with sedges and large tussock grasses such as Leafy Flat-sedge, Tall Sedge and ferns like Fishbone Water-fern, Soft Water-fern and Mother Shield-fern.

More than 74% of Swampy Riparian Woodland in the Goulburn Broken Catchment still remain, but the alteration of flooding regimes and grazing have impacted on the quality of these remnants. Many of the plants and animals that rely on this habitat are now threatened. More than 50% of this vegetation remains on private land. The main threats include drainage, poor timing of stock grazing and over grazing, lack of regeneration, pest plants and animals and loss of tree and ground habitat (through timber harvesting and firewood collection).

5B) Photograph of a Wetland:

The wetland pictured below is in good condition on the edges. However, there is a high level of *Azolla* spp. that will affect aquatic flora and fauna. *Azolla* tends to form mats over waterways and wetlands with low flow and elevated nutrient content. This can affect organisms by blocking sunlight and removing oxygen from the water column.



***Photo: The Yea Wetlands – A Key Biodiversity Asset -Yea Landscape Zone.
Photo: Cathy Olive***

6C) Actions – Wetlands and Swampy Riparian Woodland

Size/Extent:

- **Implement a buffer zone** around all identified wetlands (as far out beyond the rim of the basin as possible) to increase the size of wetlands and provide for their protection.

Condition:

Education/Extension:

- **Provide extension** to all landholders with wetlands in the Zone, to assist with recognition of the benefits of wetlands and associated plants and animals on their properties.
- **Provide opportunities for education** of landholders and school children regarding the benefits of wetlands on farms (eg. Yea wetlands site).
- **Encourage landholders** with wetlands to protect (fence/mange stock) them.
- **Encourage the grazing** of wetlands under management, only when dry, to prevent seed set of weeds.
- **Encourage the appropriate use of chemicals** and other water contaminants on farms and within local communities.
- **Encourage** monitoring of wetlands and the adoption of new wetland monitoring sites, in consultation with the 'Waterwatch' Program and the Upper Goulburn Landcare Network.
- **Prevent** further removal of wetlands, through education (and legislation where required).
- **Investigate** the use of 'Index of Wetland Condition Assessments' (DSE 2006) in conjunction with Vegetation Quality Assessments (still required to allow priority comparisons).

On-ground Works:

- **Protect** (via incentives) all identified wetlands in the Zone, commencing with very high value sites.
- **Protect existing or implement vegetative cover** on inflow paths (eg. revegetate Surface Water Schemes) to increase water quality.
- **Support the fencing** of sites to exclude grazing, particularly when wet, or prior to being wet, to allow flowering and seed-set of native plants.
- **Identify a demonstration site** (show casing very high value site) for educational purposes.

Pest Plants and Animals:

- **Control predators** (e.g. Brown Trout and Redfin) and exclude grazing from riparian zones to benefit Mountain Galaxias and River Blackfish.
- **Control weeds** such as blackberry on banks and identify and implement controls on any water weeds in wetlands.

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

- **Form clusters of wetlands** by giving priority to protecting wetlands that are in close proximity to one another, or in close proximity to a high value site.
- **Restore and deliver natural hydrological regimes** to wetlands, for the benefit of flora and fauna, through liaisons with landholders, DSE and Goulburn-Murray Water.

8.0 FURTHER INFORMATION - PRIORITY SITES



Information on the 790 priority BAP sites within the Yea 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 (ie. 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 (ie. 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 (ie. Very high, high, medium or low)?
- What is the overarching management recommendation for the site (ie. protect or restore)?
- What are the actions recommended for the site (ie. 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 (ie. fencing incentive)?
- What are the options for joining the site to public land (ie. widening roadsides to provide a corridor/link)?
- Using the Landscape Context Map (Appendix 8), determine where possible linkages (revegetation) may be of the most benefit – think about the landscape, what we could do to help the area.
- It is also important to remember that sites with scattered trees are still a vital link in the landscape and especially in an area where much of the original vegetation has given way to agriculture. Officers need to determine on site, where the best possible linkages could occur, and often this should include scattered vegetation, as although they generally have not been identified as a site in this plan, they form an important element for providing links between the identified sites.

Keeping The Data Current:

The data contained in this report is by no means 'comprehensive', as this process relies on the regular updating of information, to keep it accurate and timely. Therefore this plan is adaptive, to enable management actions and information to be modified in response to further information, including monitoring 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 ASSISTANCE AVAILABLE FOR LANDHOLDERS



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 Upper Goulburn Landcare Network, for further information on biodiversity conservation. There are extension officers within these organisations who can provide advice on a range of aspects such as; whole farm planning, irrigation design, groundwater management, revegetation and protection of remnant vegetation, threatened species protection and best management practices.

