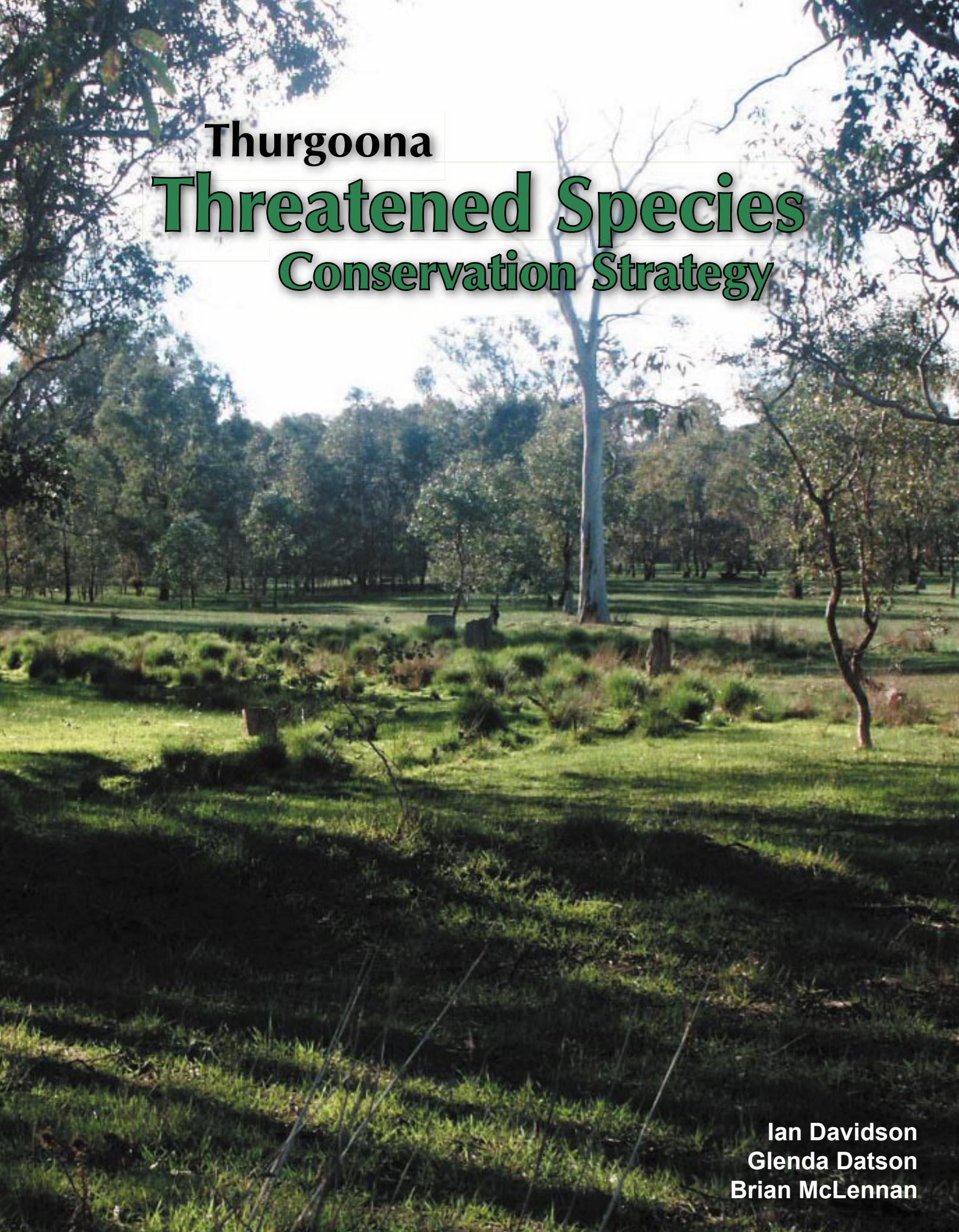

Thurgoona
Threatened Species
Conservation Strategy

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Executive Summary

The Albury-Wodonga region is strategically located on the Murray River, and is part of a rapidly growing regional area of Australia. The Albury-Wodonga Development Corporation was established by the Commonwealth Government in 1974, when Albury-Wodonga was designated as a national growth centre.

Since this time there has been a steady and constant demand for residential and industrial land for development purposes to satisfy this growth. The AWDC is the owner and manager of much of the land ear-marked for future urban development and therefore has an important role to play in ensuring that development proceeds in an environmentally sensitive and ecologically sustainable manner.

In recent years, a number of environmental studies have shown that the Albury-Wodonga region is very important to biodiversity conservation, in particular threatened species of plants and wildlife. This increase in knowledge has been matched by increased community awareness and expectation in relation to the conservation and protection of these threatened species. At the same time both Commonwealth and State governments have introduced a series of increasingly stringent environmental legislations to cover biodiversity conservation.

The AWDC has recognized the need to ensure that developments undertaken on its land are carried out in an ecologically sound manner, so that threatened species with significant local populations are not endangered. The AWDC has therefore undertaken this study to deal with the Thurgoona area of Albury.

The fact that the AWDC has endeavored to act in an environmentally responsible manner is illustrated by its commitment to the forward tree planting program described in this document. This planting is now recognized as having contributed to the conservation of threatened species such as the Regent Honeyeater in the region.

The intention of the AWDC is to extend the studies to the other areas for which it is responsible on both sides of the border. At this stage, Thurgoona is the area on the NSW side of the border which is most subject to development pressure.

Amongst the key objectives of the study are the identification of key environmental assets, the development of a strategy for urban development of AWDC land which protects and where possible enhances threatened species and their habitats, and the establishment of a framework for the long term management of the habitat areas which will be set aside in public ownership.

The primary research for the study involved systematic in-situ flora and fauna surveys over all of the AWDC land in the study area. This led to the preparation of nature conservation ratings based on different habitats, floristic ratings and linkage significance ratings for each of the areas. Reliable known fauna sightings were also considered in the report.

Assessments were made of the status of threatened species in the Thurgoona study area and of the key habitat requirements of those threatened species.
The guiding principles for the Thurgoona Threatened Species Conservation Strategy (TTSCS) were then developed together with recommendations for the retained habitat framework. The retained habitat framework identifies those areas of high conservation significance so that they will be retained, enhanced and where possible connected to each other, for the long term survival of populations of threatened species and ecological communities in Thurgoona.

During this process, valuable assistance was received from Albury City Council, NSW National Parks and Wildlife Service and Environment Australia.

The retained habitat framework encompasses about 29% of AWDC land in the study area. This compares favourably with the 30% aim expressed in the Murray Catchment Blueprint to achieve biodiversity conservation, thus meeting the current best practice in this field.

All stakeholders recognized the importance of implementation and long term management of the retained habitat framework and the surrounding native vegetation on adjoining private and public land, as recommended in the strategy. The future management section of the strategy addresses this issue, and presents what is considered to be a workable and realistic model for the long term.

The conclusion of the authors is that the implementation of the TTSCS will allow urban development and also ensure the protection and enhancement of threatened species and their habitats in the Thurgoona area.

For its part, the AWDC is committed to the strategy, as an environmentally responsible blueprint for ecologically sustainable development.

1.0 Background

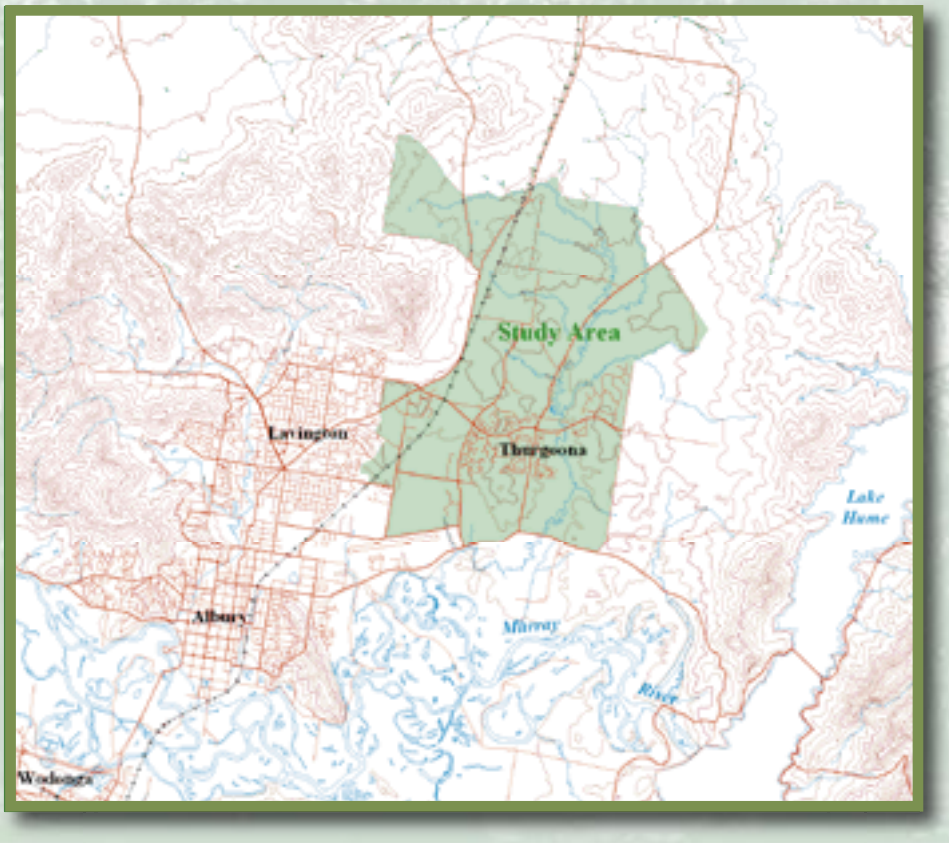
Albury–Wodonga adjoins the Murray River floodplain, and is part of a rapidly growing region in Australia. This growth manifests itself in an increased demand for residential and industrial land for development. In 1973 the Commonwealth government designated Albury-Wodonga as a national growth centre. The Albury-Wodonga Development Corporation (AWDC) was established on the 30th May 1974 to ensure that the city be built "in an orderly, efficient and proper way".

