Developer's Manual for Biodiversity Action Planning in the Goulburn Broken Catchment

2004

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Department of Primary Industries
Trust for Nature

Contents

1 Introduction

This manual is intended to outline the overarching aspects of the Biodiversity Action Planning process in order to assist developer's of Landscape Zone Conservation Plans in the Goulburn Broken Catchment.

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

- conserve native biodiversity *in situ* by maintaining viable examples of the range of ecosystems that occur naturally in Victoria
- encourage a more strategic approach and shift in public expenditure toward the protection, restoration and ongoing management of priority biodiversity sites, and
- achieve community support for landscape planning for biodiversity and the conservation of strategic assets, particularly in rural landscapes (Platt & Lowe 2002).

Importantly, Biodiversity Action Planning is intended to inform conservation planning at a series of scales – catchment, bioregional, landscape and local (Platt & Lowe 2002) – and a series of BAP documents have been published that are pertinent to each of these scales. In the Goulburn Broken catchment, summary plans for conserving native biodiversity have been prepared for every bioregion (e.g. Wierzbowski *et al*. 2002, and at www.dse.vic.gov.au/dse/nrence.nsf) and for most landscapes (e.g. Ahern *et al.* 2003a, 2003b, Ecology Australia 2003, and at www.dse.vic.gov.au/dse/nrence.nsf). Figure 1 shows the locations of these landscape zones in the catchment.

As with all new planning processes, the development of BAP in the Goulburn Broken Catchment has been iterative, with a series of changes in methodology arising as a result of:

- More clearly defined objectives for BAP
- Increased understanding and knowledge of the process
- Access to new datasets or new planning tools (e.g. the Catchment Analysis Tool/Landscape Context Tool)
- Ground-testing and review of some methodologies, and
- Complementary development or review of planning approaches in other natural resource management areas (e.g new targets established through the Regional Catchment Strategy (GBCMA 2003a)

The initial methodology used in the Longwood (Robinson & Howell 2003) and Violet Town zones thus differs from that being used now.

This manual aims to summarise the overarching Biodiversity Action Planning methodology being applied in the Goulburn Broken Catchment. A summary of the process is given in Table 1. Successive chapters provide more detail and examples about the BAP methodology. Figure 2 provides a flow diagram of a generalized schema of the BAP process used in the GB Catchment.