Incentives for On-Ground Works:

There is a range of incentives available for landholders within the 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,
- Whole Farm Planning, to assist with the development of Whole Farm Plans,
For the above two 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:

- Upper Goulburn Landcare Network – offers Landcare related advice.
- 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 Murrindindi) – managing authority for native vegetation statutory planning requirements. – 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 Yea 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 (Robinson undated).

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 – Yea 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
Wetlands	Refer to "All Key Biodiversity Sites" below	See below
Riparian Systems	<p>Trends in environmental flows and in-stream habitat condition (as measured by ISC)</p> <p>Trends in water quality – Waterwatch program run through Goulburn Valley Water Authority and Local Landcare Groups.</p> <p>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)</p> <p>Surveying of mean habitat width of waterways in Zone</p> <p>Overlay of on-ground works areas against this plans mapping data</p>	<p>Five yearly* ISC assessments</p> <p>Once yearly as part of EPA monitoring: five yearly as part of ISC: at least 30 sites (GBCMA 2004b)</p> <p>Every 5 years, 30 sites: part of ISC; CAMS inputs</p> <p>Every 5 years, all sites (or in accordance with existing waterways monitoring), aerial photography</p> <p>Once yearly, all sites</p>
All Key Biodiversity sites	<p>Trends in vegetation condition (resurvey the 100 sites using VQA assessments) (this includes threats data)</p> <p>Trends in bird survey data (resurvey the 100 sites using bird survey method)</p>	<p>Every 5 years - 30 sites</p> <p>Every 5 years – 30 sites</p>

Vegetation Quality Assessments, bird surveys and photographic point surveys at the remaining unsurveyed BAP 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)

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)

Monitoring of threatened species, against current records

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, to allow monitoring of these sites (as outlined above)

Once yearly, all new information; all sites

Initial survey throughout zone to establish baseline data on population size and structure, subsequent two-yearly as part of bioregional program: across the zone

Every 2 years: across the zone

Within next 5 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

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

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- 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 Programme, 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)
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Biodiversity Action Planning Contributors:

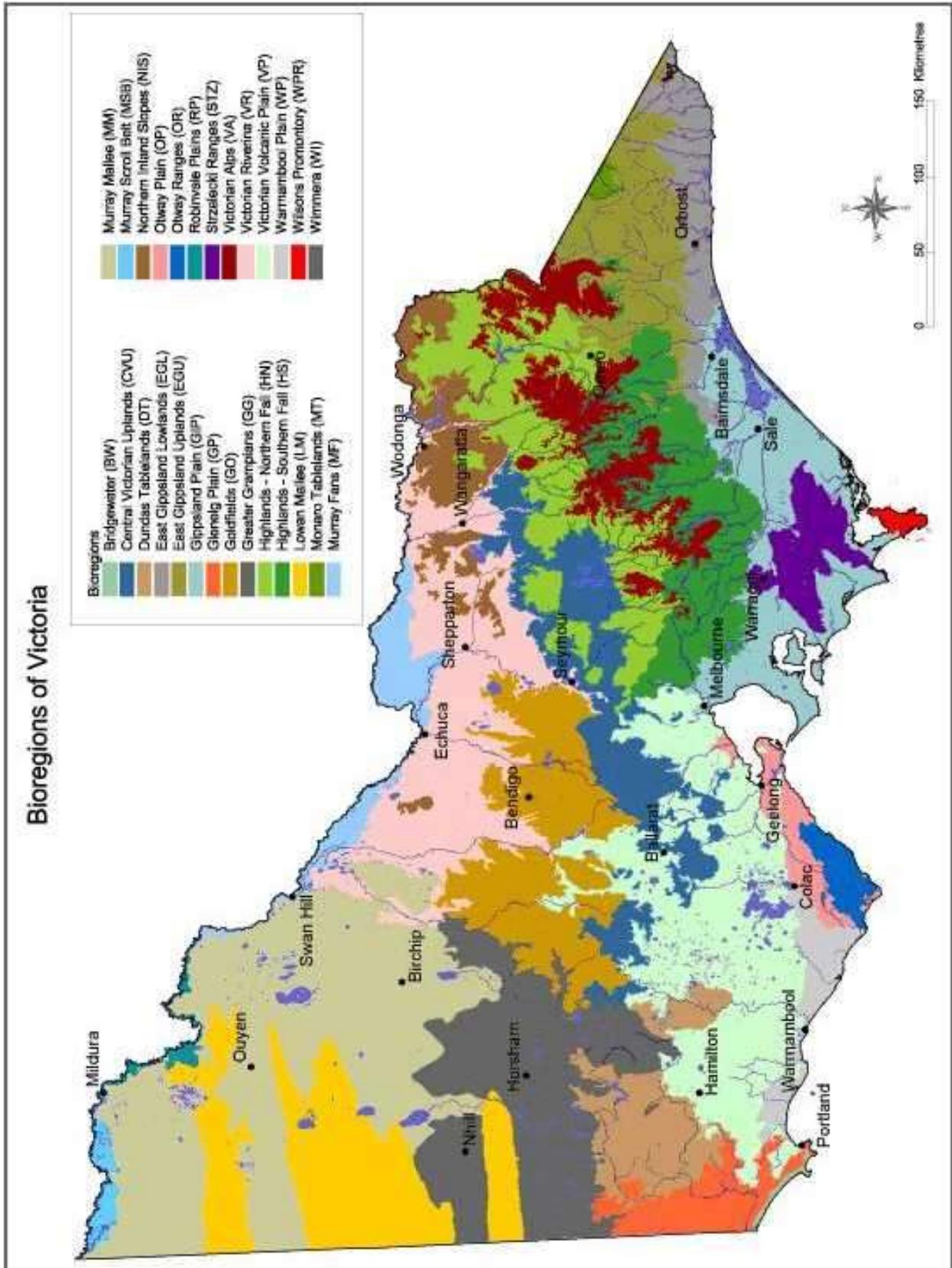
- Mitchell, Peter – Links Officer, DPI (trial implementation)
- Olive, Cathy – Links Officer, DPI (trial implementation)
- Weber, Rolf – (as) Acting Biodiversity Team Leader, DSE
- Berwick, Sue – (as) Flora and Fauna Planner, DSE (past)
- Mentiplay-Smith, Janice - Links Officer, DPI (current)
- Howell,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