In recent times numerous environmental studies have shown that the Albury-Wodonga district is very important to many threatened species of wildlife and plants. The AWDC owns much of the land earmarked for future development in this area. To ensure that the development occurs in an ecologically sound way and that threatened species with significant local populations are conserved, the AWDC has undertaken the development of this Strategy to deal with the Thurgoona area of Albury.

2.0 Study Area

The area this strategy covers, known as the Thurgoona Study Area (TSA), is generally bounded by the Hume Highway Reserve and Dallinger Road on the west, the Riverina Highway in the south, Kerr Road on the east and the Norske Skog Paper Mill plantations to the north. Fig. 1 denotes the key identifying features and the AWDC land in the TSA.

Figure 1. Context & Locality Map



The majority of Albury-Wodonga is located on riverine alluvial sediments (sands, silts, clays and gravels) deposited by the Murray River and its contributory creeks.
The Thurgoona district is an undulating area gently rising towards the north along the valleys of Woolshed and Eight-mile Creeks, which eventually flow south to the Murray River below the Hume Dam. The region experiences mild winters with frequent frosts and typically hot, dry summers with occasional thunderstorms. The average annual temperature ranges from 30° - 12°C in the summer and 12° - 0° C in the winter (Commonwealth Bureau of Meteorology 2003). The area receives around 700 millimetres of rainfall per year accompanied by an appreciable occurrence of south and southwest winds.

3.0 Purpose/Aim

To create a clearly recognizable and acceptable framework which will enable the AWDC, and potentially other land owners in the future, to carry out urban development in the zoned areas of Thurgoona in an efficient and environmentally responsible manner.

4.0 Objectives

- To identify the key environmental assets relating to threatened species and threatened ecological communities in the Thurgoona area;
- To develop a strategy for urban development of AWDC land which protects and where possible enhances populations of threatened species and their habitats;
- To provide a strategy for urban development by the AWDC, and possibly other landowners;
- To ensure that this strategy addresses the requirements of the NSW Threatened Species Conservation Act 1995 and the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 in relation to threatened species conservation;
- To develop an action plan for the implementation and the on-going evaluation and management of the strategy; and
- To ensure that the methodology applied in this strategy is applicable elsewhere.

5.0 Bioregional Context

The Albury area is located in the South West Slopes biogeographic (bioregion) region of New South Wales. This bioregion has been described as one of the most cleared regions in Australia (State of the Environment Advisory Council 1996). The fertile natural grassy woodlands were mostly cleared for agriculture, and now there is less than 10% remaining (Miles 2001). As a result many of the plants and animals which survive in these remnants are threatened with extinction and for this reason new land developments in this area attract considerable interest from biodiversity conservation authorities.

Albury itself is nestled between a series of hills to the west and north and the Murray River in the south, including the Hume Weir in the east.

Figure 2. Study Area Map

The rocky and steeper parts of these hills (known as Nail Can Hill and Black Range) are mostly covered in native vegetation. This woodland vegetation, which consists greatly of re-growth trees from historic clearing in the late 1800s, is the habitat for a diverse range of native plants and animals. In fact recent studies have shown that there are at least 11 species of threatened plants and animals utilizing Nail Can Hill Range (Davidson 2000a, 2002b, 2002c).

The Murray River provides important streamside vegetation which links Albury with the extensive Red Gum forests further west along the river e.g. the Barmah-Millewa forest. As well, many of the trees along the river are large hollow bearing (LHB) specimens which provide a valuable nesting and roosting habitat region for hollow dependant species like parrots, owls, possums and gliders. The vegetation is not as diverse along the Murray River at Albury, as that in the Nail Can Hill Range. However LHB trees are more limited in the hills than along the riparian corridors because of past clearing for agricultural pursuits.

The significant vegetation in the other lands surrounding Albury is comprised mainly of remnant woodland trees in paddocks, reserves, watercourses and road reserves. As with the Murray River a key habitat feature of these areas is the relative abundance of LHB trees. Unfortunately many of these trees are isolated, with only a few water courses and roadsides providing connectivity between the river and the ranges, and these trees.

6.0 Landscape

The TSA is surrounded by a number of important habitats (see Fig. 2), including Bells Travelling Stock and Camping Reserve (TSCR), Nail Can Hill and Black Range, Norske Skog Plantation, Wirlinga Army Depot and the Murray River. Bells TSCR, adjoining the northern edge of the TSA, is the best relict example in the TSA of the Box-Gum Woodland vegetation once common on the fertile soils surrounding Albury. Many wildlife species which utilise the study area also find suitable habitat in the Nail Can Range to the west of the TSA. This range contains diverse rocky slopes vegetation of many native plants species. The Norske Skog Plantation contains tracts of remnant and planted native vegetation, amongst the soft wood plantations, and a diverse range of fauna has been recorded there (Klomp et.al. 2001). The Wirlinga Army Depot adjoining the south eastern part of the study area contains important relicts of Grassy Box Woodland and creekline vegetation. The riparian vegetation along the Murray River provides foraging, nesting and roosting habitat for many wildlife species.

7.0 Forward Tree Plantings

Unique to this district are the extensive areas of tree plantings, known as forward tree plantings. The Federal Government's "decentralization" policy which saw the establishment of the Albury-Wodonga Development Corporation was intended to facilitate the process which encouraged the movement of businesses and householders into the area. One of the many issues concerned the environmental impacts of increased urbanization. To help offset this impact, a strategy was implemented that involved an extensive tree planting program which eventually saw more than 3 million trees, with a total cover of more than 2000 hectares planted into the Albury-Wodonga region. Broad-scale plantings of mixed indigenous and exotic natives began in 1976 and continued until 1996. Described at the time as the biggest urban re-afforestation project ever undertaken in Australia, the program could be called 'The Greening of the Growth Centre'. In 1988 the program was recognized by the Australian Institute of Landscape Architects as a program of national significance. Its positive impact was seen as one that would increase as the trees matured.

One of the major challenges was to preserve the quality of country living while still providing all the amenities required in a large city. The Forward Tree Planting Program was an integral part of this philosophy as its aim was to create a well treed country setting for the city. This involved the restoration of cleared grazing land to a woodland environment. The major objectives of the program were to:

- improve the urban environment;
- establish tree cover in peripheral hills areas for conservation and aesthetic reasons;

- restrict run-off for erosion control;
- lower water tables and improve riparian environments;
- provide wildlife corridors to encourage movement of birds and other fauna; and to
- provide a role model for urban and rural land users in other areas.

The revegetation of some of the denuded and eroded hills surrounding Albury-Wodonga has improved the overall appearance of the district by providing a treed backdrop, as well as the provision of walking, bike and riding trails within treed corridors along ridgelines or down drainage easements. These are within easy walking distance for a significant proportion of the community. When development was to take place in areas where vegetation cover had been systematically removed for agricultural purposes, plantings took place at least five years beforehand. By the time development took place, these plantings were expected to provide a pleasant place for people to live in and to provide a suitable backdrop. It was hoped that plantings of ecological corridors between the surrounding hills, through the urban areas and down to the riverine plain would be established and largely retained throughout future developments. However it was recognized that not all of the forward tree planting would be preserved, especially in the more intense urban development areas.

In order to ensure availability and acclimatization of the required species for planting out, the AWDC set up its own wholesale production nursery, Carramar. This nursery's clients included government departments, municipal councils, local land care groups and land holders. Large numbers of trees were given annually to local government bodies, service clubs, schools and community groups in the Albury-Wodonga development area.

Cost-efficient mass planting techniques were utilized in order to revegetate large tracts of land each year over a period of twenty years. 10mx10m grid plantings were used for future urban areas to ensure the retention of individual specimen trees, and closer spacings were used to enhance forest character on peripheral hills and woodland character in parklands. Most plantings involved the use of forestry tube stock but some areas were direct seeded. Trials included different mulch and fencing types. Ongoing maintenance methods included the eradication of noxious weeds, slashing to reduce fuel loads and fire break controls. As planned, plantings of wattles were thinned out over time and treed areas were opened out to create a more random nature to achieve the desired woodland effect. In the fourth year after planting, most areas were grazed with sheep initially and later with cattle, with monitoring to avoid substantial damage to trees. This further reduced fire hazards.
In the mid eighties a farm tree planting scheme was introduced on land leased for grazing. In the early nineties the Federal Government introduced the Landcare and Environment Action Program (LEAP) and the AWDC, with local Councils and TAFE institutions, was in an excellent position to take advantage of this scheme. As part of this project 45,000 trees were planted on the slopes of Nursery Valley (behind the ACC sewage treatment works), and along the Murray River, adjacent to Cook's Lagoon (part of Wonga Wetlands).