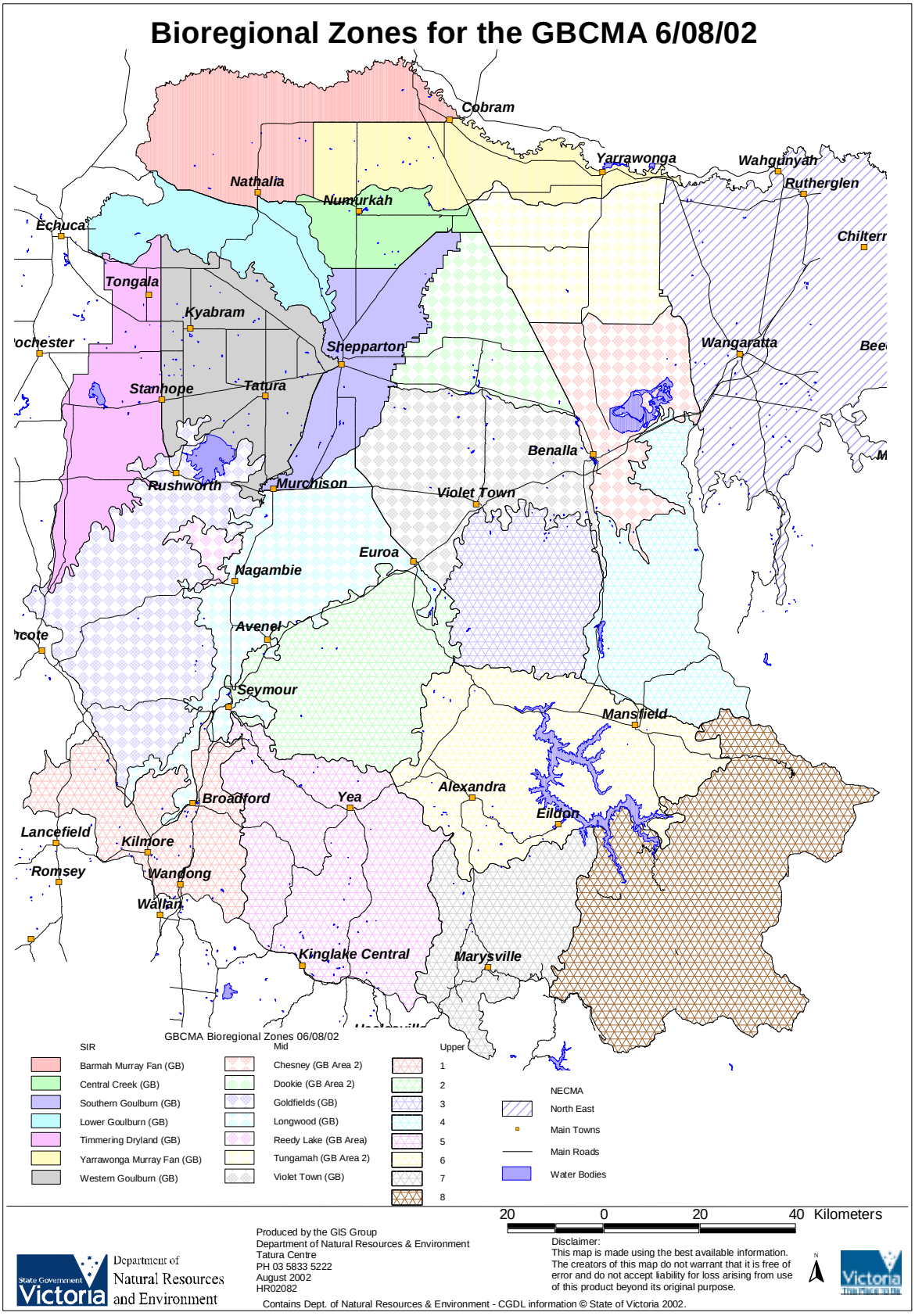

Figure 1. Biodiversity Action Planning zones in the Goulburn Broken catchment

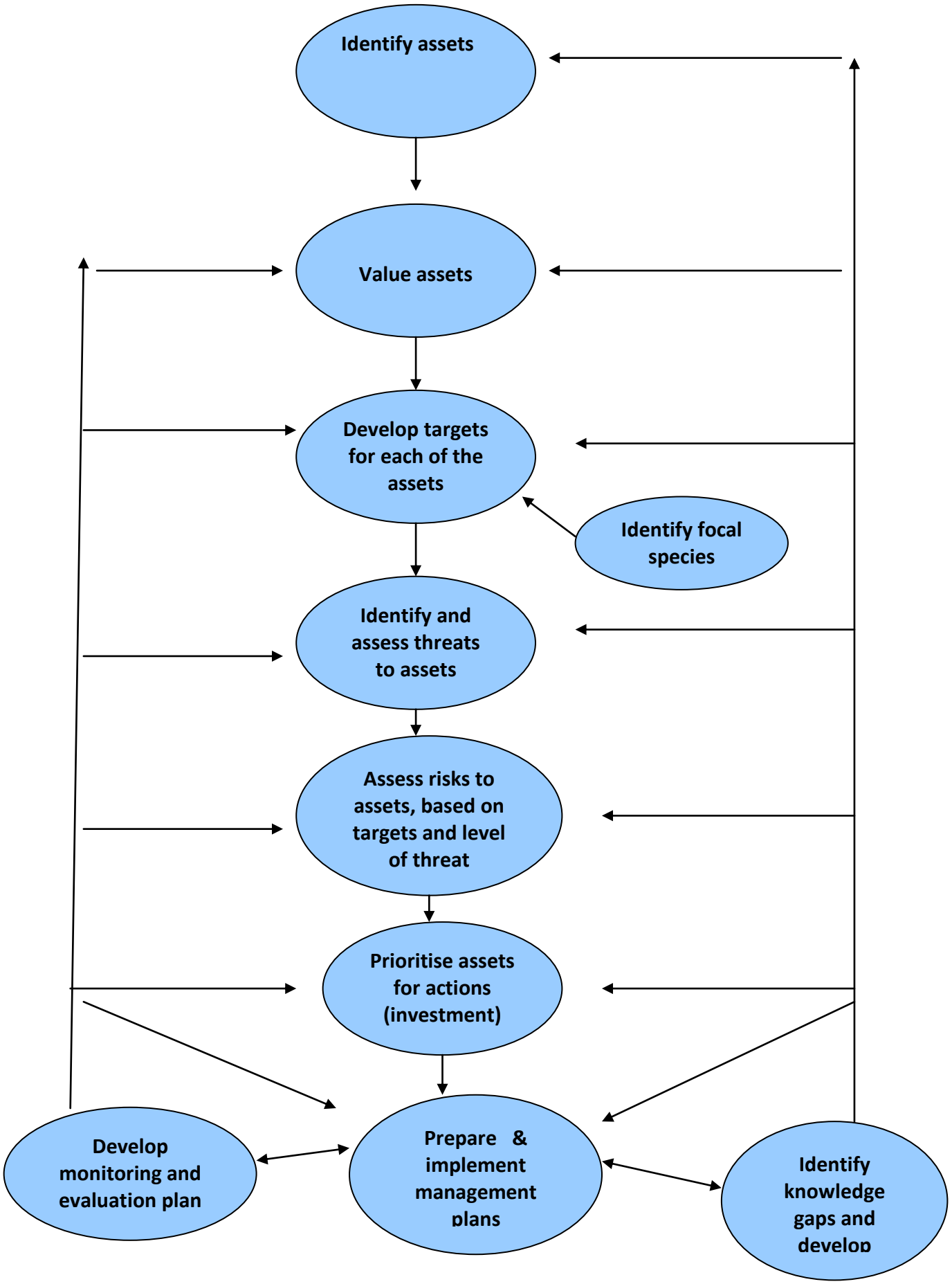

Figure 2. A generalised schema of the BAP

Table 1. *Steps in Biodiversity Action Planning for zones and landscapes*

Steps
1. <u>Identify and desktop map key biodiversity assets:</u> • EVCs – determine significance (eg E) of EVC to area • Wetlands • Remnant Veg Layer • Biosites • Threatened Flora and Fauna • TFN covenant sites • Native Pasture Management Layer Sites • Streams/Creeks/Waterways/Reserves – use public land layer – plmmt100 • Additional assets known from local knowledge, reports (e.g. regionally threatened plants, native grass paddocks) • Use Landscape Context Model for key areas to ground truth • Use map index number to assist in breaking up zone
2. <u>Ground-truth sites:</u> • Develop aerials using map index areas • Identify significant sites missed through remote surveys or previous field surveys – or lacking in condition – or not picked up (eg. grasslands/wetlands) • Prioritise sites in terms of their condition – make notes • Input data in to arcview in terms of sites to keep/sites to add. • Once decided on sites – clean up polygons (at close range) to ensure they match/line up
3. <u>Conduct Surveying (100 sites):</u> • Use table 4 in this book to ascertain which sites to survey • Use map index areas and choose 10 sites per day minimum • Try to choose from each of the index areas and keep sites in same area for the day for access • Try to choose sites that are ok to access • Choose a few VH value sites for comparison • Each of the 100 sites requires VQA analysis and 20 minute bird survey over 1ha area. Choose area that is relative to the site condition. • Record any key threats/risk to site & any VROTS seen
4. <u>Input data in to Arcview</u> • Input 100 site assessment information • Input info for the remaining sites not assessed • Make sure ok with sites – and clean up any polygons • Finalise sites and database
5. Commence report development using template
6. Develop maps for report in line with consistency of look
7. Draft to Steering Committee and community stakeholders for review.
8. Make changes to report
9. Send to Stakeholders (e.g. Implementation Committees) for final endorsement
10. GBCMA website/DPI management approval/ISBN/word check/grammar etc

2 Identification of key biodiversity assets

2.1 Introduction

The identification of the appropriate biodiversity assets to focus conservation effort on in every BAP zone is the most critical part of the BAP process. From a Departmental and CMA perspective we wish to identify which of the assets listed in the zone plans are the priority ones to conserve in that bioregion and zone. The landscape plans set out the framework for this, using:

- EVC status
- Wetland layers
- Index of Stream Condition (ISC) data, and
- Bioregional Network Analysis (BNA) data for threatened species (listed in appendices in the landscape Plans)

From a conservation planning perspective, however, additional information is required to ensure that all elements of biodiversity are conserved in a landscape and that attention is focused on those species, communities and sites that we think have the highest chance of persistence in the future. In order to do this, we have used a methodology partly based on that developed by The Nature Conservancy (e.g. Groves *et al.* 2000; Low 2002; TNC 2003) that makes conservation planners articulate the key biodiversity assets in a landscape, the major threats posed to those assets and the actions needed to counter those threats. Using this information, it is possible to develop targeted conservation plans for the landscape. This chapter sets out the steps needed to make those decisions.

Some points to keep in mind whenever we identify the key biodiversity assets and conservation actions for a landscape are:

- We are interested in the conservation of viable ecosystems and viable populations of threatened or significant taxa – one of the objectives of BAP is therefore to identify what ecosystems or VROTS are significant in every BAP zone and should be the focus of conservation effort.
- We are interested in the conservation of all biodiversity and should not ignore common EVCs or the different groups of organisms (non-vascular plants, vascular plants, invertebrates, small vertebrates, large vertebrates).
- It is presumed that if we protect and manage larger EVC remnants for conservation of species that require large home range areas, the conservation of smaller species will follow. This assumption probably only holds in intact landscapes. In fragmented landscapes, various studies have shown that the habitat preferences of different organism groups do not correspond closely (Abensperg-Traun *et al*. 1996; Robinson 1998; Lindenmayer *et al.* 2002; Macnally *et al*. 2002a). It is consequently important to identify those taxa whose needs may not be met by the simple action of protecting and restoring sites.
- It is important to be realistic about the conservation focus in a district. If the threatened species with viable populations occur mostly in roadsides and require large trees, more conservation effort should be focussed on roadside protection than the establishment of large patches across that landscape for species no longer present. Hopefully, however, most landscapes will still have groups of organisms using the different habitat configurations present. *The point is, think about the landscape, think about what we can achieve to truly help an ecosystem or threatened species in that landscape and focus effort accordingly.*

2.2 Steps to determine what are significant biodiversity assets for protection in a BAP zone

Step 1: Identify terrestrial EVCs or EVC groups in the zone

Step 1a Categorise all EVCs by

- Pre-1750 extent
- current extent
- national/State conservation status (EPBC, FFG)
- bioregional conservation status
- representation in reserve system
- area (in hectares) required to meet a restoration target of 15% of pre-European extent for naturally widespread communities and 75% for naturally restricted communities

Step 2: identify aquatic communities and ecological systems in the zone

Step 2a Categorise all wetlands shown on the Departmental wetlands layer by:

- wetland type
- Pre-1750 extent (wetland and EVC)
- current extent (wetland and EVC)
- International/National/State conservation status (Ramsar, Directory of important wetlands, National Land and Water Resources Audit)
- bioregional conservation status (NLWRA data, EVC status)
- representation in reserve system
- area (in hectares) required to meet a restoration target of 15% of pre-European extent for naturally widespread communities and 75% for naturally restricted communities
- community type (naturally widespread, naturally linear, or naturally restricted, *e.g. perched bogs, spring soaks,*)
- Rangewide distribution pattern (restricted/endemic – occurs primarily in one bioregion; limited-occurs in this bioregion and a few adjacent bioregions; widespread – in many bioregions; disjunct – occurs in bioregion as a disjunct from main distribution; peripheral – more commonly found in other bioregions.

