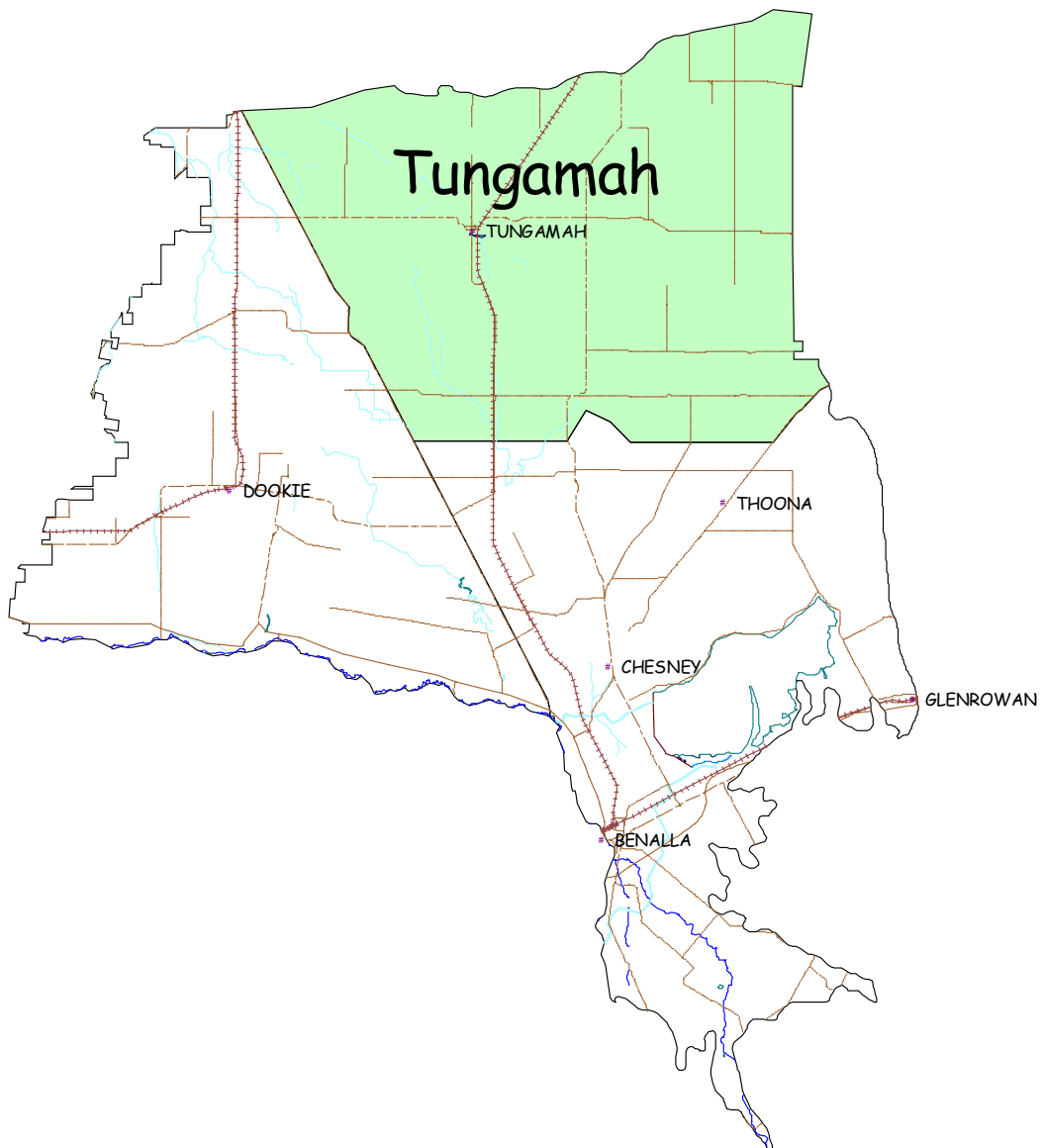


8. Tungamah Landscape Zone



8. Tungamah Landscape Zone

8.1 Tungamah Landscape Zone description

Tungamah Landscape zone (88,136 ha) is bounded to the west by the Benalla–Tocumwal Road (which is included in this zone); to the north by the border with Goulburn Broken CMA (much of which equates with the Murray Fans bioregion boundary); to the east by the Goulburn Broken CMA border with North East CMA; and to the south by the Moira-Delatite Shire boundary, Binney Road and Thoona–Boweya Road. Towns in the zone include Tungamah, Wilby and Lake Rowan. The zone is overlain by Moira, Wangaratta Rural City and Benalla Local Government Areas (Map 19).

The Victorian Riverina component (64,801 ha—about 74% of the zone) consists (as in Dookie Landscape zone) of alluvial plains of tertiary origin (LCC 1983). Rises constituting components of Northern Inland Slopes bioregion (23,335 ha—26% of the zone) vary from sedimentary to granitic in origin, and occur around Youarang, north-east of Tungamah, and across much of the south-east of the zone.

The main drainage in the zone is via the Broken–Boosey Creek system, long sections of which are reserved as Public Land Water Frontage. This riparian system, which also incorporates creek and swamp components downstream of the plan area, is considered to be ‘the only remaining substantial occurrence of high quality native vegetation on the northern plains’ (ECC 2000) and has been recommended for reservation (in part) as ‘Broken–Boosey State Park’. Within Tungamah zone, Public Land Water Frontage (K1), Streamside Reserve (K13) and Bushland Reserve (H43) along Boosey Creek—between Katamatite and Tungamah Road—is recommended for inclusion in this State Park, as is a short section of Broken Creek (ECC 2001). Similar tenures further upstream on Boosey Creek (between Tungamah and Lake Rowan—K1, K27, H46) and on Broken Creek (K1, H44-45), which were recommended as Nature Conservation Reserve (ECC 2001), have now (following local community consultation) been relegated by the Government to Natural Features Reserve (VG 2002).

Moodie Swamp, Tungamah Swamp and Dowdles Swamp State Game Reserves occur on the riverine plain within this zone, but all have had their original wetland attributes modified due to altered flooding-and-drying regimes, grazing, clearing, loss of connectivity, and other influences. Flow management in Broken Creek directly influences the ecology of Moodie Swamp, which is an off-stream component of that system. Dowdles Swamp comprises part of the catchment of the high-value wetland system known as Muckatah Depression, a narrow (20–100 m) and shallow (< 50 cm) freshwater wetland extending some 60 km to the north-west. Muckatah Depression is an important tributary of Broken Creek (outside the zone), and is listed in the Directory of Important Australian Wetlands (EA 2001) (Map 23).

Pre-1750 vegetation cover in the Victorian Riverina component included mainly *plains grassy woodland (e)*, *plains grassy woodland / gilgai plains woodland / wetland mosaic (e)*, and *pine box woodland / riverina plains grassy woodland mosaic (e)* (Map 37). Today, it is difficult to locate any relatively intact remnant examples of these woodlands greater than a few hectares in extent, except on several small conservation and gravel reserves, and on sites closely associated with the major creeklines. Significant roadsides and associated freehold remnants occur on Three Chain Road, south of Tungamah Swamp (Robinson 1998, Todd 1999). Tree species dominating remnants and scattered across farmland in the zone include River Red Gum, Grey Box, White Cypress-pine and (less commonly) Buloke.

On the more isolated outcrops, patches of hilltop woodland (comprising Blakely’s Red Gum, Yellow Box and White Cypress-pine) are frequently the only native vegetation remnants in the district, and hence have potential ‘stepping-stone’ value for fauna.

8. Tungamah Landscape Zone

8.1 Tungamah Landscape Zone description (cont'd)

Unfortunately, despite their endangered status, these hilltop remnants are typically overgrazed and often degraded by other practices, including boulder removal and gravel stripping (e.g. at Pelluebla Road, Youanmite).