7.1 Recent Implementation Activities

Most Thurgoona plantings took place about twenty years ago, and were related to future development areas. More recent ongoing programs have involved grants to Parklands Albury-Wodonga, with the AWDC providing the incentive, and with input from the National Environment Centre. Eight Mile, Nine Mile and Woolshed Creeks at Thurgoona benefited from these efforts with remnant rehabilitation works covering 165 ha, plantings of 70,000 additional indigenous trees and shrubs and ground flora, plus 40km of direct seeding (mostly shrubs) and 30 kilometres of fencing (Pers.Comm., Wayne Carlson, Parklands Albury-Wodonga). Nest boxes for possums and gliders have been placed in remnant tree areas throughout Thurgoona by the AWDC and the National Environment Centre Riverina TAFE students. Enhancement shrub plantings of tree blocks inhabited by the threatened Regent Honeyeater have been carried out by Thurgoona school students and the Thurgoona Lions Club.

Although not yet old enough to develop tree hollows some of these forward plantings provide important linkages between remnants and foraging resources, e.g. nectar resources. Domestic gardens with native plants are also emerging as an important part of the habitat used by the Regent Honeyeater, an endangered honeyeater species.

In summary, the program since its inception has undoubtedly been successful. In almost all cases, survival and growth rates have been good and the general effect has been very impressive. The basic framework for the recommended tree planting corridor system has been created and has made a major contribution towards the stated policy of the AWDC and the aesthetic and environmental quality of Albury and Thurgoona.
It is generally agreed that the forward tree planting program has done much to change the face of Albury-Wodonga and to enhance the biodiversity of the area.

8.0 Flora and Fauna Surveys

The table of nature conservation ratings as well as the observed and documented vegetation and the table of wildlife sightings in this section of the report, are based on surveys undertaken between 2000 and 2003.

8.1 Methodology

All AWDC land within the study area was assessed using one methodology. This involved completing
Flora and Fauna survey sheets adapted from rapid assessment forms used to assess Travelling Stock Reserves, other crown land and private land remnants, including AWDC land by the co-author, Ian Davidson. (See sample survey sheets in Appendix 1.)

Sites to be sampled were based on the results of air photo and satellite image analysis, using tree cover as a surrogate for native vegetation. Areas without tree cover were visited in the field to ascertain whether significant areas (those containing native grasses and forbs), were present. Blocks with similar vegetation condition, tree cover and land management problems were combined into the one site, whilst in some cases small blocks with different intrinsic values were treated individually.
Sampling involved traversing each tree covered block 1-4 times, depending on the block size and vegetation complexity.

Due to time restraints plants were identified whilst traversing the sites. This favoured the identification of flowering or larger species, and could have resulted in small, less obvious plants being missed. Surveys were timed to coincide with the main spring flowering times. As a result there are likely to be other species in the TSA not recorded during the survey. Similarly, wildlife seen or heard during the surveys was recorded along with credible records from local naturalists. As with the plants the wildlife list is likely to be conservative. Reasons for this include the fact that some species are difficult to detect, e.g. bats, and the fact that some migratory birds would have been absent at the times the TSA was surveyed. Habitat information such as Large Hollow Bearing tree surveys could be used as a surrogate to aid in the identification of bat habitat but a survey deemed adequate to obtain reasonable information was beyond the scope of the study because of time and financial constraints. There are likely to be many more wildlife species found throughout the TSA over future years.

Plants and animals identified on each block were recorded on survey sheets, as were the overall site condition ratings and summaries of land management issues and recommended ameliorative actions. Five site ratings were applied to each block considered across three ecological values and these included:

- a habitat rating (which included age structure of trees, layers of vegetation and overall habitat diversity eg. rock outcrop and drainage line);
- a rating of vegetation diversity and richness; and
- a rating for the sites connectivity value with other sites, ie. linkage significance.

The rating system was applied as follows:

Habitat

High – near natural.
Medium/High – near natural, but missing a major ecological component, e.g. no shrub layer. (A minor change in current management or just time may move the site to a high rating).
Medium – several ecological components missing or degraded, e.g. tree cover good but ground layer dominated by pasture grasses. (Will take active management to improve the site rating).
Low/Medium – totally modified but has some retained natural features e.g. scattered tree cover or tree plantation.
Low – totally modified (will require complete restoration).

Flora rating

High – near natural, few weeds and high plant diversity, especially ground layer.
Medium/High – near natural, high plant diversity but weeds common.
Medium – Modified, but includes some native grasses and forbs. Weeds are common.
Low/Medium – Highly modified, mostly weedy but with some hardy native grasses.
Low – Cleared, may contain a few isolated trees but is severely disturbed and dominated by weeds.

Linkage significance

High – connects 2 important remnants.
Medium/High – timbered creekline or roadside.
Medium – partial link between 2 remnants.
Low/ Medium – small patch < 500 m from another remnant.
Low – isolated patch, > 500 m from another remnant.

Note 1: In some cases, sites that rated medium or lower were being utilised by, or had been utilised previously by, threatened wildlife. This automatically gave the site an importance, i.e. a High rating**. For example, Regent Honeyeaters are often found where there is a high percentage of planted native shrubs which don't rank highly using the natural system described above. But the site is rated High because of usage by the Regent Honeyeater.** In short, the life history of many species of wildlife is not well understood by scientists and caution should always be applied when seeking to modify habitats used by threatened species.

Note 2: The Regent Honeyeater's usage of the Thurgoona area will be subject to monitoring, with the methodology yet to be defined. The new methodology will be produced in conjunction with the relevant authorities and may involve regular searches or network development but at this point of time there is no agreed available methodology.

Note 3: A separate study was undertaken on Squirrel Gliders by Rodney van der Ree, prior to the completion of this strategy, to gain a better understanding of this cryptic species in the Thurgoona area. A copy of this report, *"The Distribution and Status of the Squirrel Glider, Petaurus norfolcensis, in the Thurgoona area of Albury",* (van der Ree, R. 2003), is held by the AWDC and ACC.

8.2 Results

Table 1: Nature Conservation Ratings of sites

N.B. 1.To simplify site numbering precincts where established, refer to Figure 3, Appendix 2.
2. For site location information, refer to Figures 3A to 3G

Site No.	Option	Habitat	Floristic Rating	Linkage significance	Recommended actions
A1	Creekline	L/M	L/M	M	Control of flat weeds/grass, enhance plantings
A2	Norske Skog creekline	M	L/M	M/H	Control of flat weeds/grass, enhance plantings
B1	Creekline north of Bells TSCR	M	L/M	H	Control of flat weeds/grass, enhance plantings and regeneration
B2A	Wignalls Road	M	L	M/H	Maintenance of LHB trees
B2B	Creekline	M	L	M/H	Fence and undertake creekline revegetation
B2C	Forward tree plantation FTP	L/M	L	M	Maintain veg. link b/n B2B & Ettamogah Rd, retain LHBs
B2D	Paddocks	L/M	L	L	Where possible retain LHBs
B2E	Scattered timber paddock	M	L	M	Fence and revegetate
B3A	Creekline north Williams Rd	M/H	M	M/H	Northern part as for B1
B3B	Minor creekline	L/M	L/M	M	Enhancement plantings, also fence and revegetate west of Rd
B4A	Creekline south Williams Rd & FTP	M	L/M	M/H	Control flat weeds and pasture grasses
B4B	Creekline	M	L/M	M/H	Control flat weeds/grasses & promote tree regeneration
B4C	Paddocks	L/M	L	L	Where possible retain LHBs
B5A	Remnant block & drainageline	L/M	L	M	Fence and revegetate
B5B	Paddocks	L/M	L	L/M	Where possible retain LHBs
TSCR	Woodland	M/H	M/H	H	Major habitat asset in study area – support Hume RLPB
C1A	Paddock adjoining TSR	L/M	L	L/M	Where possible retain LHBs
C1B	Triangle paddock	L/M	L	L/M	Where possible retain LHBs
C1C	Treed laneway	L/M	L/M	M/H	Fence and revegetate
C2A	Creekline adjoining TSR	M/H	L/M	M/H	Control pasture grasses and Horehound
C2B	Creekline west of C2A	M/H	L/M	M/H	Control pasture grasses
C3A	Small paddock	L/M	L	L/M	Retain LHB trees where possible in creekline reserve
C3B	Paddock	L/M	L	L	Where possible retain LHBs
C4A	Paddock	L/M	L	L/M	Where possible retain LHBs
C4B	Paddock	L/M	L	L/M	Where possible retain LHBs
C4C	Cleared paddock	L	L	L	No environmental issues
C4D	Copse	L/M	L/M	M	Fence & revegetate – connect to creekline with wildlife corridor
C5A	Creekline	M/H	L/M	M/H	Improve grazing management to increase