Step 2b Categorise the different riparian systems found in the zone by:

- EVC pre-European extent
- EVC current extent
- National/state status (EPBC/FFG/LCC Rivers and Streams 1991 classifications)
- Bioregional status (ISC status, classification from the draft GBC Regional Riverine health Strategy 2004 (GBCMA 2004a)
- Representation in reserve system
- area (in hectares) required to meet a restoration target of 15% of pre-European extent for naturally widespread communities and 75% for naturally restricted communities.

Table 2. Example of Table showing the landscape conservation status of the EVCs found in Central Creek BAP zone and the 15% targets.

EVC Group	EVC Number	EVC Bioregional Conservation Status	EVC Landscape Zone Conservation Status	EVC Name	Pre-1750 Area (ha)	Current Area (ha)	% current cover	15% pre-1750 target
14	294	E	E	Plains Grassy Woodland/Gilgai Plains Woodland/Wetland Mosaic	27628	453	1.6	4144.2
14	867	E	E	Pine Box Woodland/Riverina Plains Grassy Woodland Mosaic	5556	13	0.2	833.4
14	55	E	E	Plains Grassy Woodland	4584	85	1.9	687.6
15	68	E	V	Creekline Grassy Woodland	622	161	25.9	93.3
14	868	E	E	Pine Box Woodland	616	6	1.0	92.4
19	125	E	E	Plains Grassy Wetland	564	5	0.9	84.6
19	333	E	E	Red Gum Wetland/Plains Grassy Wetland Mosaic	538	19	3.5	80.7
15	168	E	E	Drainage Line Complex	535	27	5.0	80.25
19	292	E	E	Red Gum Wetland	239	8	3.3	35.85
19	74	E	E	Wetland Formation	183	1	0.5	27.45
15	869	E	V	Creekline Grassy Woodland/Red Gum Wetland Mosaic	96	27	28.1	14.4
14	260	E	X	Gilgai Plain Woodland/Wetland/Shrubby Riverina Plains Grassy Woodland Mosaic	7	0	0.0	1.05
19	300	V	X	Reed Swamp	3	0	0.0	0.45
				TOTAL	41171	805	1.95%	6176
99	997	NA		Private Land No Tree Cover	0	40366		

2.3 Steps to identify key biodiversity assets for conservation planning in BAP zones.

The process for selection is contained in the TNC manual (Low 2002). However, broadly using the same procedure as above, we wish to identify the assets that capture all biodiversity in a zone.

- Start at the coarsest level (ecosystem) and identify ecosystems that have similar nested assets, are maintained by similar ecological processes or that have been subject to the same threats and require the same actions (e.g. a range of EVCs all found on granitic hills or riverine plains or sedimentary hills).
- If the above coarse assets (targets) and associated actions do not achieve conservation of all biodiversity, add particular species, or species groups, focussing on those taxa that have key populations in the zone and which have special needs (e.g. species subject to predation, higher order predators if present in high numbers, nationally threatened taxa, groups of threatened plants, specific EVCs that are special to the zone (e.g. spring soaks or perched bogs or freshwater meadows), species with special biology (e.g. Buloke Mistletoe, Golden Sun-moth).
- Always think about the best assets to list that capture as many other assets as possible.

2.4 Steps to identify priority sites for restoration

Biodiversity Action Planning entails the identification of both priority sites for protection and priority sites for restoration. In turn, each of these planning processes depends on the identification of the key biodiversity assets in a zone. Once the key biodiversity assets have been identified, targets can be set for them in terms of three broad sets of attributes that assess the assets' future viability:

- Size/extent (either the area covered by an ecosystem or the population size of a taxon)
- Condition (either the vegetation condition of an ecosystem, or the quality of the water or reproductive success), and
- Landscape processes (for example; appropriate hydrological regimes, habitat connectivity, appropriate fire regimes).

Two approaches have been used to help identify key sites for restoration.

Step 1. Landscape Analysis Catchment Tool/Landscape Context Modelling

This methodology combines two GIS techniques: one (the Catchment Analysis Tool) that models the landscape to create larger remnants and increase connectivity in accordance with well-documented principles for nature conservation (Wilson & Lowe 2003); and one (Landscape Preferencing) that maps the landscape in terms of the concentration of native vegetation. .

Step 2. Focal species selection

The 'focal species' approach involves the identification of a suite of species targeted for the management of threatening processes, for example, habitat loss, habitat fragmentation and habitat degradation (Lambeck 1999). The approach can also be used to identify species that respond closely to particular fire regimes or habitat attributes such as large trees. Broadly, the focal species are considered to be the most sensitive species occurring in a given landscape to the designated ecological process or threat, such that their conservation should also conserve other less-sensitive species found in the same vegetation type.

Whilst it is acknowledged that the focal species approach will not ensure the conservation of all biota (Huggett 2007), its key strengths and ability to define and guide targets (e.g. patch size and connectivity) for our landscape restoration strategies (Lambeck 1997) are recognised. Other strengths of the approach are its ability to provide quantitative and spatial advice for strategically restoring landscapes and its use of landscape ecological science principles to build new habitat for targeted taxa (Huggett 2007). The approach also allows for the monitoring of actions and provides the community with an 'iconic/focal' species (a 'social-hook') (Huggett 2007) to enhance enthusiasm for implementing works.

Accordingly, our selection of 'focal' species was guided not just by ecological factors but also by community input in terms of species they they considered important to conserve in their local environment. For every focal species, however, we established its ecological needs in that landscape, in order to be able to plan conservation works that would most effectively assist the species to persist there.

An example of the focal species selected for one of the BAP Landscape Zones is provided on the following page.