In the extensive series of hills in the south-east of the zone (around Almonds and Boweya North), roadside habitats are generally fragmented and, despite mature trees being common, understorey is mostly degraded (Davidson 1996).

However, sedimentary slope vegetation is well exemplified in *box ironbark forest* (v) at Boweya Flora and Fauna Reserve, which retains diverse flora and fauna values and sustains habitat links with

the larger Killawarra State Forest in the adjacent North East CMA, to the east (Davidson 1996) (Map 21).

Dryland farming is practiced throughout the zone (LCC 1983)—mixed cropping and grazing is the main agricultural pursuit, with vineyards becoming more prolific on better drained slopes. Honey producers utilise the excellent gum and box resources of Boweya Flora and Fauna Reserve.



A 'stepping-stone' habitat remnant of *pine-box woodland* on a granite rise on freehold near Youarang (Northern Inland Slopes bioregion).

8. Tungamah Landscape Zone

8.1 Tungamah Landscape Zone description (cont'd)

Table 28. Total area of pre 1750 and extant EVCs in the Tungamah Landscape zone, within the Victorian Riverina bioregion

EVC Group	EVC #	EVC Bioregional Conservation Status	EVC Name	Pre-1750 Area (ha)	Current Area (ha)
14	294	E	Plains Grassy Woodland/Gilgai Plains Woodland/Wetland Mosaic	34026	249
14	55	E	Plains Grassy Woodland	16613	107
14	867	E	Pine Box Woodland/Riverina Plains Grassy Woodland Mosaic	7351	39
5	175	E	Grassy Woodland	2031	3
15	68	E	Creekline Grassy Woodland	1131	151
19	292	E	Red Gum Wetland	817	137
19	333	E	Red Gum Wetland/Plains Grassy Wetland Mosaic	753	83
14	868	E	Pine Box Woodland	747	0
19	74	E	Wetland Formation	541	4
19	125	E	Plains Grassy Wetland	247	5
15	869	E	Creekline Grassy Woodland/Red Gum Wetland Mosaic	189	3
19	291	X	Cane Grass Wetland	164	0
19	297	E	Lagoon Wetland/Red Gum Wetland Mosaic	81	<1
15	168	E	Drainage Line Complex	68	6
16	67	E	Alluvial Terraces Herb-rich Woodland	24	0
14	299	E	Unclassified Lunette Woodland	13	0
4	61	V	Box Ironbark Forest	4	<1
5	80	X	Spring Soak Woodland	<1	0
TOTAL				64801	788
99	997	NA	Private Land No Tree Cover		64016

8. Tungamah Landscape Zone

8.1 Tungamah Landscape Zone description (cont'd)

Table 29. Total area of pre 1750 and extant EVCs in the Tungamah Landscape zone, within the Northern Inland Slopes bioregion

EVC Group	EVC #	EVC Bioregional Conservation Status	EVC Name	Pre-1750 Area (ha)	Current Area (ha)
5	175	E	Grassy Woodland	16254	49
4	61	V	Box Ironbark Forest	4512	499
14	294	E	Plains Grassy Woodland/Gilgai Plains Woodland/Wetland Mosaic	802	1
14	868	X	Pine Box Woodland	546	0
14	867	E	Pine Box Woodland/Riverina Plains Grassy Woodland Mosaic	336	<1
16	67	E	Alluvial Terraces Herb-rich Woodland	278	4
14	55	E	Plains Grassy Woodland	265	1
4	72	LC	Granitic Hills Woodland	164	7
15	68	E	Creekline Grassy Woodland	102	1
6	47	E	Valley Grassy Forest	40	0
16	81	E	Alluvial Terraces Herb-rich Woodland/Creekline Grassy Woodland Mosaic	19	<1
19	291	E	Cane Grass Wetland	9	0
5	80	E	Spring Soak Woodland	3	0
19	125	X	Plains Grassy Wetland	2	0
TOTAL				23335	563
99	997	NA	Private Land No Tree Cover		22772

Table 30. Total area and number of current EVCs in each conservation status in the Tungamah Landscape zone.

EVC Bioregional Conservation Status	Hectares (VR)	Number of EVCs (VR)	Hectares (NIS)	Number of EVCs (NIS)
Endangered	788	12	57	7
Vulnerable	<1	1	499	1
Depleted	0	0	0	0
Rare	0	0	0	0
Least Concern	0	0	7	1

8. Tungamah Landscape Zone

8.1 Tungamah Landscape Zone description (cont'd)

Table 31. List of current threatened flora and their conservation status in the Tungamah Landscape zone (as at December 2002, NRE 2002c).

English Name	Latin Name	Australian Status	Victorian Status	FFG Listed	FFG Action Statement No.	Recovery Plan	BNA Assessed (VR)	BNA Assessed (NIS)	Species No.
Bent-leaf Wattle	<i>Acacia flexifolia</i>	r					Un	Un	35
Bluish Raspwort	<i>Haloragis glauca f. glauca</i>	k					Un	Un	3766
Buloke	<i>Allocasuarina luehmannii</i>			L			Un	Un	678
Common Joyweed	<i>Alternanthera nodiflora</i>	k					Un	Un	185
Cotton Panic-grass	<i>Digitaria brownii</i>	k					Un	Un	1042
Dark Roly-poly	<i>Sclerolaena muricata var. semiglabra</i>	k					Un	Un	4975
Forde Poa	<i>Poa fordeana</i>	k					Un	Un	2593
Grey Billy-buttons	<i>Craspedia canens</i>	e					Un	Un	4643
Hydrilla	<i>Hydrilla verticillata</i>	r					Un	Un	1713
Leafy Templetonia	<i>Templetonia stenophylla</i>	r					Un	Un	3341
Matted Water-starwort	<i>Callitriche sonderi</i>	k					Un	Un	573
Mugga	<i>Eucalyptus sideroxylon s.s.</i>	r					Un	Un	4493
Painted Diuris	<i>Diuris tricolor</i>	e	L				Un	Un	5275
Pale Grass-lily	<i>Caesia parviflora var. vittata</i>	k					Un	Un	4342
Pale Spike-sedge	<i>Eleocharis pallens</i>	v						Un	1143
Pepper Grass	<i>Panicum laevinode</i>	v					Un	Un	4808
Riverina Bitter-cress	<i>Cardamine moirensis</i>	r					Un	Un	5032
Silky Browntop	<i>Eulalia aurea</i>	r					Un	Un	1328
Slender Tick-trefoil	<i>Desmodium varians</i>	k					Un	Un	4425
Slender Water-ribbons	<i>Triglochin dubium</i>	r					Un	Un	5010
Small Chocolate-lily	<i>Arthropodium sp. 3 (aff. strictum)</i>	k					Un	Un	4248
Small-leaf Bush-pea	<i>Pultenaea foliolosa</i>	r					Un	Un	2848
Smooth Minuria	<i>Minuria integerrima</i>	r					Un	Un	2201
Straw Wallaby-grass	<i>Austrodanthonia richardsonii</i>	v						Un	978
Swamp Billy-buttons	<i>Craspedia paludicola</i>	v					Un	Un	4649
Swamp Star	<i>Hypoxis exilis</i>	v					Un	Un	3777
Tufted Club-sedge	<i>Isolepis wakefieldiana</i>	r					Un	Un	1789
Victorian Club-sedge	<i>Isolepis victoriensis</i>	k					Un	Un	1788
Waterbush	<i>Myoporum montanum</i>	r					Un	Un	2240
Western Silver Wattle	<i>Acacia decora</i>	v					Un		27
Woolly Buttons	<i>Leiocarpa panaetioides</i>	r					Un	Un	1945
Yarran Wattle	<i>Acacia omalophylla</i>	e	L						69

8. Tungamah Landscape Zone

8.1 Tungamah Landscape Zone description (cont'd)

Table 32. List of current threatened (Cen, End & Vul) fauna and their conservation status in the Tungamah Landscape zone (as at December 2002, NRE 2002d).