					natural regeneration
C5B	Forward planting	L/M	L	M	Where possible retain link between creeklines
C5C	Paddocks	L	L	L	Where possible retain LHBs
C6A	Creeklines and FTPs	M/H	M	M/H	Revegetate with shrubs
C6B	FTP	L/M	L	L/M	Retain habitat where possible
C6C	FTP	L/M	L	M	Revegetate with shrubs
C7A	Creekline	M	L/M	M/H	Control of flat weeds/grass, enhance plantings and regenerate
C7B	Creekline	M	L/M	M/H	Control pasture grasses and revegetate with shrubs
C7C	Creekline	L/M	L	M	Fence and revegetate
C7D	Paddock with many trees	L/M	L	M	Retain as Many LHBs in reveg. area connected to 7A
C8A	Remnant	M/H	L/M	M/H	Retain and revegetate
C8B	FTP	L/M	L	M/H	Where possible retain some trees
C9	Thurgoona Park Hoffman Reserve	L/M	L/M	L/M	FTP & Remnants. Regent H/E habitat. Enhance plant
D1A	FTP strip	L/M	L	M	Retain linkage where possible
D1B	FTP strip	L/M	L	M	Retain linkage where possible
D1C	FTP strip	L/M	L	M	Retain linkage where possible
D2	Creekline	M	L/M	M/H	Control pasture grasses and weeds; revegetate
D3	FTP	L/M	L/M	M	Maintain linkage b/n D7 & D2; retain Ironbarks where possible
D4	Remnant	H/M	M	H/M	Retain, fence and revegetate
D5	Triangle paddock	L/M	L	M	Retain corridor b/n D4 and equestrian block
D6	FTP	M	L/M	M	Retain corridor b/n D7 & private property, "Noorla"; where possible retain LHB trees
D7	Remnant and FTP	M/H	M	M/H	Retain LHB trees and revegetate
D8A	Unused road	M/H	M	M/H	Retain, including LHB trees adjoining; revegetate with shrubs
D8B	Ettamogah Road	M/H	M	M/H	Retain LHB trees and where possible widen roadside corridor with revegetation
D8C	Hill paddock	M	L/M	M	Where possible include LHB trees into D8A or D8B
D9	Cleared paddocks	L	L	L	No issues
D10	Creekline adjacent CSU	M	L/M	M/H	Near Old Sydney Rd deeply eroded (worst erosion of Thurgoona area)
D11	CSU Campus Ironbark plantings	L/M	M	L/M	Regent Honeyeater habitat
D12	Telstra	L/M	M	M/H	Regent Honeyeater habitat
D13	University Close residential	L/M	M	L/M	Regent Honeater habitat
D14	St Hilaire reserves	L/M	M	M	Regent Honeyeater habitat. Maintain & enhance
D15	TAFE NEC	L/M	M	L/M	Regent Honeyeater habitat
E1A	Woodland	M/H	M/H	M	Retain, control phalaris and revegetate
E1B	Woodland- water-racing Rs	M	L/M	M	Where possible retain LHB trees
E1C	Woodland- horse	M	L/M	M/H	Where possible retain LHB trees; maintain

	paddocks				link b/n E1A and the racecourse
E1D	Screen plantings	L/M	L/M	L/M	No issues
E2	FTP, including drainage line	M	L/M	M/H	Retain LHB trees- retain linkage b/n E1A and equestrian centre (Note: drainage line requires stabilization works)
E3	FTPs	L/M	L	L/M	Where possible retain corridor adjoining Corrys Road
E4A	Paddocks	L/M	L	L	Where possible retain LHB trees
E4B	Tree copse	M	L	L/M	Where possible retain LHB trees
E5	Paddocks	L	L	L	No issues
E6A	FTP, including creekline	L/M	L/M	M/H	Retain site, especially drainage line corridor
E6B	Remnant with FTP	M	L/M	M	Fence part and enhance with shrubs
E6C	Remnant	M	L/M	M/H	Fence part and enhance with shrubs
E7A	Treed lane	M	L/M	M/H	Fence and revegetate corridor
E7B	Scattered trees	M	L/M	L/M	Fence and revegetate; reconnect with E6B or E6C
E7C	FTP	L/M	L/M	L/M	No issues
E8	FTP	L/M	L/M	M/H	Enhance corridor with E7A
E9	Creekline	L/M	L/M	M/H	Maintain and revegetate corridor
E10A	FTP block	M/H	M	M	Retain
E10B	Secondary grassland	M	M	M/H	Retain where possible as buffer to E10A
E11	Paddock	L/M	L/M	L/M	No issues
E12A	FTP	L/M	L/M	L/M	No issues
E12B	Scattered trees	M	M	M	Retain and revegetate
E13A	Dallinger Road	M	M	M/H	Retain and revegetate
E13B	Creekline	L/M	L/M	M/H	Retain and revegetate
F1	FTP and scattered LHBs	M/H	L/M	M/H	Retain and revegetate in paddocks
F2A	Roadside	M/H	L/M	M/H	Retain
F2B	Cluster	M	L	L/M	Retain and revegetate where possible
F2C	Paddock	L	L	L	No issues
F3A	Old Sydney Road	M	M	M/H	Enhance with shrubs
F3B	FTP	L/M	L/M	M	Retain and enhance link b/n F3A and F4A
F4A	FTP	M	L/M	m	Retain and revegetate
F4B	Remnant	M/H	L/M	M	Fence and revegetate
F5A	Fenced wetlands	L/M	M	L/M	Incorporate into flood retention area
F5B	Paddocks	L	L/M	L	Consider incorporating part into flood retention area
F5C	Copse	L/M	L/M	L/M	Consider fencing and revegetation
F6	Corrys Wood reserves	L/M	M	L/M	Regent Honeyeater habitat. Maintain trees & shrubs
F7	St Johns Hill reserves	L/M	M	L/M	Regent Honeyeater habitat. Maintain trees and shrubs
G1A	FTP	L/M	L/M	M/H	Where possible retain trees
G1B	Small remnant	M/H	M	L/M	Fence and retain linkage with F5
G2	Creekline	M/H	L/M	M/H	Fence and revegetate
G3	Fence boundary	M	L/M	M	Fence and revegetate
G4A	Creekline woodland	M/H	M	M/H	Fence and revegetate

G4B	Open woodland	M	L/M	M	Fence and revegetate
G5	Large FTP	M/H	M	M/H	Fence and revegetate. Regent Honeyeater habitat
G6	Paddock	L	L	L	No issues
G7	Paddock	L	L	L	No issues
G8A	Corridor planting	L/M	L/M	M	Complete link to F3A; incorporate LHB trees at bottom of slope
G8B	Small remnant	M	L/M	M	Fence and revegetate
G8C	Paddocks	L/M	L	L/M	Where possible retain LHB trees
G9	St Johns Green reserves	M	M	L/M	Regent Honeyeater habitat. Maintain Trees & shrubs

Notes:
The Southern end of Davey Rd is a major break in connectivity of the roadside tree canopy ~ 300 m corridor planting required.
Reconnect E6B and E6C, part of the gap includes a powerline.
Develop wildlife corridor between F1 and F4A.

8.2.1 Native Vegetation

The ground flora in the paddocks consists mostly of introduced pasture grasses and flat weeds, with hardy, native perennial grasses such as Wallaby Grasses *(Austrodanthonia spp.)* and Weeping Grass (*Microlaena stipoides*) being common in places.

Site E1A is the only site in the study area where native forbs are still common, including Early Nancy *(Wurmbea dioica)*, Chocolate Lily *(Arthropodium strictum)*, Bulbine Lily *(Bulbine bulbosa)*, Milkmaids *(Burchardia umbellata)*, Scaly Buttons *(Leptorhynchus squamatus),* Blue Bells *(Wahlenbergia sp.)* and Fairies' Aprons *(Utricularia dichotoma)*. Unfortunately this site has been sown with the introduced perennial Canary-grass *(Phalaris aquatica.)*, and will require thoughtful management to prevent the site degrading.

The creeklines in the study area, which make up some of the headwaters of Eight Mile Creek, are generally in better condition with Weeping Grass in particular being a major component of the grassy ground cover. Silver Wattle *(Acacia dealbata)* still persists along most reaches of creeklines to provide some shrub cover. Aquatic plants include Cumbungi *(Typha spp.),* Sedge *(Carex spp.)*, Rushes *(Juncus spp.)* and Reeds *(Phragmites australis),* with Spike-rush (*Eleocharis spp.),* Swamp Wallaby Grass *(Amphibromus fluitans)* and Spiny Mud-grass *(Pseudoraphis spinescens)* being less common. In the lower reaches of the creeklines River Red Gum *(Eucalyptus camaldulensis)* becomes the dominant tree whereas Blakely's Red Gum *(Eucalyptus blakelyi)* is more common in the upper reaches and many of the surrounding paddocks.

Water Bush *(Myoporum montanum)* was recorded along Eight Mile Creek. Although it is reasonably common further west, this is believed to be a first record for the Albury district. Other shrubs recorded included scattered Kangaroo Thorn *(Acacia paradoxa)*, particularly along Thurgoona Drive, isolated Sweet Bursaria (Bursaria spinosa) often growing at the base of trees and the occasional Hickory Wattle *(Acacia implexa*).

Low lying areas such as B3B, E1A, F5A and F5B contain many temporary wetlands and wet grassland plants in wet years, including Long-nosed Swamp Wallaby Grass *(Amphibromus macrorhinus)*, Watermilfoil *(Myriophyllum sp.)*, Water Ribbons *(Triglochin procerum.),* White Purslane *(Neopaxia australasica)* and Buttercups *(Ranunculus sp.)*. Site E1a, was particularly diverse with the Swamp Drumstick *(Craspedia variabilis)* and Swamp Daisy *(Brachyscome basaltica)* found only here. The threatened Swamp Wallaby Grass *(Amphibromus fluitans)* was not recorded during the survey period, with the surveys ending prior to the flowering of this species.