Table 2: Focal Species and their Habitat Requirements – Barmah Landscape Zone

	**Grey-crowned Babbler (*Pomatostomus temporalis*) (e)**	
	Minimum patch size (threshold)	>2ha, >1km continuous roadside
	Critical distance between patches	<500m from known site
	Dispersal threshold	<2km, very few records >10km
	Ecological Vegetation Class	Woodlands
	Some other requirements (general)	Mature trees, shrubs (>6m), linkages
	**Bush Stone-curlew (*Burhinus grallarius*) (e)**	
	Minimum patch size (threshold)	>1ha, >40m wide
	Critical distance between patches	<1km
	Dispersal threshold	<2km from known site
	Ecological Vegetation Class	Creeklines, Woodlands
	Some other requirements (general)	Ground timber, fox control
	**Superb Parrot (*Polytelis swainsonii*) (e)**	
	Minimum patch size (threshold)	Larger the better
	Critical distance between patches	Varies for breeding/non breeding
	Dispersal threshold	Varies for breeding/non breeding
	Ecological Vegetation Class	Woodlands, Forests (River Red Gum)
	Some other requirements (general)	Hollows, shrubs, corridors, dead trees
	**Brown Treecreeper *(Climacteris picumnus)* (k)**	
	Minimum patch size	>30ha
	Critical distance between patches	<500m from known site
	Dispersal threshold	<1km
	EVC utilised	Woodlands, edges, forest clearings
	Some other requirements (general)	Mature trees, fallen timber*, linkages
	**Tree Goanna (*Varanus varius*) (v)**	
	Minimum patch size (threshold)	>2km roadside/streamside patches
	Critical distance between patches	<2km
	Dispersal threshold	<2km
	Ecological Vegetation Class	Most except wetlands
	Some other requirements (general)	Mature trees, fox control, logs
	**Brolga (*Grus rubicunda*) (v)**	
	Minimum patch size (threshold)	>50ha or clusters of wetlands
	Critical distance between patches	Varies
	Dispersal threshold	Varies
	Ecological Vegetation Class	Wetland (ephemeral, 20-30cm depth)
	Some other requirements (general)	Fox control, Canegrass, *Eleocharis spp*
	**Squirrel Glider (*Petaurus norfolcensis*) (e)**	
	Minimum patch size (threshold)	>0.5ha, >1km length
	Critical distance between patches	<50 metres
	Dispersal threshold	<1km
	Ecological Vegetation Class	Woodlands, Forests
	Some other requirements (general)	Mature trees, Hollow-dependant#

** Habitat requirements include fallen timber at >40 tonne/hectare (MacNally 2006).*
 # Tree-hollows (with tight-fitting entrance hole) are essential to Squirrel Gliders for breeding and den sites.

Victorian threatened status definitions: (e) = endangered, (v) = vulnerable, (k) = poorly known.

Habitat Requirement Source: Variety of Sources (GBCMA *in prep.*) and DSE 2005a.

Photo Credits: Grey crowned Babbler (Graeme Chapman), Bush Stone-curlew (Ian McCann), Tree Goanna (Peter Robertson) and Squirrel Glider (John Seebeck) (NRE 2002f); Superb Parrot and Brown Treecreeper (Dr. Neville. R. Bartlett 2006); and Brolga (Paul O'Connor 1992).

3 Mapping of assets, data analysis and extraction

This section sets out the steps for mapping of BAP zones, the resources required and how to identify the sites to be mapped and surveyed. Refer to Table 1 for a summary of this process.The steps are as follows.

3.1 Identify resources required for mapping

- Landscape plans
- Aerial photographs or satellite imagery if unavailable
- Cadastral boundary layer with annotation
- Bioregion layer 1:100,000 scale
- Roads 1:25,000 layer
- Parish layer Victoria wide layer
- Hydrology 1:25,000 layer
- Native Pasture layer (if available)
- Topographic tiles for 1:25,000 mapsheets
- EVC layers, EVC pre-1750 at 1:100,000 scale, EVC present at 1:100,000 scale
- Thflo10055.shp
- Thfau10055.shp
- Wetland94 layer (1:100,000)
- Flora Information System
- Fauna Information System (Victoria Fauna Display)
- Biosites system
- Access to local knowledge of sites

3.2 Mapping Process

- Each zone will ideally have a new project with a polygon shapefile and populated table per Table 3.
- Draw polygons around remnant vegetation using aerial photographs, a minimum size of one hectare is recommended. A site can be a patch of dense native vegetation, scattered trees, native grassland or pasture, wetlands, creeks or any other biodiversity asset in the zone. Suggest starting with one 1:25,000 mapsheet at a time for ease of scale.
- Treat individual sites as patches regardless of cadastral boundaries. I.e. if a large area of tree cover extends over more than one cadastre, treat as one polygon, unless the site is significant in size, or covers both public and private land and is, therefore more practical to map by cadastral boundary.
- Some sites will encompass more than one EVC type. If appropriate, separate distinctively different EVCs (not part of the same EVC group), e.g., Creekline Grassy Woodland (68) runs through a patch of Granitic Hills Woodland (72), draw a separate polygon around the creekline EVC.
- Scattered trees are mapped according to the size of the patch and whether they are within 500m of another patch to provide continuity and an extension of existing habitat. The context of the landscape has to be taken into account, i.e. in a highly fragmented farming landscape scattered tree cover will assume more importance than in one still well vegetated.

- Where artifact native pasture occurs within the scattered tree patch, map whole area containing native pasture and assign 'Protect' status.
- Native pasture will be identified using any native pasture layers available or through local knowledge. If not patches can be identified during the ground survey procedure.
- Identify wetlands using Wetland94 layer. Ground truthing will be required to ascertain whether they are still intact or have been modified for farmland.
- Within each Landscape Zone, focal species have been identified. See individual Conservation Plans for focal species data, such as habitat requirements (ie. Minimum patch size, critical distance between patches, dispersal threshold).

3.3 Data extraction and input

- Data to assist in identifying focal species for each Landscape Zone can be extracted from the Victorian Fauna Display or the Geographical Information System Threatened Species layer. Remove records pre 1991, for increased accuracy.
- Use the above mentioned threatened species layer to identify which sites have threatened species records, again removing records pre 1991, for increased accuracy. Identify sites and assign 'Y' in attribute table where the species has been recorded (and within its dispersal threshold ie. Brown Treecreeper <1km).

3.4 Surveying

- Refer to Section 4 for derivation of conservation significance in order to identify those sites to be ground truthed.
- Sites to be surveyed are stratified based on size and representation of EVC in order to select a random sample of sites over the zone. The sample may have to be altered slightly for issues such as inaccessability of sites on private land.
- Carry out Vegetation Quality Assessment (VQA) at identified sites, noting threats specific to that site and any significant species for the patch. Twenty minute bird surveys (in accordance with the Birds of Australia – Atlas Search Method of 'Area Search' – 1hectare, twenty minutes, any shape patch) will also be carried out recording all birds seen and heard within the patch. Birds seen outside the patch or flying above should be recorded as incidental records. Some of the VQA, i.e. site area, native vegetation in the neighbourhood and distance to core patch can be completed in the office using aerial photographs.
- Assign conservation status based on vegetation quality assessment and conservation significance Table 2. Where no VQA has been carried out, apply the minimum status possible for that site per Table 4.
- Bird survey data will be used as a monitoring tool, and all records should be submitted to the Atlas of Victorian Wildlife.
- Whilst ground-truthing, any further sites not picked up during desk top mapping should be noted and mapped on return. Similarly, any sites that do not fulfil the criteria can be deleted.