13.0 APPENDICES



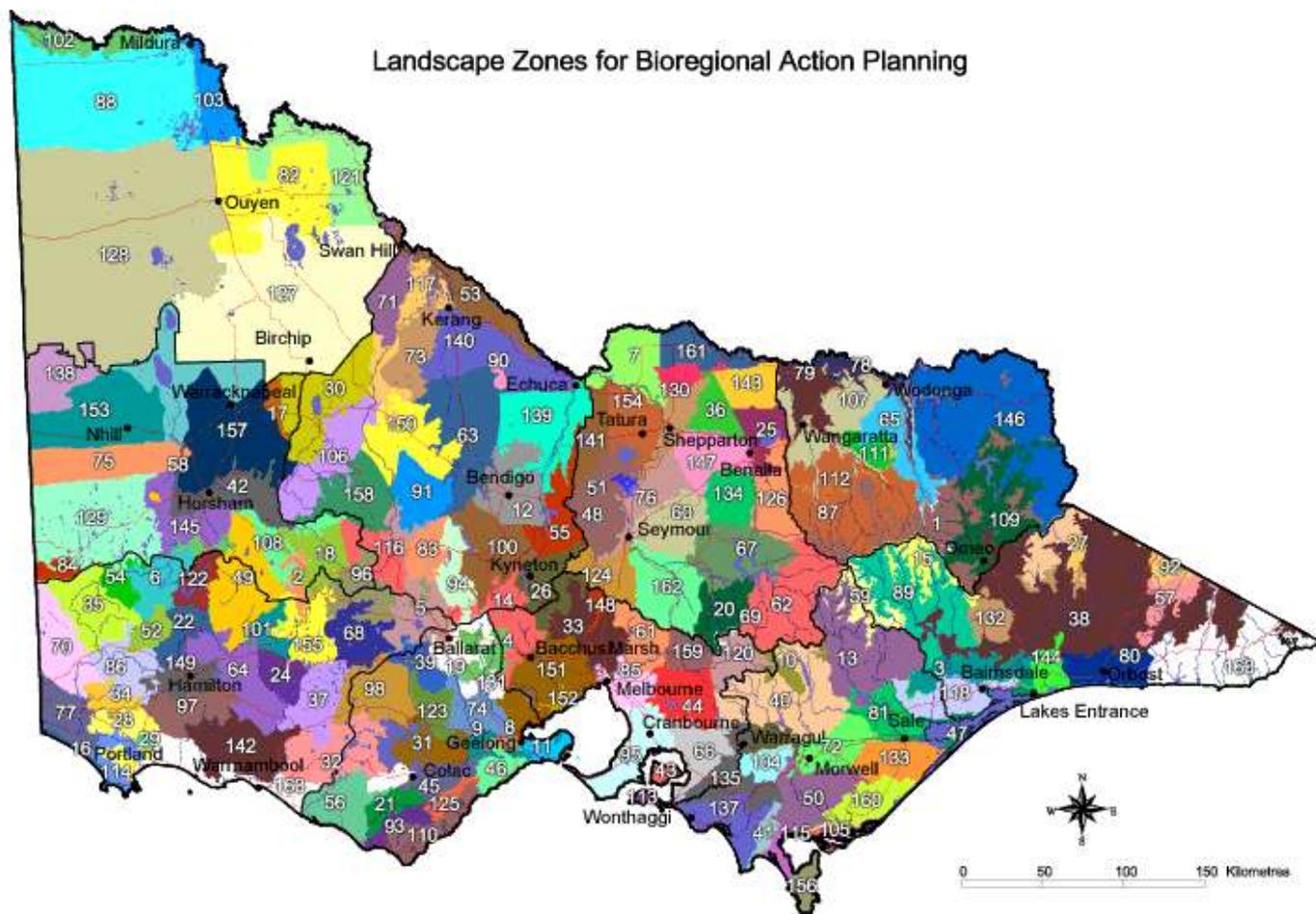
APPENDIX 1 – VICTORIAN BIOREGIONS

Source: www.dse.vic.gov.au



APPENDIX 2 – VICTORIAN LANDSCAPE ZONES

Source: www.dse.vic.gov.au



1. Alpine	34. Crawford River	67. Lake Eildon	100. Muckelford	133. Stradbroke
2. Ararat Hills	35. Dergholm	68. Lake Goldsmith	101. Muirhead	134. Strathbogie
3. Balmiscale foothills	36. Dookie	69. Lake Mountain	102. Murray Scroll Belt	135. Strzelecki West
4. Ballan	37. Dundonnell	70. Lake Mundi	103. Nangiloc - Colgan	136. Tanjil
5. Ballarat	38. East Gippsland Uplands	71. Lalbert	104. Narracan	137. Tarwin/Powlett
6. Balmoral	39. Enfield	72. Latrobe	105. Nooramunga	138. Telopea Downs
7. Barmah Murray Fan	40. Erica	73. Leaghur	106. North Central	139. Tennyson
8. Barrabool	41. Fish Creek	74. Leigh	107. North East	140. Terrick
9. Barwon	42. Flat Grey Plains	75. Little Desert	108. Northern Footholes	141. Timmering Dryland
10. Baw Baw	43. French Island	76. Longwood	109. Omsco	142. Tower Hill
11. Bellarine	44. Gembrook	77. Lower Glenelg	110. Otway	143. Tungamah
12. Bendigo	45. Gerangamete	78. Lower Kiewa	111. Ovens	144. Tyres
13. Black Range	46. Gherang	79. Lower Ovens	112. Ovens & King	145. Undulating Alluvial
14. Blackwood	47. Gippsland Lakes	80. Lower Snowy	113. Phillip Island	146. Upper Murray Milla
15. Bogong	48. Goldfields	81. Macallister	114. Portland	147. Violet Town
16. Bridgewater	49. Grampians	82. Manangatang	115. Prom Plain	148. Wallan