An important feature of the study area is the presence of large hollow bearing trees. These are common along the creeklines as well as some roadsides and are scattered throughout many of the paddocks.
The forward tree planting plantations are mostly dominated by introduced pasture grasses.
In summary, the ground layer flora is generally degraded throughout with low native plant diversity and the shrub layers are virtually non existent.

Many of the remnant trees in the study area are species which characterise Grassy White Box Woodland and Box-Gum Woodland in the south west slopes of NSW, ie. Blakely's Red Gum *(Eucalyptus blakelyi),* White Box *(Eucalyptus albens)* and Yellow Box *(Eucalyptus melliodora)*. The occurrence of these trees throughout the site is significant because Grassy White Box Woodlands and Box-Gum Woodlands have recently been listed respectively, as an Endangered Ecological Community in Australia under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and as an Endangered Ecological Community under the NSW Threatened Species Conservation Act 1995. The ramifications of this are discussed later. Other tree species include Red Box (*E..polyanthomos),* Apple Box *(E..bridgesiana),* Red Stringybark *(E.. macrorhyncha)* and River Red Gum *(E.. camaldulensis).* There are also scattered Kurrajongs *(Brachychiton populneus)*, Hickory Wattles and Silver Wattles along the creeklines.

8.2.2 Wildlife

The major biodiversity feature of the TSA was the diversity of fauna, in particular birds (see Table 2), which utilize the area and the range of habitat characteristics which enable this diverse range of species to occur. Of the 118 species of native birds recorded in the TSA between 2000 and 2003, six are listed by the NSW

Department of Environment & Conservation National Parks and Wildlife Service as being threatened species, namely: the Brown Treecreeper *(Climacteris picumnus victoriae),* Bush Stone Curlew *(Burhinus grallarius),* Diamond Firetail *(Stagonopleura guttata),* Hooded Robin *(Melanodryas cucullata),* Speckled Warbler *(Chthonicola sagittata*) and the Regent Honeyeater *(Xanthomyza phrygia*). A further five species of threatened birds are known to utilize similar adjoining habitats in the Albury area, these being: Turquoise Parrot *(Neophema pulchella)*, Swift Parrot *(Lathamus discolour)*, Purple-crowned Lorikeet *(Glossopsitta porphyrocephala)* (Davidson 2000B), Barking Owl *(Ninox connivens)* and Painted Honeyeater *(Grantiella picta)*.
The Eastern Grey Kangaroo *(Macropus giganteus),* the Common Brushtail *(Trichosurus vulpecular)* and Ringtail Possums *(Pseudocheirus peregrinus)* have been recorded previously in the area. Recent survey records show the threatened Squirrel Glider *(Petaurus norfolcensis)* is widespread throughout the TSA. In particular, Squirrel Gliders were detected in remnant woodland along streams, along several roadsides and patches of woodland and in FTP that also contained LHB trees. (van der Ree R. June 2003) .

Bats were not surveyed for this report, but the species of most conservation significance which might occur in the TSA is the Large-footed Myotis *(Myotis adversus)*, a fish eating bat recorded previously from the Murray River (Craig Grabham, Pers. Com). This bat utilises large bodies of water where fish occur and is likely to roost close by.
Unlike the nearby Nail Can Hill Range, reptiles appeared to be uncommon, probably because of habitat disturbance caused by rural activities. However during the surveys an Eastern Bearded Dragon *(Pogona barbata)* was located along the Six Mile Creek easement and an Eastern Blue-tongue Lizard *(Tiliqua scincoides)* was found in the Vickers Road FTP block. Tree Crevice Skinks *(Egernia striolata)* were also found in a stag tree and a Blackberry patch in the Kerr Road FTP block (Grabham & Datson, 2003).

Table 2: Birds of the Thurgoona Study Area (Davidson 2000A, 2000B and 2003; Grabham & Datson 2003)

Common Name	Scientific Name
Australian Hobby	Falco longipennis
Australian Magpie	Gymnorhina tibicen
Australian Magpie-lark	Grallina cyanoleuca
Australian Pelican	Pelecanus conspicillatus
Australian Raven	Corvus coronoides
Australian Wood Duck	Chenonetta jubata
Australian White Ibis	Threskiornis aethiopica
Australasian Grebe	Tachybaptus novaehollandiae
Australian Kestrel	Falco cenchroides
Barn Owl	Tyto alba
Blackbird *	Turdus merula
Black-chinned Honeyeater #	Melithreptus gularis gularis
Black-faced Cuckoo-shrike	Coracina novaehollandiae
Black-shouldered Kite	Ellanus axillaris
Blue-faced Honeyeater	Entomyzon cyanotis
Blue-winged Shoveller	Anas rhynchotis
Brown Falcon	Falco berigora
Brown Goshawk	Accipiter fasciatus
Brown-headed Honeyeater	Melithreptus brevirostris
Brown Songlark	Cinclorhamphus cruralis
Brown Thornbill	Acanthiza pusilla
Brown Treecreeper #+	Climacteris picumnus victoriae
Buff-rumped Thornbill	Acanthiza reguloides
Bush Stone Curlew #+	Burhinus grallarius
Clamorous Reed-Warbler	Arocephalus stentoreus
Collared Sparrowhawk	Accipter cirrhocephalus
Common Bronze-wing	Phaps chalcoptera

Common Starling *	Sturnus vulgaris
Crested Pigeon	Ocyphaps lophotes
Crested Shrike-tit +	Falcunculus frontatus
Crimson Rosella	Platycercus elegans
Diamond Firetail #+	Stagonpleura guttata
Dollarbird	Eurystomus orientalis
Double-barred Finch	Taeniopygia bichenovii
Dusky Woodswallow +	Artamus cyanopterus
Eastern Rosella	Platycercus eximius
Eastern Spinebill	Acanthorhynchus tenuirostris
Eastern Yellow Robin +	Eopsaltria australis
European Goldfinch *	Carduelis carduelis
Fairy Martin	Hirundo ariel
Fan-tailed Cuckoo	Cacomantis flabelliformis
Flame Robin	Petroica phoenicea
Fuscous Honeyeater	Lichenostomus fuscus
Galah	Cacatua roseicapilla
Gang Gang Cockatoo	Callocephalon fimbriatum
Golden Whistler	Pachycephala pectoralis
Great Egret	Ardea alba
Grey Butcherbird	Cracticus torquatus
Grey Fantail	Phipidura fuliginosa
Grey Shrike-thrush	Colluricincla harmonica
Grey Teal	Anus gracilis
Hooded Robin #+	Melanodryas cucullata
Horsfield's Bronze-Cuckoo	Chrysococcyx basalis
House Sparrow *	Passes domesticus
Jacky Winter+	Microeca fascinans
King Parrot	Alisterus scapularis
Latham's Snipe •	Gallinago hardwickii
Laughing Kookaburra	Dacelo novaeguineae
Leaden Flycatcher	Myiagra rubecula
Little Corella	Cacatua sanguinea
Little Friarbird	Philemon citreogularis
Little Lorikeet	Glossopsitta pusilla
Little Pied Cormorant	Phalacrocorax melanoleucos
Masked Lapwing	Vanellus miles
Mistletoe bird	Dicaeum hirundinaceum
Nankeen Kestrel	Falco cenchroides
Noisy Friarbird	Philemon corniculatus
Noisy Miner	Manorina melanocephala
Olive-backed Oriole	Oriolus sagittatus
Pacific Black Duck	Anus superciliosa
Painted Button Quail +	Turnix varia
Pallid Cuckoo	Cuculus pallidus
Peaceful Dove	Geopelia striata
Peregrine Falcon	Falco peregrinus
Pied Butcherbird	Cracticus nigrogularis
Pied Currawong	Strepera graculina
Rainbow Bee-eater	Merops ornatus
Red-capped Robin +	Petroica goodenovii
Red Wattlebird	Anthochaera carunculata
Red-rumped Parrot	Psephotus haematonotus

Regent Honeyeater #•	Xanthomyza phrygia
Red-browed Finch	Neochmia temporalis
Restless Flycatcher +	Muiagra inquieta
Richard's Pipit	Anthus novaeseelandiae
Rufous Songlarki	Cinclorhamphus mathewsi
Rufous Whistler +	Pachycephala rufiventris
Sacred Ibis	Threskiornis molucca
Sacred Kingfisher	Todiramphus sanctus
Scarlet Robin	Petroica multicolor
Shining Bronze-Cuckoo	Chrysococcyx lucidus
Silver Eye	Zosterops lateralis
Speckled Warbler #+	Chthonicola sagittata
Spotted Pardalote	Pardalotus punctatus
Spotted Turtle-Dove *	Streptopelia chinensis
Straw-necked Ibis	Threskiornis spinicollis
Striated Pardalote	Pardalotus striatus
Striated Thornbill	Acanthiza lineata
Sulphur-crested Cockatoo	Cacatua galerita
Superb Fairy Wren	Malurus cyaneus
Tawny Frogmouth	Podargus strigoides
Tree Martin	Hirundo nigricans
Varied Sitella +	Daphoenositta chrysoptera
Weebill	Smicrornis brevirostris
Welcome Swallow	Hirundo neoxena
Western Gerygone	Gerygone fusca
Whistling Kite	Haliastur sphenurus
White-bellied Sea-Eagle •	Haliiaeetus leucogaster
White-browed Woodswallow +	Artamus superciliosus
White-faced Heron	Egretta novaehollandiae
White-naped Honeyeater	Melithreptus lunatus
White-necked Heron	Ardea pacifica
White plumed Honeyeater	Lichenostomus penicillatus
White-throated Gerygone	Gerygone olivacea
White-winged Chough	Corcorax melanorhamphos
White-winged Triller	Lalage sueurii
Willie Wagtail	Rhipidura leucophrys
Yellow-billed Spoonbill	Platalea flavipes
Yellow-faced Honeyeater	Lichenostomus chrysops
Yellow Rosella	Platycercus elegans flaveolus
Yellow-rumped Thornbill	Acanthiza chrysorrhoa
Yellow Thornbill	Acanthiza nana
Yellow-tufted Honeyeater	Lichenostomus melanops

* Introduced species.