Table 3: Explanation of attribute table headings

Field Name	Description
BAP_ZONE	**BAP Zone** identifies which Biodiversity Action Planning Landscape Zone the site is contained within.
SITE_NO	**Site Number** identifier for each site based on 1:25,000 mapsheet number followed by a unique number (e.g. 79263_344).
SITE_NAME	**Site Name** to assist in site identification (only applicable for public sites – e.g. forests, reserves and roads).
PRIORITY	**Priority** site ranking (VH=Very High, H=High, M=Medium, L= Low). *See site prioristisation method in BAP Zone Conservation Plan appendices.*
HECTARES	Area of the site in **hectares** (ha).
BIOREGION	**Bioregion** that the site is within (e.g. MF = Murray Fans, VR= Victorian Riverina).
EVC	**Ecological Vegetation Class** number (e.g. Plains Woodland = 803). *See page 2 for key*. Alternatively, you can visit *www.dse.vic.gov.au.*
EVC_CON_ST	**Conservation Status** of the above EVC within the bioregion (e.g. E = endangered, V = vulnerable).
BIO_ASSET 1 BIO_ASSET2	Key **Biodiversity Asset** (e.g. Wetland, Box-Ironbark forest). Sites may contain two asset types e.g. Bio_Asset1 & Bio_Asset 2. *See BAP Zone Conservation Plans for detailed information.*
VQA_SCORE	**Vegetation Quality Assessment Score** (VQA) is the total score for the site out of 20. *For assessment sheets, see the 'Updating BAP' section on the BAP CD (Version 1 2008)*.
VQA_DATE	**Date** (month) that the VQA was undertaken.
LARGE_TREE	**Large tree score** (from the VQA).
CANOPY	**Canopy score** (from the VQA).
UNDERSTOREY	**Understorey score** (from the VQA)
WEEDS	**Weediness score** (from the VQA)
RECRUITMENT	**Recruitment of species score** (from the VQA)
ORG_LITTER	**Organic litter score** (from the VQA)
LOGS	**Logs Score** (from the VQA)
PATCH_SIZE	**Patch Size Score** (from the VQA)
NEIGHBOURH	**Neighbourhood Score** (from the VQA)
DIST_CORE	**Distance to nearest remnant** (from the VQA)
BIRD_SURVEY	**Date** that a **Bird Survey** was Undertaken (Month and Year). Hardcopies of the surveys are stored at DSE Benalla.
THREAT_1 THREAT_2 THREAT_3	**Threats** at the site (e.g. 230 = Invasion by Environmental Weeds). Based on field observation/surveys. Multiples of up to three listed per site. *See page 2 for key*.
TH_FAUNA	**Threatened Fauna** Recorded at Site (Victorian Fauna Display or survey) post Year 1991.
TH_FLORA	**Threatened Flora** Recorded at Site (Flora Information Systems or survey) post Year 1991.
TH_VEG_COM	**Threatened Vegetation Communities** (if applicable).
NOTABLE_SP	Any **notable species** surveyed at site (e.g. no threatened status).
FOCAL_SP1 FOCAL_SP2 FOCAL_SP3	Suggested **Focal species** for the site. Multiple species listed of up to three per site. *See BAP Zone Conservation Plans for detailed information.*
F_SP1_PRES F_SP2_PRES F_SP3_PRES	Whether the suggested **Focal species** for the site have been recorded at the site (via survey or Flora Information System/Victorian Fauna Display).
LANDHOLDER	**Landholder/Land Manager** of the site (e.g. private).

LFW	Whether the site had a **Land for Wildlife** agreement (where known).
BUSHTENDER	Whether the site has a **Bush Tender** agreement (where known).
BUSHBROKER	Whether the site has a **Bush Broker** agreement (where known).
INCENTIVE	Whether the site has/had an **Environmental or Tree Growing Incentive** (Yes or No)
TFN_COVENT	Whether the site/part of the site has a **Trust for Nature Covenant.**
BIOSITES	Whether the site is identified on the **Biosites** database.
HVEF_SCORE	**High Value Environmental Features** Vegetation Quality Assessment Score (only for SIR sites).

4 Site Prioritisation

One of the key tasks of Biodiversity Action Planning is to provide detailed information on site priorities for biodiversity conservation across the catchment. That information can then be used as part of other planning processes, for instance waterways management, salinity management and Environmental Management Grants. In particular, BAP is intended to provide site-specific information on the relative conservation value of a particular site, based on the initial identification of key biodiversity assets found in a zone.

Because of the large number of remnants of native vegetation found in many zones, however, (e.g. Hughes Creek, > 1800 mapped sites), one of our tasks was to develop rules for assessing the priority ranking of a given site and to ascertain if sites need to be ground-truthed or not in order to determine their conservation significance.

In general, we have used the same criteria for assigning significance as in the Victorian Native Vegetation Framework (Crown 2002). Following the Framework's definitions of conservation significance, we have generally assigned significance based on bioregional conservation status, threatened species' use and habitat condition, with the following qualifications:

- Because of the importance of large remnants for nature conservation and groundwater control, we have deviated from the Framework in assigning a minimum 'High priority ranking' to all sites larger than 40 ha in area.
- Because of the focus of BAP on the needs of particular taxa and attempts to conserve them, all potential habitat patches within the known dispersal range of a key threatened taxon or focal species are given a higher priority than sites without those taxa. This approach is consistent with that off the Native Vegetation Framework.

Explanations for the selection criteria are as follows:

1. EVC status; as for the framework but based on zone status.

1. Potential habitat within known range of key threatened taxa or focal species: For threatened animals and plants identified as being significant within each landscape zone, any native vegetation site that meets each species' habitat needs and dispersal preferences (see Table 5) is automatically considered to be significant and a priority for protection. Any potential restoration sites within the dispersal range of the threatened species may also become a priority for protection. Threatened

species' habitat needs and dispersal needs thus become the first means of separating sites that need to be ground-truthed or not.

2. LCAT (Landscape Context Analysis Tool). This methodology and its rationale are described in Section 2.4.
3. Size classes: These are based on thresholds proposed by Wilson & Lowe (2003). Forty hectares is used as a meaningful threshold for large patch size on the basis of studies investigating species richness in relation to patch size and the capacity of patches to control groundwater. In addition, an analysis of all remnants in every bioregion in the catchment showed that < 95% of all remnants are > 40 ha in size, with the exception of the Alps bioregion (Wilson & Low in prep.)

Table 4. Determining conservation significance and the need for ground-truthing for mapped BAP sites. * Landscape Context Analysis Tool

Conservation status of EVC (Bioregional)	**Potential habitat within known dispersal range of threatened taxon or focal species, or within priority areas as identified by LCAT***	**EVC Size Patch size**	**Ground-truthing required to confirm priority rank on basis of vegetation condition**	**Priority Very High, High, Medium, Low**
E	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
V	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
R	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
D	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
LC	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

Table 5. Prioritisation rules in relation to known dispersal behaviour and habitat needs of VROTS and/or focal species in the Goulburn Broken catchment

Prioritisation rules in relation to known dispersal behaviour and habitat needs of VROTS and/or focal species in GBC

This spreadsheet forms a basis for prioritising potential habitat sites for known VROTS in relation to point locations, their dispersal needs and patch size needs.

NB> it is assuming that these rules are only applied to those species identified as having significant occurrences in the zone

Species	EVC criteria	patch size threshold	proximity to 'source' patch (and size)	isolation theshold	dispersal threshold	Rationale	Reference
Regent Honeyeater	Within 5 kms of known sites in the key districts, all tree cover that meets patch size thresholds should be ranked as very high priority. For radius of 10 kms, particular EVCs (Box-ironbark forest, Grassy Woodland, Valley Grassy Forest; Creekline Grassy Woodland; Alluvial Terraces herb-rich Woodland,Plains Grassy Woodland) that meet patch size requirements should be ranked as very high priority;	patches > 5 ha in size, continuous roadside vegetation > 1 km in length	not known	none	highly mobile; in districts with key populations of the species (i.e Lurg, Warby Range, Boweya, Goorambat), I'd propose that a 5 km core radius be used around known sites and that a large radius of 10 km be used to identify preferred EVCs	Highly mobile species, so will follow nectar rather than be site-limited; larger sites will offer more protection from aggressive competitors	Robinson *et al.* unpubl data; French *et al*. 2003
Grey-crowned Babbler	(Plains Grassy Woodland, Grassy Woodland, Box-ironbark Forest, Gilgai Plain Woodland, Creekline Grassy Woodland)	> 2 ha patches or continuous roadside vegetation > 1 km long	none	< 500 m	< 2km from known site	Most babblers disperse less than 2 km from natal territory; very few records > 10 km	Robinson *et al*. in prep.; Simondson 2001
Swift Parrot	particular EVCs (Box-ironbark forest, Grassy Woodland, Valley Grassy Forest; Creekline Grassy Woodland; Alluvial Terraces herb-rich Woodland, Plains Grassy Woodland)	none	none	none	< 1 km from known site	Highly mobile species, so will follow nectar and other resources rather than be site-limited; larger sites will offer more protection from aggressive competitors, although Mac Nally & Horrocks found that there was a weak	Mac Nally & Horrocks 2000