English Name	Latin Name	Australian Status	Victorian Status	FFG Listed	FFG Action Statement No.	Recovery Plan	BNA Assessed (VR)	BNA Assessed (NIS)	Species No.
Apostlebird	<i>Struthidea cinerea</i>		v					Un	675
Australasian Bittern	<i>Botaurus poiciloptilus</i>		e				Un	Un	197
Australasian Shoveler	<i>Anas rhynchotis</i>		v				Un	Un	212
Baillon's Crake	<i>Porzana pusilla</i>		v				Un	Un	50
Barking Owl	<i>Ninox connivens</i>		e	L					246
Black Falcon	<i>Falco subniger</i>		e					Un	238
Blue-billed Duck	<i>Oxyura australis</i>		v	L				Un	216
Brolga	<i>Grus rubicunda</i>		v	L				Un	177
Brown Quail	<i>Coturnix ypsilophora</i>		i				Un	Un	10
Bush Stone-curlew	<i>Burhinus grallarius</i>		e	L	78				174
Carpet Python	<i>Morelia spilota metcalfei</i>		e	L				Un	2969
Diamond Firetail	<i>Stagonopleura guttata</i>			L			Un	Un	652
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>		i				Un	Un	1072
Freckled Duck	<i>Stictonetta naevosa</i>		e	L	105			Un	214
Glossy Ibis	<i>Plegadis falcinellus</i>		v					Un	178
Great Egret	<i>Ardea alba</i>		e	L				Un	187
Grey Goshawk	<i>Accipiter novaehollandiae</i>		l				Un	Un	220
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>		e	L	34				443
Hardhead	<i>Aythya australis</i>		v				Un	Un	215
Hooded Robin	<i>Melanodryas cucullata</i>			L			Un	Un	385
Intermediate Egret	<i>Ardea intermedia</i>		c	L					186
Little Bittern	<i>Ixobrychus minutus</i>		e					Un	195
Little Egret	<i>Egretta garzetta</i>		c					Un	185
Musk Duck	<i>Biziura lobata</i>		v				Un	Un	217
Nankeen Night Heron	<i>Nycticorax caledonicus</i>		v					Un	192
Painted Honeyeater	<i>Grantiella picta</i>		v	L			Un		598
Painted Snipe	<i>Rostratula benghalensis</i>		e						170
Pied Cormorant	<i>Phalacrocorax varius</i>		l				Un	Un	99
Regent Honeyeater	<i>Xanthomyza phrygia</i>	E	c	L	41		Un		603
Royal Spoonbill	<i>Platalea regia</i>		v					Un	181
Speckled Warbler	<i>Chthonicola sagittata</i>		v				Un	Un	504
Square-tailed Kite	<i>Lophoictinia isura</i>		e				Un		230
Squirrel Glider	<i>Petaurus norfolcensis</i>		e	L	166				1137
Superb Parrot	<i>Polytelis swainsonii</i>	V	e	L	33			Un	277
Swift Parrot	<i>Lathamus discolor</i>	E	e	L	169				309
Tasmanian Pademelon	<i>Thylogale billardierii</i>		x	L	14		Un	Un	1235
Tree Goanna	<i>Varanus varius</i>		i				Un	Un	2283
Turquoise Parrot	<i>Neophema pulchella</i>		l	L					302
Whiskered Tern	<i>Chlidonias hybridus</i>		l				Un	Un	110
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>		e	L	60			Un	226

8. Tungamah Landscape Zone

8.2 Tungamah Landscape Zone priorities

8.2.1 Summary of priority biodiversity actions for Tungamah Landscape zone

- Protect and enhance existing biodiversity attributes of Boweya Flora & Fauna Reserve (G11); Dowdles Swamp, Moodie Swamp and Tungamah Swamp Wildlife Reserves (C29 & 26-27); Bushland Reserves H43-47, 85-86 & 103; Tharanbeggia Gravel & Stone Reserve (R16) and unreserved Public Land (U33) at Tungamah.
- Improve protection and management of Public Land Water Frontage, Streamside Reserves and key unreserved creeklines throughout the zone, giving priority to reserves along Boosey Creek (K1, K13), Broken Creek (K1) and Back Creek (at Lake Rowan; K27).
- Protect and enhance roadside remnants and networks (including associated freehold), giving priority to the locality of Three Chain, Pelluebla and Kreeck Roads, south-east of Tungamah Swamp (where good remnants occur on both roadsides and freehold); and other important roadsides at Wilby and Marungi.
- Prevent further decline in biodiversity values of native vegetation due to domestic grazing on public land by removal or continued exclusion of stock, and fencing of relevant reserves where needed. Give priority to Boweya Flora & Fauna Reserve; Dowdles, Moodie and Tungamah Swamp Wildlife Reserves; Bushland Reserves H43-47, 85-86 & 103; Public Land and Water Frontages and streamside areas on Boosey, Broken and Back Creeks; roadsides at Tungamah, Wilby and Marungi; unreserved Public Land (U33) at Tungamah; and a licensed unused road between Boweya Flora and Fauna Reserve and Killawarra State Forest. Also discourage domestic grazing (wherever possible) on creeklines in freehold.
- Identify localised sites of high biodiversity value and provide appropriate protection and management. Select the most strategic sites *around which* to develop Local Landscape Plans, where appropriate. These plans would use vegetation restoration to expand and extend existing remnants across tenures, for the most effective biodiversity outcome. Priority sites include areas surrounding Boweya Flora & Fauna Reserve; Dowdles, Moodie and Tungamah Swamp Wildlife Reserves; Bushland Reserves H43-47, 85-86 & 103; Public Land and Water Frontages and State Reserves on Boosey, Broken and Back Creeks; roadsides and associated freehold remnants at Tungamah, Wilby and Marungi; unreserved Public Land (U33) at Tungamah; unused road between Boweya Flora and Fauna Reserve and Killawarra State Forest; and high-quality freehold at Almonds, Bundalong, Nooramunga, Tungamah, Boweya, and between Tungamah and Lake Rowan.
- Encourage farmers to protect from disturbance, and facilitate regeneration in, relict woodland stands of Buloke, White Cypress-pine, Grey Box and River Red Gum on farmland, and Yellow Box, Blakely's Red Gum and White Cypress-pine remnants on granite outcrops. Give priority to restoration strategies which incorporate existing remnants and which feature habitat linkages, road reserve networks or 'stepping stones' across the landscape.

8. Tungamah Landscape Zone

8.3 Private Land

Land Tenure Details:

This tenure includes all private land in the zone, with associated creeklines. Freehold is largely cleared throughout the zone, with few good-quality remnants above 10 ha in extent. Todd (1999) has identified freehold blocks at Almonds (20 ha) and Bundalong (15 ha) as priority sites for protection in the zone. Robinson (1998b) has identified as significant some freehold remnants between Three Chain Road and Boosey Creek frontage, and to north of Kreeck Road, at Tungamah—these remnants being closely associated with high-quality roadside reserves (see Local Govt.). Other notable localised remnants (containing White Cypress-pine, Blakely's Red Gum, Buloke and Grey Box) occur on freehold between Tungamah and Lake Rowan (e.g. on Holmes Road). A number of significant box ironbark remnants occur on freehold around Boweya Flora and Fauna Reserve (G11) (Davidson 1996) and have strategic importance to the conservation of local threatened taxa, particularly Squirrel Glider and Grey-crowned Babbler.