New South Wales threatened species listed as Endangered or Vulnerable, protected under the TSC Act 1995.

• Commonwealth listed species protected under Threatened Species, Migratory Terrestrial Species, Migratory Wetland Species or Listed Marine Species provisions under the EPBC Act 1999.

+ Declining Woodland Bird, listed as being of Conservation Concern in NSW.

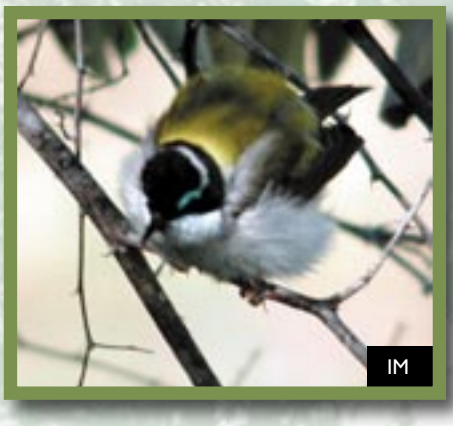
9.0 Status of Threatened and Declining Species and Ecological Communities in the TSA

A map showing sighting records of threatened species from the Thurgoona area is held by AWDC and ACC.

9.1 Threatened Species

Regent Honeyeater #•

This nationally endangered honeyeater, of which about 1000 birds remain, has been regularly recorded breeding in and around the Thurgoona residential estates over the last five years, for example Corry's Wood Estate in 1998 and 1999 (Davidson 2000a). As a condition of development consent the AWDC has developed an annual monitoring program with the National Environment Centre, Riverina TAFE, Thurgoona to establish the Regent Honeyeater usage of the Corrys Wood site (Fenton 2003). Its status in the TSA prior to the late 1990s is unknown. Regent Honeyeaters appear to be attracted to the TSA by the extensive forward tree plantings, in particular the Ironbarks, along with other native garden plants which provide an important nectar food resource. All breeding records of Regent Honeyeaters are important to the conservation of this species (Regent Honeyeater Recovery Plan), and the regularity of breeding indicates that the TSA is of national significance.

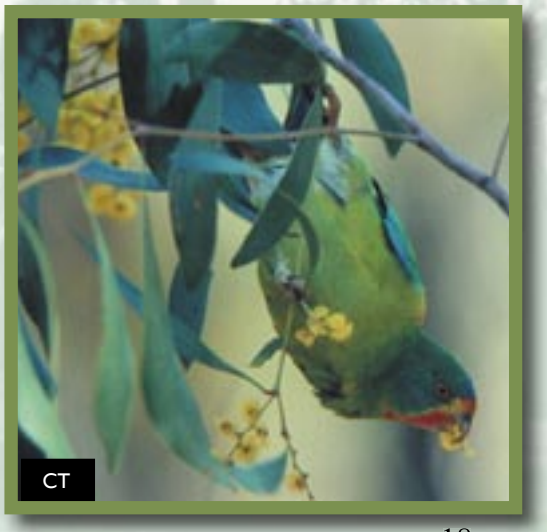


Black-chinned Honeyeater

This is a recently listed threatened honeyeater which is regularly seen or heard, with its characteristic call, along creeklines, on the lower parts of the Nail Can Range, in large paddock trees and in gardens, coinciding with eucalyptus flowering. The Black-chinned Honeyeater appears to be a resident in the Albury district, with small foraging groups seeking flowering eucalypts year-round. This species utilizes the creeklines, roadsides, paddock remnants and planted habitats of the Thurgoona Study area. (For example, Charles Sturt University, Mitchell Park, Kerr Road, St. John's Hill, Corry's Wood.)

Swift Parrot #•

This is a regular winter visitor to the Albury district, where it seeks out the flowering White Box and lerp upon which it feeds. This nationally threatened species, of which it is estimated only 1200 nesting pairs remain, breeds in Tasmania and over-winters on the mainland (Swift Parrot recovery Plan 2001). Swift Parrots are likely to forage on the winter flowering eucalypts in the TSA in some years.



Turquoise Parrot #

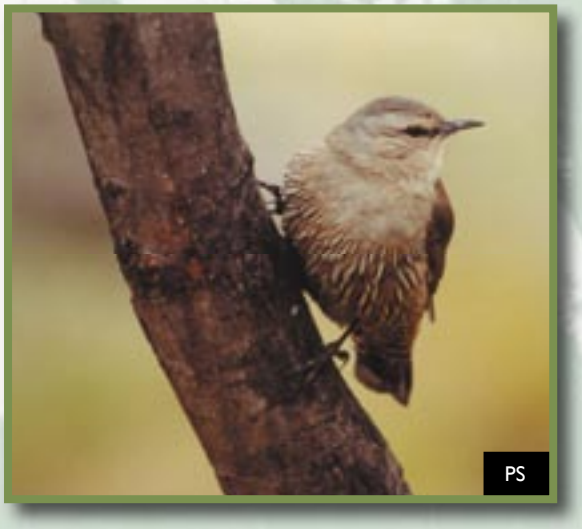
This is a rare, grass-seed eating parrot, which breeds in and around the Nail Can Range and the nearby Table Top Range. Regularly seen flying east across Urana Road, from Hamilton Valley towards the TSA (Davidson 2000c), Turquoise Parrots may forage in summer/autumn across the TSA towards Bells TSCR searching for native grass seed.

Purple-crowned Lorikeet #

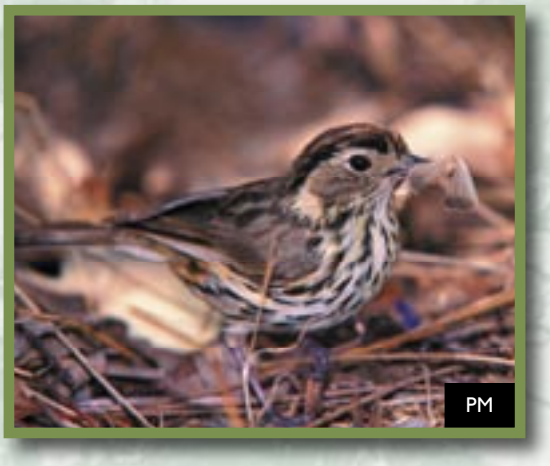
This is a rare visitor to the Albury district, on the north eastern edge of its range. A pair was observed feeding on flowering mature eucalypts in the nearby Hamilton Valley (Davidson 2000c). This lorikeet may occasionally forage on flowering eucalypts in the TSA.

Brown Treecreeper (SE form – sub-species picumnus) #+

A recently listed species, dependant on large patches of woodland or well connected streamside vegetation, where this Treecreeper forages for insects on the trunks and branches of trees and on the ground below trees and on fallen logs (Walters et. al. 1999). This resident treecreeper has a number of small populations centred on Eight Mile Creek, Bells TSCR and in the remnants of Norske Skog and within the TSA .



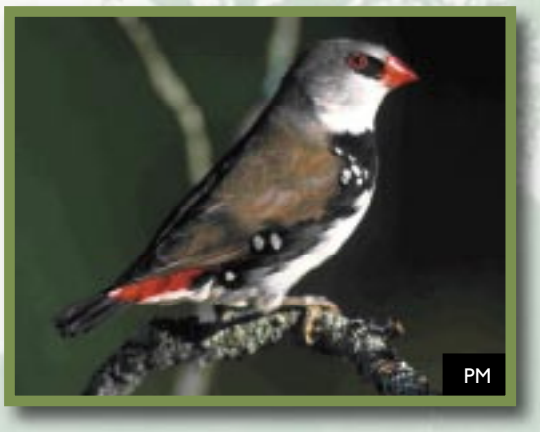
Speckled Warbler #+



This small, sedentary ground feeding bird also nests on the ground, often at the base of shrubs or trees, and was recently listed as a threatened species in NSW. It is dependent on patches of structurally complex shrubs or ground litter, where it can often be found foraging with thornbills and other small insect feeding birds. Speckled Warblers are relatively common in the nearby Black Range (Davidson 2000c), but, within the study area, were found only in the large FTP block on Kerr Road.