17. Brim Lawler	50. Grand Ridge	83. Maryborough	116. Pyrenees	149. Wannon
18. Bulgara	51. Graytown	84. Meurook	117. Quambatook	150. Wedderburn
19. Buninyong	52. Gringalgon	85. Melbourne	118. Red Gum Plain	151. Werribee
20. Buxton	53. Gunbower	86. Merino	119. Reedy Lake	152. Werribee South
21. Carisale	54. Harrow	87. Mid King	120. Reefton	153. West Wimmera Plain
22. Cavendish	55. Heathcote	88. Millewa - Carwarp	121. Robinvale - Nyah	154. Western Goulburn
23. Central Creek	56. Heytesbury	89. Mitchell	122. Rocklands	155. Willaura
24. Chatsworth	57. Highlands - Far East	90. Miliamo	123. Rokewood	156. Wilsons Promontory
25. Chesney	58. Hindmarsh	91. Moliagul	124. SW Goulburn	157. Wimmera Plains
26. Cobaw	59. Howitt	92. Monaro Tableland	125. Sabine	158. Wingalick
27. Cobblers	60. Hughes Creek	93. Moornoorong	126. Samaria/Lake Nillahcootie	159. Yarra
28. Cobboboonee	61. Hurstbridge	94. Moorookyle	127. South East Mallee	160. Yarram
29. Codrington	62. Jamieson/Bula	95. Mornington	128. South West Mallee	161. Yarrswonga Murray Fan
30. Corack	63. Jankin	96. Mount Cole	129. South West Wimmera	162. Yea
31. Corangamite East	64. Karabeal	97. Mount Eccles	130. Southern Goulburn	163. unnamed
32. Corangamite West	65. Kiewa	98. Mount Elephant	131. Steiglitz	
33. Craigieburn	66. Koo Wee Rup	99. Mt Talbot	132. Stirling	

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 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).