Land Manager:

Private landholders

Stakeholders:

Key CMA, LGA, Lc, DSE, DPI, PV

Other TFN, LFW, BG, GAV, CVA, FNC, VAA, VFF, GNP

Threatened Biodiversity Assets (in brackets: Cons status Vic - lower case, Aust - upper case; followed by BNA priority / risk rankings for threatened taxa = 1A, 2B, etc., or un - unassessed):

EVCs: Freehold land within the VR bioregion formerly (pre-1750) carried broad tracts of *plains grassy woodland* (e) and *plains grassy woodland / gilgai plains woodland / wetland mosaic* (e), with lesser expanses of *pine-box woodland / riverina plains grassy woodland mosaic* (e), *pine box woodland* (e) and *grassy woodland* (e). Low-lying sites on the plains often supported *red gum wetland / plains grassy wetland mosaic* (e), *plains grassy wetland* (e), *red gum wetland* (e) or *wetland formation* (e). Within NIS bioregion, freehold formerly carried largely *grassy woodland* (e) or *box ironbark forest* (v), as well as considerable *pine-box woodland / riverina plains grassy woodland mosaic* (e), and minor areas of several other EVCs. Scattered fragments are today all that remain of most of the woodland vegetation, while the surviving wetland types are mostly highly degraded, and isolated through loss of connective vegetation.

8. Tungamah Landscape Zone

8.3 Private Land (cont')

Threatened flora: Bluish Raspwort (k, 1B - VR), Pale Spike-sedge (v, 1B - VR), Plains Leek-orchid (Re, 3A - VR), Western Silver Wattle (v, 4A - NIS), Yarran Wattle (e, 1A - VR).



Prasophyllum sp. (Nagambie)
(Photo: John Eichler)

Threatened fauna: Australasian Bittern (v, unr - VR), Barking Owl (e, 2A - VR), Black Falcon (e, 1A - VR), Apostlebird (v, 3B - VR), Blue-billed Duck (v, 4B - VR), Brolga (v, 2B - VR), Bush Stone-curlew (e, 1A - VR), Freckled Duck (e, unr - VR), Glossy Ibis (v, 3B - VR), Great Egret (e, unr - VR), Grey-crowned Babbler (e, 2A - VR), Intermediate Egret (cen, 1A - VR), Lace Monitor (dd, unr - NIS), Little Bittern (e, 1A - VR), Little Egret (cen, 1A - VR), Nankeen Night Heron (v, 1B - VR), Painted Honeyeater (Rv, 1B - NIS), Regent Honeyeater (Ecen, 2A - NIS), Royal Spoonbill (v, 1B - VR), Speckled Warbler (v, unr - NIS), Squirrel Glider (e, 3A - NIS), Swift Parrot (Ve, 4A - NIS), Turquoise Parrot (In, 1C - NIS), White-bellied Sea-eagle (e, unr - VR).



Intermediate Egret (Photo: Mike Carter)

Recommended actions:

Protection of existing remnants:

- Determine priorities for protection of remnants of woodland, creekline or wetland habitats, on freehold throughout the zone and apply voluntary programs, incentives and/or planning controls, as appropriate. In particular, encourage and assist landholders of remnants identified (above) by Todd (1999) and Robinson (1998b) near Tungamah, Almonds and Bundalong, to protect and maintain existing biodiversity values.
- Assist Landcare groups and LFW extension officers to inform landholders of their potential role in conserving biodiversity, and to coordinate their involvement for the best possible outcome.
- Highlight the need to protect habitats larger than 2 ha in extent at or near Grey-crowned Babbler or Squirrel Glider colonies, especially where patches adjoin roadsides or creeklines.
- Investigate the potential of freehold remnants to complement remnant native vegetation on Public Land Water Frontage and Streamside Reserves along the Broken–Boosey Creek system, conservation reserves and other public land.
- Adhere strictly to native vegetation retention controls, particularly in the case of large trees and woodlots near Grey-crowned Babbler or Squirrel Glider colonies.
- Ensure that Shire staff know locations and importance of freehold remnants having biodiversity values.
- Assist Shire to incorporate into roadside conservation plans any priority freehold remnants having strategic connective value or potential.

8. Tungamah Landscape Zone

8.3 Private Land (cont')

- Encourage Shires to promote responsible pet ownership, giving priority to strongholds of Squirrel Glider, Bush Stone-curlew and Grey-crowned Babbler habitat.
- Monitor freehold remnants on granite rises to ensure that habitat is not further degraded by illegal granite or gravel removal.

Management to enhance remnants for threatened taxa (BNA response level in brackets: 4 = full commitment, 3 = substantive participation, 2 = opportunistic action, 1 = watching brief):

- Supplement availability of shallow freshwater swamps, with some open water, as well as areas of emergent vegetation, lignum, flood debris, etc., suitable for Freckled Duck (2 - VR).
- Supplement availability of shallow-water feeding areas—with nearby dense tree-clumps for roosting of Nankeen Night Heron (3 - VR) near wetlands and streams, and with reeds, shrubs or trees as nesting habitat for Royal Spoonbill (3 - VR).
- Enhance flow regimes on drainage lines, wetlands and floodplains (in VR bioregion) to provide more natural environmental conditions for Bush Stone-curlew (4 - VR), Intermediate Egret (4 - VR), Little Bittern (4 - VR), Little Egret (4 - VR) and Royal Spoonbill (3 - VR), as well as Australasian Bittern (2 - VR), Great Egret (2), White-bellied Sea-eagle (2 - VR), Blue-billed Duck (1 - VR) and Glossy Ibis (1 - VR).
- Exclude domestic grazing to benefit Intermediate Egret (4 - VR), Yarran Wattle (4 - VR), Grey-crowned Babbler (3 - VR), Plains Leek-orchid (3 - VR) and Apostlebird (2 - VR).
- Exclude grazing around wetlands of VR bioregion to benefit Intermediate Egret (4 - VR) and Brolga (2 - VR), but ensure that fencing does not exclude Brolga chicks from receding wetlands (Arnol *et al.* 1984).
- Modify domestic grazing levels, as appropriate, to benefit Bush Stone-curlew (4 - VR), Little Bittern (4 - VR) and Bluish Raspwort (3 - VR).
- Control foxes and cats to minimise unnatural predation upon Bush Stone-curlew (4 - VR), Grey-crowned Babbler (3 - VR), Apostlebird (2 - VR), Brolga (2 - VR), Turquoise Parrot (2 - NIS) and Lace Monitor (1 - NIS).
- Control weeds to benefit Bush Stone-curlew (4 - NIS) and Bluish Raspwort (3 - VR).



Royal Spoonbill (Photo: Peter Menkhorst)



Apostlebird (Photo: DSE/McCann)

8. Tungamah Landscape Zone

8.3 Private Land (cont')

- Increase abundance of mature and hollow-bearing trees, conserve native understorey trees and shrubs, retain fallen timber and litter, and conserve mistletoe populations, to supplement woodland habitat for Black Falcon (4 - VR), Bush Stone-curlew (4 - VR), Barking Owl (3 - VR), Grey-crowned Babbler (3), Squirrel Glider (3 - NIS), Painted Honeyeater (3 - NIS), Apostlebird (2 - VR), Swift Parrot (2 - NIS), Lace Monitor (2 - NIS) and Speckled Warbler (2 - NIS).
- Offer advice and assistance to interested landholders on management practices to benefit Plains Leek-orchid (3 - VR), Pale Spike-sedge (3 - VR) and Western Silver Wattle (2 - NIS) on known freehold sites.