Barking Owl #

Several pairs of this rare, large owl are thought to persist in the Albury district, with the closest breeding record to the TSA being in a drainage line in the Norske Skog Plantation (Peter Merrit Pers. Comm.). Barking Owls have large home ranges (Recovery Plan 2003) where they forage for possums, rabbits, large insects and birds. It is highly likely that this pair of owls forage at times along Eight Mile Creek and its tributaries in the TSA.



Diamond Firetail #+

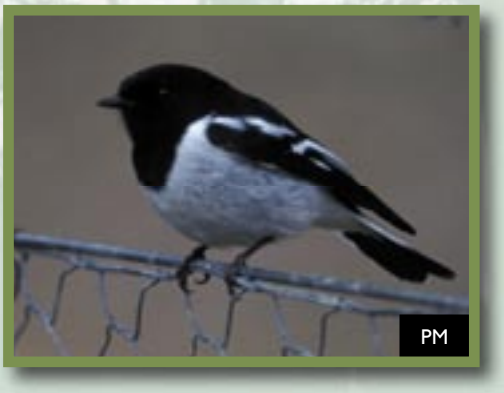
This small grass-seed eating finch was recently listed as a threatened species in NSW. Its prime habitat is the grassy woodlands, where it nests in dense, often prickly, shrubs and forages on the ground for various native grass seeds. This species was only recorded at one location in the study area at E10A and the adjoining E10B. It appears that the near absence of native grass seed (upon which the species forages) in the TSA greatly limits this species population size. Diamond Firetails have been recorded in Bells TSCR previously, by one of the authors, and is common in the nearby Black Range (Davidson 2000c).

Squirrel Glider #

The Squirrel Glider is a small-medium sized (200 – 350g) gliding possum that was once common in the fertile woodlands on the inland side of the Great Dividing Range. Extensive clearing of habitat for agriculture and the decline in quality of the remaining habitats are the primary threats to the persistence of this species. Squirrel Gliders depend on abundant tree hollows within their range to den and raise young. Squirrel Gliders feed on nectar and pollen, sap and insects from a range of Eucalypts and Acacias. The minimum area required by Squirrel Gliders in high quality fertile habitat is approximately 3 – 5 ha, which increases as habitat quality decreases (van der Ree and Bennet 2003). The primary means of movement is by gliding between trees, with distances of up to 75m being regularly traversed (van der Ree et al. in press).

Bush Stone Curlew #+

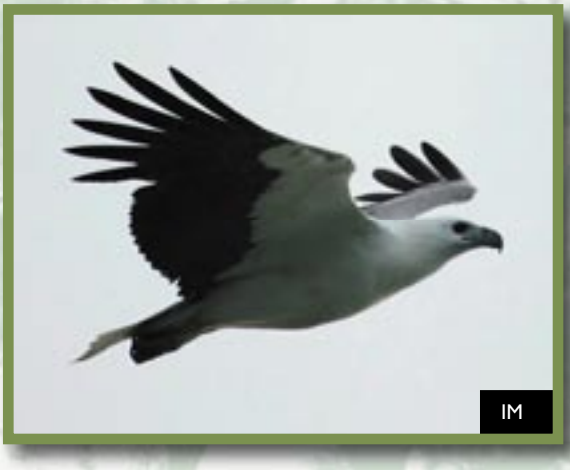
The Bush Stone Curlew is a large ground nesting bird which roosts in clumps of woodland with abundant fallen logs which it uses for camouflage, emerging at night to feed on large arthropods, lizards and even mice (Bush Stone Curlew Recovery Plan, 2003). The only recent records from the Albury district include an individual calling at the Thurgoona Golf Course (Craig Grabham Pers. Obs.) and an unconfirmed report of a bird near Ettamogah Road.



Hooded Robin #+

The Hooded Robin is uncommon in the Albury area, with several pairs located throughout the higher quality, open woodland parts of the Nail Can Range. The only recorded sighting in the TSA was of a resident breeding pair on the Thurgoona TAFE grounds.

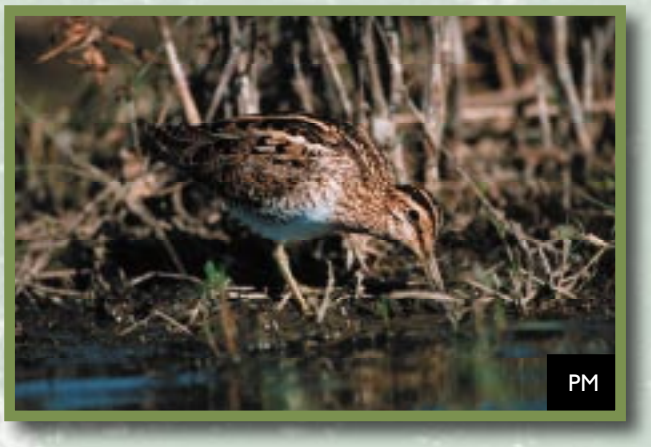
White-bellied Sea-Eagle •

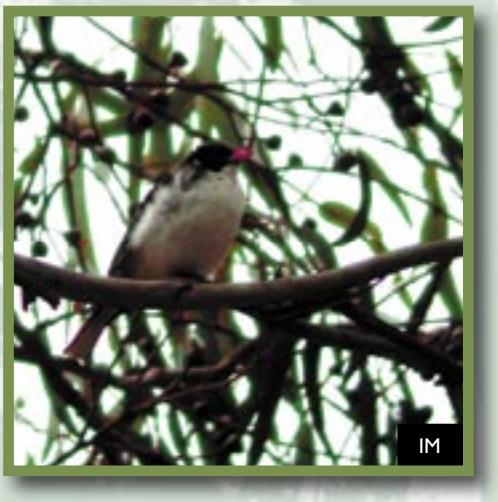


The White-bellied Sea-Eagle is scattered along the Murray River with several pairs regularly seen in the Albury area – mainly on the Hume Weir. A pair was observed roosting in Bells TSCR during the drought of 2002/2003, when the Hume Weir was very low. It is likely that Sea-Eagles may occasionally forage throughout the TSA for birds, when their preferred aquatic prey is limited.

Latham's Snipe •

Latham's Snipe is a regular summer migrant to SE Australia from Japan. Latham's Snipe occurs in small parties on the edge of well vegetated dams and swamps, where it forages for aquatic organisms in the soft mud or shallow water. Two Snipe were flushed from a dam below Charles Sturt University during spring surveys in 2003.





Painted Honeyeater #

This rare nomadic honeyeater has not been recently recorded in the Albury district, although there is an unconfirmed record from the CSU grounds (Tracy Harrison Pers. Comm.). Further surveys will be undertaken in 2003 to verify the status of this species in the TSA. It is unlikely that Painted Honeyeaters would regularly utilize the TSA because the area does not provide the abundance of mistletoe upon which it is dependant for food.

Swamp Wallaby Grass #•

This rare, highly palatable Swamp Wallaby Grass was identified in a lightly grazed dam north of Williams Road, in a previous study (Frankenberg unpublished report). This dam is on a drainage line which is part of the catchment of Eight Mile Creek and therefore it is likely that *Amphibromus fluitans* occurs elsewhere in the TSA. The dry conditions over recent years and the fact that the field surveys in 2003 were completed prior to the seeding of this species make it impossible to verify its status within the TSA.

9.2 Threatened Ecological Communities in the Thurgoona Study Area

Box-Gum Woodland #

The NSW Scientific Committee has made a final determination to list the Box-Gum Woodland as an Endangered Ecological Community (EEC) under the NSW Threatened Species Conservation Act 1995 (TSC Act). This EEC is characterized by containing Yellow Box, White Box and Blakely's Red Gum (NSW NPWS 2002), all species common throughout the TSA. The best example of this EEC is Bells TSCR and parts of E1A , with their relatively intact ground flora as well as their near natural woodland tree cover. Whilst the ground flora throughout the TSA is highly modified, much of the remnant tree cover, particularly where clustered, would be considered as being Box-Gum Woodland EEC.

Grassy White Box Woodland •

The Commonwealth of Australia has listed Grassy White Box Woodlands as a Threatened Ecological Community under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The Grassy White Box Woodlands represents those distinct woodland communities where the dominant tree species is generally White Box, *Eucalyptus albens,* and grass species dominate the ground layer. Within this community type, White Box may form mosaics with Blakely's Red Gum, *Eucalyptus blakelyi,* and Yellow Box, *E. melliodora,* which may become locally dominant in lower topographic positions, while areas subject to waterlogging may be treeless. Grassy White Box Woodland is a subset of the Box-Gum Woodland referred to previously, being that part with mostly White Box trees. The Grassy White Box Woodland in the Thurgoona area is scattered throughout, being more common on the rising country, above the creeklines and flats. As described for the Box-Gum Woodland previously, the ground layer for the Grassy White Box Woodland is similarly highly disturbed and the remnant tree cover, where clustered, would be considered an endangered ecological community. Sites D4, D7 and F4B are examples of this ecological community.

9.3 Threatened species considered less likely to occur in the TSA.

Superb Parrot #•

Albury is not within the extant range of this species. Incidental sightings near Oze Wildlife, along Ettamogah Road and at Red Light Hill are thought to be of avarian escapees.