APPENDIX 4 – THREATENED FLORA

List of threatened flora and their conservation status in the Yea Landscape Zone (Flora Information System 2005).

Scientific Name	English Name	Australian Status	Victorian Status	FFG Code	Species Code
<i>Bossiaea cordigera</i>	Wiry Bossiaea		r		435
<i>Calyptrochaeta brownii</i>	Brown's Mitre-moss		r		6252
<i>Carex alsophila</i>	Forest Sedge		r		622
<i>Corymbia maculata</i>	Spotted Gum		v		1295
<i>Dicranoloma platycaulon</i>	Fork Moss		r		6754
<i>Eucalyptus crenulata</i>	Buxton Gum	E	e	L	1265
<i>Eucalyptus fulgens</i>	Green Scentbark		r		5175
<i>Fissidens strictus</i>	Water Pocket-moss		r		6282
<i>Grevillea repens</i>	Creeping Grevillea		r		1549
<i>Metzgeria fauriana</i>	Fringed Veilwort		k		6473
<i>Olearia speciosa</i>	Netted Daisy-bush		k		2326
<i>Pellaea calidirupium</i>	Inland Sickle-fern		k		4902
<i>Pellaea nana</i>	Dwarf Sickle-fern		r		4812
<i>Persoonia arborea</i>	Tree Geebung		v		2459
<i>Pomaderris vacciniifolia</i>	Round-leaf Pomaderris		v		2675

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

APPENDIX 5 – THREATENED FAUNA

List of threatened fauna and their conservation status in the Yea Landscape Zone (Victorian Fauna Database 2005).

<i>Scientific Name</i>	English Name	International Status	Australian Status	Victorian Status	FFG Code	Code
<i>Accipiter novaehollandiae</i>	Grey Goshawk			v		220
<i>Alcedo azurea</i>	Azure Kingfisher			n		319
<i>Anas rhynchotis</i>	Australasian Shoveler	C, J		v		212
<i>Archaeophylax canarus</i>	Caddisfly (5008)			r	L	5008
<i>Ardea alba</i>	Great Egret	C, J		v	L	187
<i>Aythya australis</i>	Hardhead			v		215
<i>Biziura lobata</i>	Musk Duck			v		217
<i>Chthonicola sagittata</i>	Speckled Warbler			v	L	504
<i>Cinclosoma punctatum</i>	Spotted Quail-thrush			n		436
<i>Climacteris picumnus</i>	Brown Treecreeper			n		555
<i>Coturnix ypsilophora</i>	Brown Quail			n		10
<i>Dasyurus maculatus</i>	Spot-tailed Quoll		V	e	L	1008
<i>Delma impar</i>	Striped Legless Lizard		V	e	L	2159
<i>Egretta garzetta</i>	Little Egret			e	L	185
<i>Euastacus armatus</i>	Murray Spiny Cray			d	L	5041
<i>Falco subniger</i>	Black Falcon			v		238
<i>Galaxias fuscus</i>	Barred Galaxias		E	c	L	4034
<i>Galaxias rostratus</i>	Flat-headed Galaxias			d		4037
<i>Gallinago hardwickii</i>	Latham's Snipe			n		168
<i>Gymnobelideus leadbeateri</i>	Leadbeater's Possum		E	e	L	1141
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle			v	L	226
<i>Hemiphysalia mirabilis</i>	Damselfly			v	L	5002
<i>Litoria raniformis</i>	Growling Grass Frog		V	e	L	3207
<i>Lophoictinia isura</i>	Square-tailed Kite			v	L	230
<i>Macquaria australasica</i>	Macquarie Perch		E	e	L	4096
<i>Mastacomys fuscus</i>	Broad-toothed Rat			n		1438
<i>Myotis macropus</i>	Southern Myotis			n		1357
<i>Neophema pulchella</i>	Turquoise Parrot			n	L	302
<i>Ninox connivens</i>	Barking Owl			e	L	246
<i>Ninox strenua</i>	Powerful Owl			v	L	248
<i>Nycticorax caledonicus</i>	Nankeen Night Heron			n		192
<i>Oxyura australis</i>	Blue-billed Duck			e	L	216
<i>Oxyura australis</i>	Blue-billed Duck			e	L	216
<i>Petaurus norfolcensis</i>	Squirrel Glider			e	L	1137
<i>Phalacrocorax varius</i>	Pied Cormorant			n		99
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale			v	L	1017
<i>Plegadis falcinellus</i>	Glossy Ibis			n		178
<i>Pogona barbata</i>	Eastern Bearded Dragon			d		2177
<i>Pseudophryne bibronii</i>	Brown Toadlet			e		3117
<i>Pseudophryne semimarmorata</i>	Southern Toadlet			v		3125
<i>Sminthopsis murina</i>	Common Dunnart			v		1061
<i>Stagonopleura guttata</i>	Diamond Firetail			v	L	652