Restoration of strategic vegetation blocks or linkages:

- Encourage and assist landholders of freehold remnants to restore and expand available habitats, and improve connectivity to any nearby remnants on freehold, road reserves or other tenure. Give priority to significant remnants identified by Todd (1999), Robinson (1998b) and Davidson (1996), at Almonds, Bundalong, Nooramunga, Tungamah and near Boweya Flora and Fauna Reserve (G11) (see above).
- Arrange (in consultation with licensees) to fence out key unused roads (of which there are many associated with this tenure) and creeklines.
- Urge and assist Landcare groups and LFW extension officers to inform landholders of their potential role in conserving biodiversity, and to coordinate their involvement for the best possible outcome.
- Co-ordinate restoration and revegetation initiatives to assist landholders and the Shire in consolidating local remnants.
- On freehold land abutting roadside habitats of Squirrel Glider or Grey-crowned Babbler, promote and assist creation of buffer strips (at least 15 m wide and 0.5 km long) which have preferably been neither ploughed nor ripped.
- In consultation with CMA, develop habitat management plans for streamsides on freehold, with particular emphasis upon protecting and expanding habitat nodes (e.g. creekline-roadside intersections).



Squirrel Glider (Photo: DSE/Menkhorst)

8. Tungamah Landscape Zone

8.3 Private Land (cont')

EXISTING POLICIES, PLANS OR PROGRAMS supporting one or more of the recommended actions:

- FFG Action Statement – Grey-crowned Babbler (34).
- FFG Action Statement – Regent Honeyeater (41).
- FFG Action Statement – Predation by Red Fox (44).
- FFG Action Statement – White-bellied Sea-eagle (60)
- FFG Action Statement – Bush Stone-curlew (78).
- FFG Action Statement – Predation by Cat (80).
- FFG Action Statement – Freckled Duck (105).
- FFG Action Statement – Squirrel Glider (166).
- FFG Action Statement – Swift Parrot (169).
- CAMBA – Glossy Ibis, Great Egret, Painted Snipe, White-bellied Sea-eagle.
- JAMBA – Great Egret.
- Management Plan – Brolga (Arnol et al. 1984).
- Recovery Plan – Regent Honeyeater (Menkhorst et.al. 1999).
- Recovery Plan – Swift Parrot (SPRT 2000).

8. Tungamah Landscape Zone

8.4 Public Land Water Frontage

Land Tenure Details:

A number of relatively long lengths of Public Land Water Frontage (K1) occur on the Boosey and Broken Creek systems within this zone. Associated with this water frontage are sections of Streamside Reserve—K13 (72 ha) on Boosey Creek, and K27 (3 ha) on Back Creek at Lake Rowan (LCC 1985). All of these reserve parcels fall within a more extensive creek and wetland system which has been identified by Robinson (1998b) as part of a 'major site of conservation significance in the Victorian eastern Northern Plains'. Todd (1999) has also identified part of this tenure—the section of Boosey Creek from Tungamah to Lake Rowan—as a 'priority area for protection and establishment of protected areas'. Broken Creek water frontage, within the zone, is part of a larger drainage system which is listed (VIC036) in the Directory of Important Australian Wetlands (EA 2001).

Land Manager:

Land Victoria

Stakeholders:

Key CMA, DSE, DPI, Private

Other LGA, Lc, WAG, RAG, LFW, GAV, CVA, VFF, VAA, GNP

Threatened Biodiversity Assets (in brackets: Cons status Vic - lower case, Aust - upper case; followed by BNA priority / risk rankings for threatened taxa = 1A, 2B, etc., or un - unassessed):

EVCs: The Boosey-Broken Creek system retains discontinuous remnants of *creepline grassy woodland* (e), which once extended for the full length of these stream systems in the zone. This remnant EVC is in places fringed by broken strips of either *plains grassy woodland* / *gilgai plains woodland* / *wetland mosaic* (e), *plains grassy woodland* (e) or *pine box woodland* / *riverine plains grassy woodland mosaic* (e). These woodland vegetation types formerly (pre-1750) extended over almost all of the riverine plains within the zone. Dominant tree cover within the water frontage varies between River Red Gum and Grey Box, with occasional Yellow or Black Box, or even Buloke or White Cypress-pine. The creepline vegetation of today, though degraded, retains biodiversity values not found elsewhere in the zone (ECC 2000).

Threatened flora: Bluish Raspwort (k, unr - VR), Pale Spike-sedge (v, unr - VR).

Threatened fauna: Grey-crowned Babbler (e, unr - VR), Nankeen Night Heron (v, 3B - VR), Royal Spoonbill (v, unr - VR).



Nankeen Night Heron (Photo: Viridans Biological Databases)

8. Tungamah Landscape Zone

8.4 Public Land Water Frontage (cont')

Recommended actions:

Protection of existing remnants:

- Assess the status and condition of stream frontages in the zone, especially with respect to fencing and grazing. Implement measures to provide maximum protection for existing values, excluding or reducing grazing wherever possible. Give priority to significant water frontage identified above on Boosey and Broken Creeks.
- Assess sites of occurrence of Bluish Raspwort (2 - VR) and Pale Spike-sedge (2 - VR) within the tenure to determine habitat protection and management requirements of these taxa.

Management to enhance remnants for threatened taxa (BNA response level in brackets: 4 = full commitment, 3 = substantive participation, 2 = opportunistic action, 1 = watching brief):

- Supplement habitat, including riparian tree cover and shallow feeding areas, to benefit Nankeen Night Heron (2 - VR).
- Enhance flow regimes to benefit Royal Spoonbill (2) and Pale Spike-sedge (2 - VR).
- Increase abundance of mature hollow-bearing trees, conserve understorey, and retain fallen timber and litter, to benefit Grey-crowned Babbler (2 - VR).
- Exclude domestic stock grazing from water frontage to benefit Grey-crowned Babbler (2 - VR), Bluish Raspwort (2 - VR) and Pale Spike-sedge (2 - VR).
- Control introduced predators, especially on K13, to benefit Grey-crowned Babbler (2 - VR).
- Control weeds to benefit Bluish Raspwort (2 - VR).



Nankeen Night Heron
(Photo: DSE/McCann)

Restoration of strategic vegetation blocks or linkages:

- Undertake restoration and revegetation to consolidate riparian habitat working where possible from existing habitat nodes and linking to adjacent remnants on freehold, roadsides or other sections of unreserved creekline. Give priority to water frontage on Boosey and Broken Creeks.
- Encourage (through incentives and voluntary programs) similar restoration and revegetation works on intervening stream sections which are currently unreserved.

8. Tungamah Landscape Zone

8.4 Public Land Water Frontage (cont')

EXISTING POLICIES, PLANS OR PROGRAMS supporting one or more of the recommended actions:

- FFG Action Statement – Grey-crowned Babbler (34).
- FFG Action Statement – Predation by Red Fox (44).
- FFG Action Statement – Predation by Cat (80).
- ECC (2001) recommendation to include K1, 13 & 27 on Boosey Creek (between Katamatite and Tungamah Road), and about 0.5 km of Broken Creek (east of Benalla–Tocumwal Road), as parts of Broken-Boosey State Park. Subsequent Government policy (VG 2002) designates all K1 on Broken Creek (other than that destined for State Park) and all K1 and K27 on Boosey Creek between Tungamah and Lake Rowan as Natural Features Reserve rather than Nature Conservation Reserve.

8. Tungamah Landscape Zone

8.5 Other State Government

Land Tenure Details:

This tenure includes unused roads in the zone, the Benalla–Yarrowonga rail reserve, as well as several Recreation Reserves (O4) and Tharanbeggia Gravel & Stone Reserve (R16; 8 ha on Tungamah Road, N of Tungamah). The latter reserve has geological relevance for educational purposes (LCC 1985), as well as containing remnant vegetation. A block of unreserved Public Land at Tungamah (U33; 100 ha) has been recommended for revegetation as a Bushland Reserve (LCC 1985). Several small unclassified Public Land parcels (designated Z99 on DSE GIS maps) are also included in the tenure. Management of some of the above reserves having intensive community use (e.g. O4, T1, Z99) may be delegated to LGA. A notable vegetation link of mature trees (indeed, the last link) between Boweya Flora and Fauna Reserve (G11) and Killawarra State Forest (F1, to the east) occupies a licensed unused road (Davidson 1996).