						positive relationship with Noisy Miner occurrence	
Bush Stone-curlew	particular EVCs (Box-ironbark forest, Grassy Woodland, Valley Grassy Forest; Creekline Grassy Woodland; Alluvial Terraces herb-rich Woodland,Plains Grassy Woodland); strips > 40 m wide; patches > 1 ha in size	1 ha, roadsides	none	< 1 km from other native vegetation	< 2km from known site	BTK studies found that most occupied sites have other vegetation patches within 1 km	Johnson & Baker-Gabb 1994
Brolga	wetlands	50 ha (Herring, unpubl data)	none known	none known	none known	probably going to be more common where there are clusters of wetlands and wetland types to provide for variable resources.	Herring unpubl data
Carpet Python	Granitic Hills Woodland; Rocky Outcrop Shrubland, Valley grassy Forest, Grassy Woodland, Heathy Dry Forest;	30 ha	< 1 km (100 ha)		< 1 km from known site	based on radio-tracking at Mt Meg - cited in G. Heard's study; home range size from	Heard, G. 2001
Tree Goanna	most EVCs except for the Wet Forest group and floodplain woodland group	home range of 160 ha but often use smaller remnants linked by scattered vegetation; continuous roadside or streamside vegetation of > 2 km	none	< 2 km from other potential habitat patches	< 2 km		Brown & Bennett 1995; Guarino 2002
Squirrel Glider	particular EVCs (Box-ironbark forest, Grassy Woodland, Valley Grassy Forest; Creekline Grassy Woodland; Alluvial Terraces herb-rich Woodland, Plains Grassy Woodland, Gilgai Plain Woodland, Floodplain Woodland);	continuous vegetated strips at least 1 km in length, patches > 0.5 ha	none	< 50 m	< 1 km from known site	Rodney Van der Ree's study shows linear home ranges to be up to 2 km long but gaps of > 50 m limit dispersal	Van der Ree 2000; R. Van der Ree pers. comm 2004; Van der Ree et al. 2003
Brush-tailed Phascogale	Most EVCs except for the Wetlands and Wet Forest groups; include Floodplain woodlands and creekline grassy woodlands	continuous roadside vegetation > 1 km long; connected patches > 20 ha; any patch of appropriate EVC > 100 ha	10 km (500 ha)	< 500 m	10 km	mean linear home range of females = 1457 m	Humphries & Seebeck 1997; Soderquist & Lill 1995; Soderquist 1995; Van Der Ree et al. 2001; Soderquist pers comm. 2004

Powerful Owl	Damp Forests, Dry Foothill Forests, Box-ironbark Forests, Floodplain Forests	500 ha for Damp and Foothill Forests, 1000 ha for Box-ironbark forests	20 km (3,800 ha)	none	20 km (from McCarthy et al. 1999	Habitat quality also important, generally I nareas with high densities of mature trees	Webster *et al*. 1999; Soderquist, T. (1999); Mccarthy et al. 1999; Loyn et al. 2001
Hooded Robin	Plains Grassy Woodland, Pine-box Woodland, Grassy Woodland, Box-ironbark Forest, Granitic Hills Woodland; Gravelly Sediment Mallee, Grassy Dry Forest	> 10 ha patches where close to source patch. Not roadsides	< 2 km (100 ha), Griffioen 2002, Freudenberger 2002	< 500 m (pers obs)	< 2 km (Freudenberger 2002)		
Diamond Firetail	Plains Grassy Woodland, Pine-box woodland; Gilgai Plain woodland, Alluvial terraces herb-rich Foothill Forest, Grassy Woodland, Box-ironbark Forest, Granitic Hills Woodland; Gravelly Sediment Mallee, Grassy Dry Forest, Creekline Grassy Woodland	> 10 ha patches where close to source patch. Not roadsides	< 2 km (100 ha), Griffioen 2002	< 1 km	> 10 km -not applicable for this analysis	mobile species known to disperse seasonally in search of food	
Speckled Warbler	Grassy Woodland, Box-ironbark Forest, Valley Grassy Forest, Granitic Hills Woodland; Gravelly Sediment Mallee, Grassy Dry Forest, Heathy Dry Forest	> 10 ha patches where close to source patch (Gardner et al 2003). Not roadsides	< 2 km (400 ha), Griffioen 2002, Freudenberger 2001, 2002	< 500 m	< 2 km (Gardner et al. 2003)		Gardner et al. 2003
Painted Honeyeater	Grassy Woodland, Box-ironbark Forest, Valley Grassy Forest, Granitic Hills Woodland; Gravelly Sediment Mallee, Grassy Dry Forest	patches > 10 ha	?	none	< 1 km from known site	Site faithful but annual distribution ultimately affected by mistletoe flowering/fruiting and mobile in response;	
Threatened fish	waterways	same reach			same reach	The CMA uses reaches as one of its management and reporting units. These are partly defined by natural environmental or human divisions that are also likely too affect fish distributions	GBCMA 2004
Invertebrates (e.g. Golden Sun-moth,	matched EVCs	no size constraint	< 1 km	< 1 km	< 1 km	Most invertebrates, and especially some of the threatened ones have very low dispersal; habitat needs probably more important; see paper on genetic bottlenecks in sun-moths	Clarke & O'Dwyer 2000
Plants	matched EVC(s)	same tenure (e.g. if record in roadside, then only consdier the roadside)			< 0.5 km from known site	Plant dispersal generally much more restricted than vertebrate dispersal	

5 Assessing threats to key biodiversity assets

5.1 Introduction

One of the critical steps in conservation planning is an assessment of the risk posed to assets by various threats and this asset-based approach is now used widely as part of natural-resource management planning (e.g. Crown 2002, Hobbs *et al*. 2002; Lyon *et al*. 2002). Based on the approach taken by the TNC in its conservation planning, we have tried to identify both the immediate stress to biodiversity assets in the catchment and the sources of those stress. Focussing on both aspects of threats allows more focussed conservation responses (Low 2000). Table 6 below describes the most relevant ecological stresses and sources of stress to biodiversity in the catchment. Using these, we have adapted DSE's standard threats list from its Actions for Biodiversity Conservation (ABC) program and generated a standard list of threats. At every BAP site, threats are selected from this standard list in order of priority. This list is shown in Table 7.

Table 6: Standardised table of sources of stress in the Goulburn Broken catchment.