<i>Stagonopleura guttata</i>	Diamond Firetail			v	L	652
<i>Synemon plana</i>	Golden Sun Moth		C	e	L	5021
<i>Tyto tenebricosa</i>	Sooty Owl			v	L	253
<i>Varanus varius</i>	Tree Goanna			v		2283
<i>Xanthomyza phrygia</i>	Regent Honeyeater		E	c	L	603

Definitions – C: CAMBA listed (China-Australia Migratory Bird Agreement); J: JAMBA listed (Japan-Australia Migratory Bird Agreement); V: vulnerable in Australia; E: Endangered in Australia; c: critically endangered in Victoria; e: endangered in Victoria; v: vulnerable in Victoria; n: near threatened in Victoria; L: listed under FFG

APPENDIX 6 – SITE PRIORITISATION METHOD

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

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

APPENDIX 7 –VEGETATION QUALITY ANALYSIS (VQA) ASSESSMENT FORM

There are four survey forms for vegetation types in the Yea Landscape Zone (eg. plains grassy woodlands or forests and grassy woodlands or herb-rich forests). This example is the plains grassy forests or woodland sheet. Refer to DSE 2004 for further information.

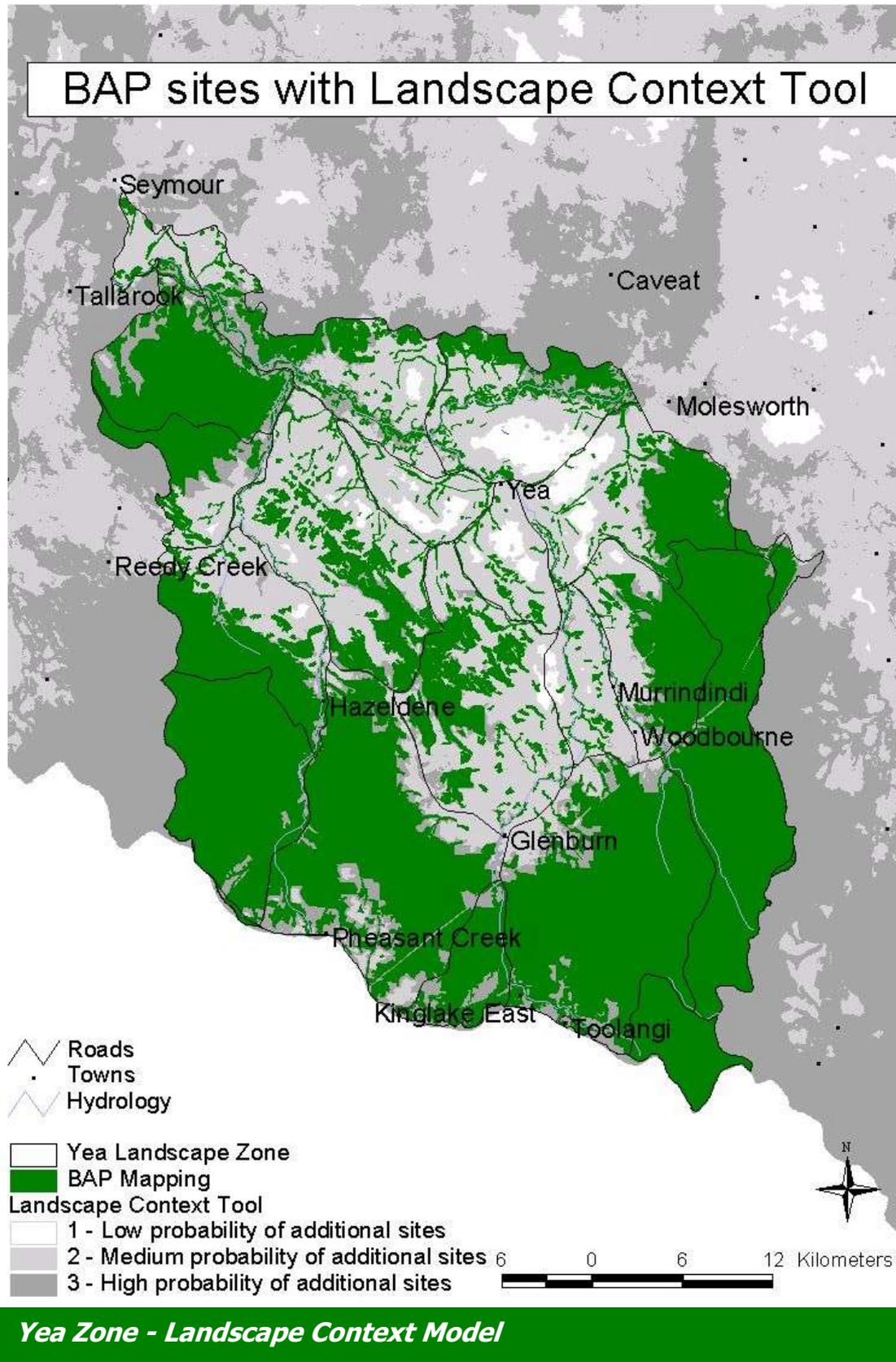
ASSESSMENT OF HABITAT QUALITY – Self-assessment method