Land Manager:

Land Victoria, Public Transport Corporation

Stakeholders:

Key DSE, DPI, CMA

Other VAA, BG, TSN, FNC, LGA, GNP, Private.

Threatened Biodiversity Assets (in brackets: Cons status Vic - lower case, Aust - upper case; followed by BNA priority / risk rankings for threatened taxa = 1A, 2B, etc., or un - unassessed):

EVCs: Along Boosey Creek, U33 supports remnant *red gum wetland / plains grassy wetland mosaic* (e) and *plains grassy woodland / gilgai plains woodland / wetland mosaic* (e). Grey Box is prominent, with River Red Gum and other box species in mixture. This vegetation formerly (pre-1750) covered the whole block, with *creepline grassy woodland* (e) close along the stream. R16 lies on a plain formerly covered with *grassy woodland* (e) of mainly Grey Box. A small remnant of this EVC remains in the reserve.

Threatened flora: None recorded.

Threatened fauna: Bush Stone-curlew (e, unr - VR), Brolga (v, unr - VR).

Recommended actions:

Protection of existing remnants:

- Identify and monitor sites of biodiversity significance, and ensure that existing levels of habitat protection are adequate. In particular, exclude or minimise grazing pressure on all reserves with remnant native vegetation.
- Assess whether conservation reserve status is warranted for any sites in this tenure, giving priority to U33 and R17.



Bush Stone-curlew (Photo: Viridans Biological Databases)

8. Tungamah Landscape Zone

8.5 Other State Government (cont')

- If necessary, establish a Public Authority Management Agreement with PTC to protect habitat for Bush Stone-curlew within the Benalla–Yarrawonga rail reserve, near St James.
- For reserves whose management is delegated to LGA or other agency, ensure managers are aware of any biodiversity values requiring specific protection or management.
- In consultation with licensees, review status of unused roads and, where habitat values (or potential values) exist, assess fencing, grazing exclusion, and regeneration to ensure habitat protection.

Management to enhance remnants for threatened taxa (BNA response level in brackets: 4 = full commitment, 3 = substantive participation, 2 = opportunistic action, 1 = watching brief):

- Supplement abundance of clumps of trees in open woodland, and retain fallen timber and litter, to benefit Bush Stone-curlew (2 - VR), notably on rail reserve around St James.
- Control foxes and cats, and exclude or control grazing, to benefit Bush Stone-curlew (2 - VR), notably on rail reserve around St James, and Brolga (2 - VR), notably at Z99 (5 km south-east of Tungamah) on Three Chain Road.



Red Fox (Photo: unknown)

Restoration of strategic vegetation blocks or linkages:

- Give priority to sites according to conservation status of vegetation remnants.
- In consultation with licensees, improve habitat quality and connectivity of unused roads (e.g. see Davidson 1996). In particular, fence key elements of existing or potential habitat on unused roads, avoiding the use of barbed wire, which can fatally ensnare Squirrel Gliders.
- Plan and implement revegetation works, if still required, on U33.

EXISTING POLICIES, PLANS OR PROGRAMS supporting one or more of the recommended actions:

- FFG Action Statement – Predation by Red Fox (44).
- FFG Action Statement – Bush Stone-curlew (78).
- FFG Action Statement – Predation by Cat (80).
- Management Plan – Brolga (Arnol et al. 1984).
- ECC (2001) recommendation to redesignate O4 Recreation Reserves as Community Use Areas, upgrade R16 and U33 to be included in Tungamah Nature Conservation Reserve (D64). Subsequent Government policy (VG 2002) designates R16 and U33 as part of Tungamah Natural Features Reserve, rather than Tungamah Nature Conservation Reserve.

8. Tungamah Landscape Zone

8.6 Local Government

Land Tenure Details:

This tenure includes municipal road reserves and Township land (T1). Generally only very localised native vegetation remnants persist on roadsides within the zone. Some of the better habitat nodes are often associated with adjacent wetlands or intersections with drainage lines. In the south-east of the zone, significant roadside remnants (Grey, Red and Yellow Box; White Cypress-pine) occur north of Bungeet and in the nearby Boweya area. Roadsides become more fragmented away from Boweya–Killawarra blocks and, although mature trees are common, understoreys are generally degraded (Davidson 1996). Nevertheless, several segments of outstanding roadside reserve, closely associated with the Broken–Boosey Creek system, have been identified by Robinson (1998b) as a 'major site of conservation significance in the eastern Northern Plains', and by Todd (1999) as a 'priority area for protection in Victorian Riverina bioregion'. These (intersecting) roadsides (of Grey and Yellow Box, and River Red Gum) are on Three Chain Road (between Tungamah Swamp Wildlife Reserve [C27] and Pelluebla Road) and Kreeck Road (between the Bushland Reserve [H46] on Boosey Creek and the Benalla–Yarrowonga Road).

In a survey of native grasslands in Moira Shire, Cook (1997) identified eleven separate roadside remnants of conservation significance in the zone, some of which correspond to those selected by Robinson and Todd. Cook's sites were on Angle Road (site 30), Wilby; on Tungamah–Peechelba Road (site 31), Tungamah; on and near Three Chain and Kreeck Roads (sites 32-37), Tungamah; and on Church Road (site 38) and Marungi Road (site 39), Marungi. Of these roadside remnants, those at sites 31, 32-35 and 37-39 were considered by Cook to be of 'high significance'.

Land Manager:

Local Government Authority

Stakeholders:

Key DSE, DPI, CMA, PV, CFA

Other Private, BG, LFW, FNC, CVA, GAV, LFB

Threatened Biodiversity Assets (in brackets: Cons status Vic - lower case, Aust - upper case; followed by BNA priority / risk rankings for threatened taxa = 1A, 2B, etc., or un - unassessed):

EVCs: The pre-1750 vegetation cover of the zone was riverine woodlands, particularly *plains grassy woodland* (e) and *plains grassy woodland / gilgai plains woodland / wetland mosaic* (e), with hilly areas of *grassy woodland* (e) and (in the south-east) *box ironbark forest* (v). *Pine box woodland* (e - VR, x - NIS) occurred on both hill and plain. Fragments of most of these, as well as wetland and creekline remnants, can still be found.

Threatened flora: Pale Spike-sedge (v, unr - VR), Plains Leek-orchid (Re, unr - VR), Straw Wallaby-grass (v, 1B - VR), Western Silver Wattle (v, 1A - NIS), Yarran Wattle (e, 3A - VR).

8. Tungamah Landscape Zone

8.6 Local Government (cont')

Threatened fauna: Apostlebird (v, unr - VR), Brolga (v, unr - VR), Bush Stone-curlew (e, unr - VR), Carpet Python (e, unr - NIS), Great Egret (e, unr - VR), Grey-crowned Babbler (e, 1A), Lace Monitor (dd, unr - NIS), Little Egret (cen, unr - VR), Nankeen Night Heron (v, unr - VR), Painted Honeyeater (Rv, unr - NIS), Royal Spoonbill (v, unr - VR), White-bellied Sea-eagle (e, unr - VR).

Recommended actions:

Protection of existing remnants:

- Protect existing roadside remnants, giving priority to those identified by Robinson (1998b), Todd (1999) and Cook (1997) above, and to any others having mature or hollow trees and relatively intact understorey and ground layers.
- Provide fencing and sign-posting of all high-quality remnants.
- Assist Shires to develop roadside conservation plans and encourage integration with voluntary efforts on adjacent freehold. Promote voluntary programs (e.g. LFW) and planning overlays, as tools to assist Shires in protecting and managing roadsides.
- Identify in Shire roadside conservation plans known and likely sites of Apostlebird Bush Stone-curlew, Carpet Python, Grey-crowned Babbler, and Lace Monitor, as well as fire-dependent threatened flora taxa (Yarran Wattle, Western Silver Wattle), and advise CFA to avoid unplanned control burning of these sites.
- As far as possible, determine measures appropriate to protect known and likely habitat of threatened flora taxa recorded from the tenure, and incorporate this information into Shire roadside conservation plans.
- Prevent removal from roadside habitats of ground litter, fallen timber, logs or dead-standing trees, which provide valuable shelter and forage sites for Apostlebird, Bush Stone-curlew, Carpet Python, Grey-crowned Babbler and Lace Monitor.
- Ensure that Shire staff (especially road maintenance crews) are aware of significant roadsides and their protection requirements.
- Monitor roadside remnants on granite rises to ensure that habitat is not further degraded by illegal granite removal.
- As far as possible, discourage and exclude domestic grazing from the tenure.