Threat number	Source of threat name	Stresses resulting from source	comments
1	Historical clearing for agriculture	Habitat loss, habitat fragmentation, , population fragmentation, erosion, sedimentation of waterways, salinity, high water tables	This threat is the major threat in many landscapes and although it occurred historically, the consequences of it are active today – hence we record it as an active threat
2	Current clearing for agriculture	As above, decreased food availability	
3	Agroforestry and orchard	Habitat loss, habitat fragmentation, nutrient increases,	

	development & operations	pesticide/herbicide use,	
4	Intensive agriculture	Habitat loss, habitat fragmentation, , population fragmentation, erosion, sedimentation of waterways, salinity, high water tables	This source obviously overlaps with other such as 3, 5, 9, 10. The decision when selecting is which category best describes the sources of a particular stress in a landscape, and best helps us focus attention on what is mostly contributing to the threat
5	Irrigated agriculture	Habitat loss, habitat fragmentation, , population fragmentation, erosion, sedimentation of waterways, salinity, high water tables	As above
6	Development of roads or utilities	Habitat loss, habitat fragmentation	
7	Subdivision	Habitat loss, habitat fragmentation, weed invasion, recreational activities, introduced predators, changes in species composition, loss of fallen timber	
8	Dwellings	Habitat loss, habitat fragmentation, weed invasion, recreational activities, introduced predators, changes in species composition, loss of fallen timber	
9	Stock-grazing practices	Lack of recruitment, changes in species composition, groundlayer degradation, loss of fallen timber, tree dieback, soil compaction/erosion/pugging, weed invasion, changes to water quality, nutrient concentrations	
10	Crop/pasture production practices	Habitat loss, Habitat fragmentation, changes in species composition, changes in vegetation structure, weed invasion, pesticides/herbicide impacts, nutrient increases, soil loss, habitat loss through burning, ploughing; changes in hydrological regime, salinity, high water tables, groundlayer degradation, loss of fallen timber	Habitat loss may occur through the cultivation of native grass pastures or through laser levelling off shallow wetlands, Changes in hydrological regimes may occur through laser levelling and increased run-off

11	Operation of dams/reservoirs, drainage/diversion/levee schemes	Changes in hydrological regime; habitat fragmentation, reduced water quality; changes in water chemistry, habitat loss, nutrient increases	Habitat loss refers to loss of wetlands through drainage, but also potentially to habitat loss through flooding; habitat fragmentation may occur though lack of flows and isolation of pools or through lack of connectivity between floodplains and rives
12	Channelisation of rivers and streams	Loss of snags; riparian habitat destruction	
13	Introduced herbivores	Lack of recruitment, decreased food availability, changes in species composition, fauna habitat degradation, soil erosion/pugging/disturbance, weed invasion; changes to water quality	NB; category includes terrestrial(e.g. rabbits, hares, deer, pigs) and aquatic herbivores (e.g. carp)
14	Native herbivores	Lack of recruitment, changes in species composition, fauna habitat degradation, tree dieback, soil compaction/erosion/pugging, weed invasion,	Refers to kangaroos, wallabies, wombats, potentially koalas
15	Introduced predators	Decreased population size, lack of recruitment, disease, decreased food availability	Refers to both terrestrial (Foxes, cats, dogs) and aquatic (trout, mosquito-fish) predators; cats cause toxoplasmosis Decreased food availability may occur where the predators are competing with native predator species
16	Competition by Noisy/Bell miners	Decreased population size, decreased food availability, tree dieback	
17	Predation by native birds	Decreased population size, lack of recruitment	Elevated numbers of species such as currawongs, ravens, magpies and butcherbirds

			may cause high rates of nesting failure and local population declines
18	Groundwater withdrawal	Habitat loss, Changes in hydological regimes, changes in species composition, small population size, loss of keystone species	In this case, may lose sphagnum or other important species unique to the system
19	Forestry practices	Habitat loss, habitat fragmentation, small population size, changes in species composition, changes in successional dynamics, soil disturbance, sedimentation, changes in hydrological regime, nutrient increases, weed invasion	
20	Clearing for silviculture		
20	Firewood collection	Habitat loss; habitat fragmentation; loss of fallen timber; loss of instream woody debris	
21	Burning practices	Changes in species composition, changes in fire regime; weed invasion, lack of recruitment, changes in successional dynamics	
22	Mining/quarrying activities	Habitat loss, changes in species composition, changes in successional dynamics, sedimentation, weed invasion, groundlayer degradation, soil disturbance	
23	Overfishing	Small population size, lack of recruitment	
24	Recreational activities	Weed invasion, habitat fragmentation, groundlayer degradation, soil disturbance, erosion, sedimentation	e.g. off-road vehicles, horse-riding,
25	Commercial developments	Habitat loss, habitat fragmentation, weed invasion, introduced predators, changes in species composition, loss of fallen timber; nutrient increases; sedimentation	
26	Habitat fragmentation and edge effects		
27	Invasive weeds		

Table 7 DSE's standard threats list from its Actions for Biodiversity Conservation (ABC) program

10	Agricultural chemicals / effluent	192	Groundwater - saline intrusion
20	Animals - cats	200	Hunting - shooting
21	Animals - dogs	201	Hunting - trapping/snaring/netting
22	Animals - domestic stock	210	Inappropriate tree planting
23	Animals - foxes	220	Introduction of species to areas outside their range
24	Animals - introduced herbivores	230	**Invasion by environmental weeds**
25	Animals - native species (inc noisy miners)	240	Land use changes - agricultural intensification
30	Aquaculture - freshwater	241	Land use changes - cultivation
41	Built structures e.g. powerlines, windmills	243	Land use changes - residential / commercial development
70	Collection/harvesting of target species	270	Parasites (inc mistletoe)
81	Construction/maintenance - fuel breaks	281	Recreational activities - motorised
82	Construction/maintenance - road, rail or utility	282	Recreational activities - non-motorised
90	Controlling - native animals	290	Loss of hollow bearing trees
91	Controlling - pest animals	291	Removal of rocks and/or soil
104	Disease	292	Vegetation control activities (inc.slashing)
120	Dumping - rubbish	293	Vegetation clearance
130	Earthworks	310	Soil erosion
150	Extractive and mining related activities	320	Timber harvesting
160	Fire - frequency	321	Timber plantations
161	Fire - intensity	340	Water - level / flow changes
162	Fire - season or time	341	Water - nutrients and chemicals
163	Fire - wildfire	343	Water - saline intrusion
164	**Firewood collection**	350	Waterways - instream barriers (incl dams)
173	Fisheries - recreational	351	Waterways - removal of wood debris/snags
190	Groundwater - level changes	352	Waterways - sedimentation or siltation
191	Groundwater - quality changes	500	**Habitat fragmentation/edge effect (inc roadsides)**

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Appendix 1. List of woodland and forest-dependent bird species in Victoria (DSE 2002).

Apostlebird	*Struthidea cinerea*
AustralianKingParrot	*Alisterus scapularis*
AustralianOwletnightjar	*Aegotheles cristatus*
AustralianRingneck	*Barnardius zonarius*
AzureKingfisher	*Alcedo azurea*
BarkingOwl	*Ninox connivens*
BassianThrush	*Zoothera lunulata*
BellMiner	*Manorina melanophrys*
BlackchinnedHoneyeater	*Melithreptus gularis*
BlackearedCuckoo	*Chrysococcyx osculans*
BlackfacedCuckooshrike	*Coracina novaehollandiae*
BlackfacedWoodswallow	*Artamus cinereus*
BlackHoneyeater	*Certhionyx niger*
BlackKite	*Milvus migrans*
BlueBonnet	*Northiella haematogaster*
BluefacedHoneyeater	*Entomyzon cyanotis*
BluewingedParrot	*Neophema chrysostoma*
BrownGoshawk	*Accipiter fasciatus*
BrownheadedHoneyeater	*Melithreptus brevirostris*
BrownThornbill	*Acanthiza pusilla*
BrownTreecreeper	*Climacteris picumnus*
BrushBronzewing	*Phaps elegans*
BrushCuckoo	*Cacomantis variolosus*
BuffrumpedThornbill	*Acanthiza reguloides*
BushStonecurlew	*Burhinus grallarius*
ChestnutcrownedBabbler	*Pomatostomus ruficeps*
ChestnutrumpedHeathwren	*Hylacola pyrrhopygia*
ChestnutrumpedThornbill	*Acanthiza uropygialis*
Cicadabird	*Coracina tenuirostris*
CollaredSparrowhawk	*Accipiter cirrhocephalus*
CommonBronzewing	*Phaps chalcoptera*
CrescentHoneyeater	*Phylidonyris pyrrhoptera*
CrestedBellbird	*Oreoica gutturalis*
CrestedShriketit	*Falcunculus frontatus*
CrimsonRosella	*Platycercus elegans*
DiamondDove	*Geopelia cuneata*
DiamondFiretail	*Stagonopleura guttata*
Dollarbird	*Eurystomus orientalis*
DuskyWoodswallow	*Artamus cyanopterus*
EasternRosella	*Platycercus eximius*
EasternSpinebill	*Acanthorhynchus tenuirostris*
EasternYellowRobin	*Eopsaltria australis*
FantailedCuckoo	*Cacomantis flabelliformis*