Site score sheet 20. Wet or Damp FORESTS

Component & Benchmark	Observations	Quality Range	Score
LARGE TREES Defined as trunk diameter or circumference at breast height Diameter (Circumference) 90 cm (285 cm)	Number of large trees /ha (100m x 100m)	<i>no large trees</i>	0
		<i>up to</i> 12 LARGE TREES /ha	1
		<i>more than</i> 12 LARGE TREES /ha in	2
CANOPY COVER Defined as the tallest stratum of native trees greater than 5m tall Wet or Damp FORESTS 40% benchmark	% canopy cover % cover/40 x 100	<i>less than</i> 25% CANOPY COVER	0
		<i>between</i> 25 – 50% CANOPY COVER	0.5
		<i>more than</i> 50% CANOPY COVER	1
UNDERSTOREY (B) Tick appropriate boxes for PRESENCE of native vegetation (i.e. different life forms) Tree >5m Small herb <1m Tree fern Moss or lichen Shrub 1-5m Grass or grasslike >1m Fern Other Large herb >1m Grass or grasslike <1m Scrambler or climber	(A) % cover of native species	<i>minimal</i> COVER <i>less than</i> 10%	0
		<i>low</i> COVER <i>between</i> 10% – 25%	2
		<i>reduced</i> COVER <i>between</i> 25% - 75% AND <i>less than</i> 5 boxes ticked OR 5 or <i>more</i> boxes ticked	3
		<i>adequate</i> COVER <i>more than</i> 75% AND <i>less than</i> 5 boxes ticked OR 5 or <i>more</i> boxes ticked	4
		<i>adequate</i> COVER <i>more than</i> 75% AND <i>less than</i> 5 boxes ticked OR 5 or <i>more</i> boxes ticked	5
WEEDINESS	% weed cover	50% or <i>more</i> WEED COVER	0
		<i>between</i> 25% - 50% WEED COVER	1
		<i>between</i> 5% - 25% WEED COVER	2
		<i>less than</i> 5% WEED COVER	3
RECRUITMENT A woody species is considered to be recruiting 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	% recruitment = B/A x100	<i>less than</i> 30% woody species RECRUITING	0
		<i>between</i> 30% -70% woody species RECRUITING	1
		70% or <i>more</i> woody species RECRUITING	2
ORGANIC LITTER Defined as small branches (less than 10cm diameter), twigs, leaves and other fallen or dead organic matter	% cover of organic litter	<i>less than</i> 30% ORGANIC LITTER	0
		<i>more than</i> 30% ORGANIC LITTER	1
LOGS Defined by length of stumps, fallen trees or branches at least 10 cm diameter (30 cm circumference)	Length of logs greater than 10 cm dia in 50m x50m (i.e. 0.25 ha) Logs (m) x 4 (i.e. m/ha)	<i>no logs</i>	0
		<i>less than</i> 100m LOGS/ha	0.5
SIZE Defined by the size of the area being assessed AND any adjoining native vegetation		<i>more than</i> 100m LOGS/ha	1
		<i>less than</i> 2 ha	0
		<i>between</i> 2 – 10 ha	1
NEIGHBOURHOOD Defined by the % area covered by native vegetation within 1 km of the site being assessed		<i>more than</i> 10 ha	2
		<i>less than</i> 10% area covered	0
		<i>between</i> 10% - 50% area covered	1
CORE AREA Defined by the distance of the site being assessed from a block of native vegetation greater than 50ha		<i>more than</i> 50% area covered	2
		<i>1 km or more</i> from 50 ha block of native vegetation	0
		<i>less than 1 km</i> from 50 ha block of native vegetation	1
Department of Sustainability and Environment ENVIRONMENTAL MANAGEMENT IN AGRICULTURE Native Biodiversity Resource IGt ©2004		Assessment of Habitat Quality (total)	