Lace Monitor (Photo: Peter Robertson)

Management to enhance remnants for threatened taxa (BNA response level in brackets: 4 = full commitment, 3 = substantive participation, 2 = opportunistic action, 1 = watching brief):

- Supplement habitats on roadsides (and around townships such as Tungamah) by increasing abundance of large hollow-bearing trees, conserving natural shrubby and grassy understorey, retaining fallen timber and litter, and conserving mistletoe populations, to benefit Grey-crowned Babbler (4), Painted Honeyeater (2 - NIS), Carpet Python (2 - NIS), Apostlebird (2 - VR) and Lace Monitor (2 - NIS).



Painted Honeyeater (Photo: DSE/Mcann)

8. Tungamah Landscape Zone

8.6 Local Government (cont')

- Exclude grazing on roadsides to prevent physical disturbance, or understorey loss or damage, affecting Grey-crowned Babbler (4), Western Silver Wattle (4 - NIS), Straw Wallaby-grass (3 - VR), Yarran Wattle (3 - VR), Apostlebird (2 - VR), Brolga (2 - VR), Bush Stone-curlew (2), Carpet Python (2 - NIS) and Plains Leek-orchid (2 - VR).
- Control cats and foxes to curtail predation on Apostlebird (2 - VR), Brolga (2 - VR), Bush Stone-curlew (2 - VR), Carpet Python (2 - NIS), Grey-crowned Babbler (4) and Lace Monitor (2 - NIS).
- Control weeds affecting habitat of Western Silver Wattle (4 - NIS), Straw Wallaby-grass (3 - VR) and Pale Spike-sedge (2 - VR).
- Enhance flow regimes in roadside and township drainage lines to improve habitat for Little Egret (2 - VR), Great Egret (2 - VR), Pale Spike-sedge (2 - VR), Royal Spoonbill (2 - VR) and White-bellied Sea-eagle (2 - VR).
- Supplement riparian tree cover near roadsides to benefit Nankeen Night Heron (2 - VR).
- Implement appropriate control burning regimes, under expert guidance, to benefit Western Silver Wattle (4 - NIS) and Yarran Wattle (3 - VR).
- Modify stocking levels as appropriate, and install signage, at sites supporting or potentially suitable for Straw Wallaby-grass (3 - VR), notably on township land at Wilby.

Restoration of strategic vegetation blocks or linkages:

- Using the roadside priorities identified above, as well as Shire roadside conservation plans or other guidance, encourage and assist regeneration and consolidation of woodland habitat, especially at habitat nodes on creek-crossings or intersections, or near adjacent stands on freehold.
- Develop a roadside conservation plan to re-link discontinuous roadside remnants along Three Chain Road, east of Tungamah.
- Extend and expand existing roadside / creekline habitat networks, giving priority to sites known or likely to support colonies of Grey-crowned Babbler (notably in the Thoona–Bungeet–Boweya North districts) and Squirrel Glider (around Boweya Flora and Fauna Reserve and Killawarra State Forest). Likewise target suitable sites no greater than 0.3 km from a known colony.
- In expanding linear habitat networks, utilise nodes on creek-crossings, intersections with other road reserves or patches on adjacent freehold.
- Liaise with landholders on adjacent properties to establish habitat strips by which to broaden roadside habitat, or to take other measures to supplement connectivity and patch size.
- Also liaise with landholders to fence across paddock corners at key intersections of roadside tree lines, to maximise habitat availability for fauna (Robinson & Davidson, in prep.).

8. Tungamah Landscape Zone

8.6 Local Government (cont')

EXISTING POLICIES, PLANS OR PROGRAMS supporting one or more of the recommended actions:

- FFG Action Statement – Grey-crowned Babbler (34).
- FFG Action Statement – Predation by Red Fox (44).
- FFG Action Statement – White-bellied Sea-eagle (60)
- FFG Action Statement – Bush Stone-curlew (78).
- FFG Action Statement – Predation by Cat (80).
- JAMBA – White-bellied Sea-eagle
- Management Plan – Brolga (Arnol et al. 1984).



White-bellied Sea-eagle (Photo:
Mike Carter)

8. Tungamah Landscape Zone

8.7 Parks & Reserves

Land Tenure Details:

The tenure includes a number of conservation reserves, the largest being Boweya Flora & Fauna Reserve (G11; 300 ha), which contains significant populations of Squirrel Glider and Grey-crowned Babbler (Davidson 1996), as well as a diverse range of other flora and fauna. Three substantial freshwater swamps are designated as Wildlife Reserves (and State Game Reserves) in the zone—Dowdles (C29; 291 ha), Moodie (C26; 198 ha) and Tungamah (C27; 146 ha) Swamps. The first two of these swamps form components of larger drainage systems which are listed in the Directory of Important Australian Wetlands (EA 2001) as Muckatah Depression (VIC053) and Broken Creek (VIC036), respectively. In the case of Dowdles Swamp SGR, artificial thinning of River Red Gum regeneration may be necessary to restore optimal tree attributes to benefit native fauna (R. Weber; pers comm.). In addition, the zone contains a number of Bushland Reserves (H43-47, 85-86 & 103), totaling 150 ha. C26-27 and H43-46 have together been identified by Robinson (1998b) as components of a 'priority nature conservation site for reservation and management in the Victorian eastern Northern Plains'. H103 has been noted as a good example of soak vegetation (Davidson 1996). Robinson recommended C29 as a (separate) priority site, also.

Land Manager:

Parks Victoria

Stakeholders:

Key DSE, DPI, CMA

Other ECC, VNPA, VAA, TSN, BG, FNC, Private, LGA, GNP

Threatened Biodiversity Assets (in brackets: Cons status Vic - lower case, Aust - upper case; followed by BNA priority / risk rankings for threatened taxa = 1A, 2B, etc., or un - unassessed):

EVCs: G11 retains *box ironbark forest* (v) with primarily Red Ironbark, Grey Box and Red Stringybark. This block was formerly within a more extensive *box ironbark forest* belt contiguous with the present Killawarra State Forest (F1, to the east). At C29, formerly a *red gum wetland* (e) surrounded by *plains grassy woodland / gilgai plains woodland / wetland mosaic* (e), only a fringe of Grey and Yellow Box remains around a River Red Gum woodland modified by altered flood levels. C26, formerly a *cane grass wetland* (x) surrounded by *pine box woodland* (e - VR, x - NIS) and *plains grassy woodland* (e), retains a wetland fringe of River Red Gum and Grey Box, but is in need of revegetation in the south and west (LCC 1985). C27 formerly comprised several *red gum wetland* patches linked by *plains grassy wetland* (e), and surrounded mainly by *plains grassy woodland / gilgai plains woodland / wetland mosaic*. Only the two main *red gum wetland* components of C27 persist today, and revegetation is required to link these. Amongst the Bushland Reserves, the range of small remnants includes *plains grassy woodland / gilgai plains woodland / wetland mosaic* and *creepline grassy woodland* (e) on H85 (at Wilby), *box ironbark forest* (v) on H47 (near Tungamah), *pine box woodland* (e - VR) on H45 (Broken Creek), *creepline grassy woodland* (e) and *plains grassy woodland* on H44 (Broken Creek), *creepline grassy woodland* on H43 (Boosey Creek), and *spring soak woodland* (e - NIS, x - VR) and *grassy woodland* (e) on H103 (Boweya).