FlameRobin	*Petroica phoenicea*
FuscousHoneyeater	*Lichenostomus fuscus*
GanggangCockatoo	*Callocephalon fimbriatum*
GilbertsWhistler	*Pachycephala inornata*
GlossyBlackCockatoo	*Calyptorhynchus lathami*
GoldenWhistler	*Pachycephala pectoralis*
GreyButcherbird	*Cracticus torquatus*
GreycrownedBabbler	*Pomatostomus temporalis*
GreyCurrawong	*Strepera versicolor*
GreyFantail	*Rhipidura fuliginosa*
GreyGoshawk	*Accipiter novaehollandiae*
GreyShrikethrush	*Colluricincla harmonica*
GroundCuckooshrike	*Coracina maxima*
HoodedRobin	*Melanodryas cucullata*
HorsfieldsBronzeCuckoo	*Chrysococcyx basalis*
InlandThornbill	*Acanthiza apicalis*
JackyWinter	*Microeca fascinans*
LaughingKookaburra	*Dacelo novaeguineae*
LeadenFlycatcher	*Myiagra rubecula*
LittleButtonquail	*Turnix velox*
LittleEagle	*Hieraaetus morphnoides*
LittleFriarbird	*Philemon citreogularis*
LittleLorikeet	*Glossopsitta pusilla*
Malleefowl	*Leipoa ocellata*
MaskedOwl	*Tyto novaehollandiae*
MaskedWoodswallow	*Artamus personatus*
Mistletoebird	*Dicaeum hirundinaceum*
MuskLorikeet	*Glossopsitta concinna*
NewHollandHoneyeater	*Phylidonyris novaehollandiae*
NoisyFriarbird	*Philemon corniculatus*
NoisyMiner	*Manorina melanocephala*
OlivebackedOriole	*Oriolus sagittatus*
PaintedButtonquail	*Turnix varia*
PaintedHoneyeater	*Grantiella pictus*
PallidCuckoo	*Cuculus pallidus*
PeacefulDove	*Geopelia striata*
PeregrineFalcon	*Falco peregrinus*
PiedButcherbird	*Cracticus nigrogularis*
PiedCurrawong	*Strepera graculina*
PinkRobin	*Petroica rodinogaster*
PowerfulOwl	*Ninox strenua*
PurplecrownedLorikeet	*Glossopsitta porphyrocephala*
PurplegapedHoneyeater	*Lichenostomus cratitius*
RainbowBeeeater	*Merops ornatus*
RainbowLorikeet	*Trichoglossus haematodus*

RedbackedKingfisher	*Todiramphus pyrrhopygia*
RedbrowedFinch	*Neochmia temporalis*
RedbrowedTreecreeper	*Climacteris erythrops*
RedcappedRobin	*Petroica goodenovii*
RedchestedButtonquail	*Turnix pyrrhothorax*
RedtailedBlackCockatoo	*Calyptorhynchus b. graptogyne*
RedWattlebird	*Anthochaera carunculata*
RegentHoneyeater	*Xanthomyza phrygia*
RestlessFlycatcher	*Myiagra inquieta*
RoseRobin	*Petroica rosea*
RufousFantail	*Rhipidura rufifrons*
RufousSonglark	*Cincloramphus mathewsi*
RufousWhistler	*Pachycephala rufiventris*
SacredKingfisher	*Todiramphus sanctus*
SatinBowerbird	*Ptilonorhynchus violaceus*
SatinFlycatcher	*Myiagra cyanoleuca*
ScarletRobin	*Petroica multicolor*
ShiningBronzeCuckoo	*Chrysococcyx lucidus*
ShyHeathwren	*Hylacola cauta*
Silvereye	*Zosterops lateralis*
SingingHoneyeater	*Lichenostomus virescens*
SouthernBoobook	*Ninox boobook*
SouthernScrubrobin	*Drymodes superciliaris*
SouthernWhiteface	*Aphelocephala leucopsis*
SpeckledWarbler	*Chthonicola sagittata*
SpinycheekedHoneyeater	*Acanthagenys rufogularis*
SpottedNightjar	*Eurostopodus argus*
SpottedPardalote	*Pardalotus punctatus*
SpottedQuailthrush	*Cinclosoma punctatum*
SquaretailedKite	*Lophoictinia isura*
StriatedFieldwren	*Calamanthus fuliginosus*
StriatedPardalote	*Pardalotus striatus*
StriatedThornbill	*Acanthiza lineata*
StripedHoneyeater	*Plectorhyncha lanceolata*
SuperbParrot	*Polytelis swainsonii*
SuperbFairy-wren	*Maulrus cyanerea*
SwiftParrot	*Lathamus discolor*
TawnycrownedHoneyeater	*Phylidonyris melanops*
TawnyFrogmouth	*Podargus strigoides*
TreeMartin	*Hirundo nigricans*
TurquoiseParrot	*Neophema pulchella*
VariedSittella	*Daphoenositta chrysoptera*
VariegatedFairywren	*Malurus lamberti*
WedgetailedEagle	*Aquila audax*
Weebill	*Smicrornis brevirostris*

WesternGerygone	*Gerygone fusca*
WhistlingKite	*Haliastur shenurus*
WhitebelliedCuckooshrike	*Coracina papuensis*
WhitebreastedWoodswallow	*Artamus leucorynchus*
WhitebrowedBabbler	*Pomatostomus superciliosus*
WhitebrowedScrubwren	*Sericornis frontalis*
WhitebrowedWoodswallow	*Artamus superciliosus*
WhiteearedHoneyeater	*Lichenostomus leucotis*
WhitefrontedHoneyeater	*Phylidonyris albifrons*
WhitenapedHoneyeater	*Melithreptus lunatus*
WhiteplumedHoneyeater	*Lichenostomus penicillatus*
WhitethroatedGerygone	*Gerygone olivacea*
WhitethroatedNightjar	*Eurostopodus mystacalis*
WhitethroatedTreecreeper	*Cormobates leucophaeus*
WhitewingedChough	*Corcorax melanorhamphos*
WhitewingedTriller	*Lalage sueurii*
YellowfacedHoneyeater	*Lichenostomus chrysops*
YellowplumedHoneyeater	*Lichenostomus ornatus*
YellowRosella	*Platycercus e. flaveolus*
YellowrumpedPardalote	*Pardalotus p. xanthopygus*
YellowtailedBlackCockatoo	*Calyptorhynchus funereus*
YellowThornbill	*Acanthiza nana*
YellowtuftedHoneyeater	*Lichenostomus melanops*