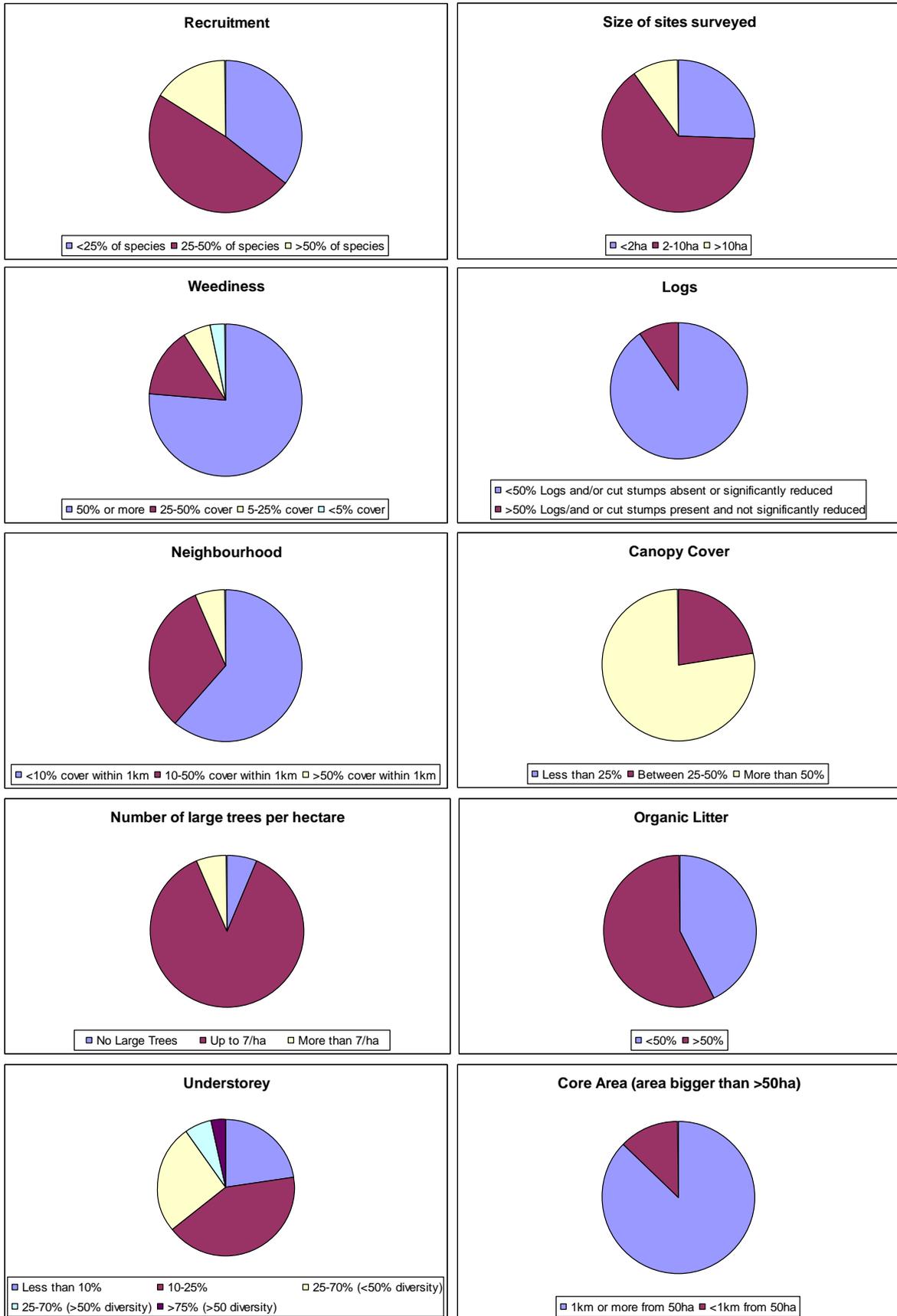
APPENDIX 8 – LANDSCAPE CONTEXT MODEL

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.



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

APPENDIX 9 – VEGETATION QUALITY ASSESSMENT RESULTS



APPENDIX 10 – BIRD LIST

List includes birds surveyed during 50 site (20 minute) surveys. It is not intended to represent the entire bird population in the Yea Landscape Zone. For further information on birds surveyed at each site refer to Appendix 11 (CD).

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

APPENDIX 11 – 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