8. Tungamah Landscape Zone

8.7 Parks & Reserves (cont')

Threatened flora: Bent-leaf Wattle (r, unr - NIS), Bluish Raspwort (k, 1B - VR), Mugga (r, unr - NIS), Pale Spike-sedge (v, 3B - VR), Small-leaf Bush-pea (r, unr - NIS), Small Chocolate-lily (k, unr - NIS), Western Silver Wattle (v, unr - NIS).



Acacia flexifolia (Photo: Jeff Jeanes)

Threatened fauna: Australasian Bittern (e, unr - VR), Blue-billed Duck (v, 2B - VR), Brolga (v, unr - VR), Bush Stone-curlew (e, 4A - NIS), Carpet Python (e, 1B - NIS), Freckled Duck (e, 1A - VR), Great Egret (e, 2A - VR), Grey-crowned Babbler (e, unr - NIS), Intermediate Egret (cen, unr - VR), Little Egret (cen, 3A - VR), Nankeen Night Heron (v, unr - VR), Painted Honeyeater (Rv, 1B - NIS), Regent Honeyeater (Ecen, 1A - NIS), Squirrel Glider (e, 1A - NIS), Swift Parrot (Ve, 1A - NIS), Royal Spoonbill (v, 3B - VR), Speckled Warbler (v, unr - NIS), Turquoise Parrot (In, 1C - NIS), White-bellied Sea-eagle (e, unr - VR).



Australasian Bittern (Photo: Peter Menkhurst)

Recommended actions:

Protection of existing remnants:

- Assess condition and habitat values on all reserves within the tenure. In particular, assess the status of revegetation works recommended by LCC (1985) on C26, 27 & 29 and H43. Also note recommendation of Davidson (1996) for signage and fencing at H86, and signage at H103.
- Refine priorities for protection of conservation reserves, based on habitat quality, patch size and existing or potential connectivity value.
- As far as possible, determine measures appropriate to protect known and likely habitat of threatened flora taxa recorded from the tenure, and incorporate this information into the reserve management planning process.
- Ensure that flow regimes and drainage patterns on (and around) reserves in the zone are maintained as near to natural as possible.
- Determine whether the necessity exists for artificial thinning of River Red Gum regeneration on C29, and implement action if appropriate.
- Pursue procedures to ensure that G11 retains its relative freedom from weed invasion (Davidson 1996).
- Determine whether the existing regulatory regime for watering of C26 from Broken Creek provides a suitably natural flooding-drying cycle to sustain existing biodiversity values, or whether this regime can be improved.
- Remove or phase out domestic grazing from all reserves in the tenure.
- Closely monitor apiculture in G11 and control feral bee colonies where necessary to protect biodiversity values.

8. Tungamah Landscape Zone

8.7 Parks & Reserves (cont')

Management to enhance remnants for threatened taxa (BNA response level in brackets: 4 = full commitment, 3 = substantive participation, 2 = opportunistic action, 1 = watching brief):

- Increase abundance of mature hollow-bearing trees, conserve understorey, retain fallen timber and litter, and conserve mistletoe populations (notably at G11), to supplement habitat for Regent Honeyeater (4 - NIS), Squirrel Glider (4 - NIS), Swift Parrot (4 - NIS), Carpet Python (3 - NIS), Painted Honeyeater (3 - NIS), Grey-crowned Babbler (2 - NIS), Speckled Warbler (2 - NIS) and Turquoise Parrot (2 - NIS).



Regent Honeyeater (Photo: DSE/Shepherd)

- Control cats and foxes, to curtail predation on Squirrel Glider (4 - NIS), Carpet Python (3 - NIS), Bush Stone-curlew (2 - NIS), Grey-crowned Babbler (2 - NIS), Turquoise Parrot (2 - NIS) and Brolga (1 - VR).
- Implement enforcement, and exclude human disturbance, to benefit Carpet Python (3 - NIS).
- In controlling macropod and introduced herbivore levels (particularly fumigating rabbit burrows), ensure that adverse effects upon Carpet Python (3 - NIS) are carefully avoided.



Carpet Python (Photo: Peter Robertson)

- Enhance natural water regimes to benefit Freckled Duck (4 - VR), Great Egret (4 - VR), Little Egret (3 - VR), Royal Spoonbill (3 - VR), Blue-billed Duck (2) and Pale Spike-sedge (1 - VR), as well as Australasian Bittern (2 - VR), White-bellied Sea-eagle (2 - VR) and Intermediate Egret (2).
- Supplement habitat to ensure replacement of nest trees and provide quality feeding sites for Great Egret (3 - VR), White-bellied Sea-eagle (3 - VR) and Nankeen Night Heron (2 - VR) and exclude (or buffer) human disturbance of roosting or breeding areas for these species.
- Exclude grazing on reserves to prevent physical disturbance, or understorey loss or damage, affecting Squirrel Glider (4 - NIS), Brolga (2 - VR), Intermediate Egret (2 - VR), Speckled Warbler (2 - NIS) and Pale Spike-sedge (1 - VR). Also monitor for any needed grazing controls to benefit
- Control macropods and introduced herbivores to benefit Pale Spike-sedge (1 - VR), notably at C27 & H46, and Bluish Raspwort (3 - VR), notably at C27.
- Determine management needs for Bent-leaf Wattle (2 - NIS) Mugga (2 - NIS), Small-leaf Bush-pea (2 - NIS), Small Chocolate-lily (2 - NIS) and Western Silver Wattle (2 - NIS) in G11.
- Control weeds to benefit Bluish Raspwort (3 - VR), notably at C27.



Pullenaea foliolosa (Photo: Ollie Thompson)

8. Tungamah Landscape Zone

8.7 Parks & Reserves (cont')

Restoration of strategic vegetation blocks or linkages:

- Investigate with adjoining landholders or other managers any possible options to bolster connectivity adjacent to existing remnants, especially along drainage lines. For more isolated patches, investigate options for buffer establishment on adjacent land.
- Implement revegetation as required on C26, 27 or 29 (LCC 1985).
- Encourage managers of neighbouring land tenures to recognise the value of reconsolidating vegetation linkage between G11 and Killawarra State Forest.

EXISTING POLICIES, PLANS OR PROGRAMS supporting one or more of the recommended actions:

- FFG Action Statement – Grey-crowned Babbler (34).
- FFG Action Statement – Regent Honeyeater (41).
- FFG Action Statement – Predation by Red Fox (44).
- FFG Action Statement – White-bellied Sea-eagle (60).
- FFG Action Statement – Bush Stone-curlew (78).
- FFG Action Statement – Predation by Cat (80).
- FFG Action Statement – Freckled Duck (105).
- FFG Action Statement – Squirrel Glider (166).
- FFG Action Statement – Swift Parrot (169).
- CAMBA – Great Egret, White-bellied Sea-eagle.
- JAMBA – Great Egret.
- Management Plan – Brolga (Arnol et al. 1984).
- Recovery Plan – Regent Honeyeater (Menkhorst et.al. 1999).
- Recovery Plan – Swift Parrot (SPRT 2000).
- ECC (2001) recommendation to recategorise Bushland Reserves H47, 85, 86 & 103 and WRs C26 & 29 as Natural Features Reserves, to upgrade Wildlife Reserve C27 to Nature Conservation Reserve, to add Bushland Reserves H43-46 to Broken–Boosey State Park (□B2), and to upgrade G11 (along with F1 and M2 to the east) to become part of an enlarged Warby Range State Park (□B3). Subsequent Government policy (VG 2002) designates H44-46 as Natural Features Reserve, rather than Nature Conservation Reserve.