Southern Bell Frog (Growling Grass Frog) #•

This species was not recorded during the surveys, even though extensive searches were made. It requires large flood events for breeding and dispersal *(Pers. Comm. Skye Wassens).*

9.4 Declining Woodland Birds of the Thurgoona Study Area

Thurgoona is a known habitat of fifteen declining species, five of which are threatened species. The Crested Shrike-tit, Dusky Woodswallow, Eastern Yellow Robin, Jacky Winter, Painted Button-quail, Red-capped Robin, Restless Flycatcher, Rufous Whistler, Varied Sitella and White-browed Woodswallow are listed as being of some conservation concern and could potentially become threatened if appropriate management of remaining habitat is not undertaken. Woodland birds have declined significantly in the wheat/sheep belt of New South Wales over the past 50 years, and have become extinct in at least three of the eleven areas for which long term records exist (NSW NPWS 2003). The area, condition and isolation of those remnants are important factors in the survival of bird populations, as is the total amount of habitat remaining in the landscape (NSW NPWS 2002c). In most instances the conservation requirements of Thurgoona's threatened species will overlap with that of the declining birds and thus additional planning measures are unlikely to be required.

9.5 Significance of Threatened Species and ecological species in the Thurgoona Study Area

In summary there are a number of threatened species known or predicted to occur in the TSA. The main species on which urban development is likely to have a significant effect are the Regent Honeyeater and the Squirrel Glider, along with the Box-Gum Endangered Ecological Community. It is because there is a healthy local population of Squirrel Gliders centred around Thurgoona that the species is considered significant. The Regent Honeyeater is so rare that anywhere it breeds is significant. Populations of other threatened species are considered less significant in the TSA.

10.0 Key Habitat Features of the TSA

10.1 Creeklines

Creeklines are an essential feature in this study area and provide habitat and connectivity across the landscape for up to nine threatened species. They contain most of the remnant tree cover within the area and provide an ideal opportunity to improve the environmental values of the area whilst not greatly limiting urban development. The Squirrel Glider, Barking Owl and Black-chinned Honeyeater depend on these systems.

10.2 Large Hollow Bearing (LHB) Trees

Overall there are many LHB trees across the TSA, mostly occurring along the drainage lines, along roadsides and as scattered paddock trees. Hollows for wildlife are a very limited resource throughout the Albury district. They have a high value for species of wildlife that rely fully on hollows for shelter or raising young, such as parrots, kingfishers, possums, gliders and bats. Squirrel Gliders are dependent on the retention of LHB trees as are owls and the Brown Treecreeper.

10.3 Forward Tree Plantings (FTP)

The larger blocks of tree cover consist of forward tree plantations, dominated by eucalypts, and as these trees are less than 30 years old they have not yet developed hollows.
The majority of FTP areas have low structural diversity. That is, they contain mostly an upper storey of tree species. Where FTP blocks have been enhanced with a shrub layer, the added floristic and structural diversity has improved the various foraging, roosting and breeding opportunities for many bird species. For this reason, the habitat value of the isolated remnant trees within these blocks has generally improved for native wildlife (Grabham & Datson 2003).

Seventy eight species of trees and shrubs have been identified in the tree blocks, of which 20 species are indigenous and a further 6 indigenous to bordering localities (Margules & Partners Pty. Ltd 1989). This has provided a more or less continuous succession of flowering and has thus ensured a reliable supply of nectar and insects for foraging birds and animals. Many inland as well as common resident bird species were observed utilizing the resources provided by FTP blocks during the 2002/03 drought. During mammal surveys of the area it was observed that the strips of shed bark hanging over tree branches of smooth barked Eucalyptus species in the FTP blocks were providing habitat for the Squirrel Glider (Pers. Comm. Rodney van der Ree).
Many FTPs play an important role in providing wildlife corridors, as they connect various sites throughout the district.

10.4 Dead Standing Habitat Trees (Stag Trees)

Stag trees contain hollows and crevices providing suitable foraging habitat as well as roosting and nesting sites for many bird species, bats, reptiles, possums and the threatened Squirrel Glider. Stag trees are scattered throughout creeklines, paddocks and in some of the FTPs.

10.5 Remnant shrubs

Shrubs are rare throughout the TSA with scattered Silver Wattles along the creeklines and scarce clumps of Hedge Wattle, mainly in the Thurgoona Drive area. There is also the occasional Hickory Wattle and Sweet Bursaria, and a solitary Waterbush on Eight Mile Creek. Shrubs can provide important nesting and roosting habitat, for birds and reptiles as well as providing a deterrent for predators. For example remnant Hedge Wattle is an extremely important habitat for the Double-barred Finch, Red-browed Finch and Blue Wrens in the Thurgoona area. Hedge wattle also provides nesting habitat for the threatened Diamond Firetail in adjoining habitat (Davidson 2000c). Some of these shrub remnants have been retained in FTPs but most occur along roadsides, specifically Thurgoona Drive, and it is important that they are retained and that an appropriate management regime be undertaken to conserve this valuable habitat component.

10.6 Ground litter

Fallen logs are common beneath remnant trees and stags. Fallen logs are used by reptiles and frogs for shelter and provide an important substrate for foraging by many species including the threatened Brown Treecreeper. As well, the Bush Stone Curlew uses the sticks as camouflage from predators. Other ground cover in the form of leaf litter is also common below remnant trees and is used by many species for foraging purposes.

10.7 Habitat Linkages (Wildlife Corridors)

An important concept in maintaining viable populations of wildlife involves allowing animals to move across the landscape. This ensures that: (a) gene flow between populations is maintained (i.e. populations do not become inbred); (b) areas can be recolonised following local extinction events (e.g. after a wildfire eliminates a local population); and (c) small populations can be bolstered by new immigrants.

Connectivity across the landscape can be achieved through a number of things that include corridors for movement, linear habitats, and stepping-stones. If strategically designed and appropriately managed, these three components can form the basis for an effective habitat network strategy for Thurgoona. (It is worth noting that other landowners own important components of this network and should be engaged in this strategy development. See the retained habitat framework section).

The linear strips of remnant woodland along the many creeks and roadsides provide habitat for many species of plants and animals as well as potentially providing conduits for movement. In particular, the Eight Mile Creek and its tributaries, Williams, Wignalls and Ettamogah Rds, are important habitats and linkages. Areas of FTP that do not contain LHB trees are probably unable to support resident populations of many species, but are highly likely to be suitable as "corridors" for animals to move from one patch of habitat to the next. The FTP would be particularly valuable as juvenile animals disperse from where they are born. Small and discrete patches of habitat may not provide continuous corridors but still provide connectivity by acting as "stepping stones" from one patch of habitat to the next. Scattered trees in paddocks and small patches of habitat throughout the developed and undeveloped areas of the TSA may act as stepping stones.

10.8 Nectar Rich Resources

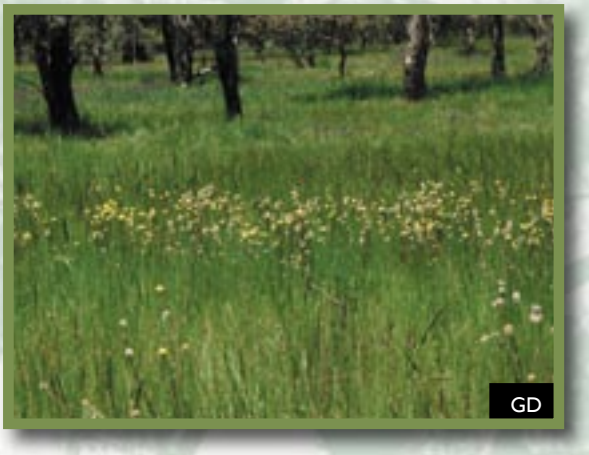
Seven species of eucalypt were recorded growing naturally in the study area, which is very diverse for the catchment. This would provide a varied nectar resource throughout much of the year. Red Box was flowering patchily during the survey period, and whilst six honeyeater species were recorded, they were mostly feeding on insects. The planted Ironbark and Yellow Gum, not endemic to the Albury area, would provide an excellent nectar source in good flowering years. Regent Honeyeaters are found in a mix of planted and remnant vegetation in the nearby Thurgoona estates due in part to the rich and diverse nectar supply. The Regent Honeyeater foraging preferences will drive much of the revegetation principles and retention choice of FTP blocks within its range at Thurgoona. Planted Ironbarks throughout walkways, streets and reserves should be managed and retained for the Regent Honeyeater's conservation in the area.

Resident, aggressive family groups of Noisy Miners exert a major influence upon the variety of nectar feeding birds which utilize a site, by defending a territory from the smaller less common birds (e.g. Swift Parrot, Black-chinned Honeyeater, Purple-crowned Lorikeet).

10.9 Mistletoe

Mistletoe is a particularly valuable habitat being common on many of the FTP eucalypt species and scattered on remnant trees. In flower it provides a rich nectar source for many native birds such as honeyeaters, insects, possums and gliders. Mistletoe fruit is a vital part of the diet of the Mistletoebird and various honeyeaters including the rare Painted Honeyeater. Its complex structure provides good cover for native birds to perch and nest, including the Regent Honeyeater, which successfully nested and fledged young in a mistletoe clump on Hotham Circuit in 2002 (Pers.Obs. Collins & Herring). Possums, gliders (including the threatened Squirrel Glider) and many butterfly species feed on the foliage. At least four species of mistletoe including Drooping Mistletoe *(Amyema pendula)* and Box Mistletoe *(Amyema miquelii)* have been recorded in the FTP. During the summer of 2002/2003 Mistletoe was observed to be providing a resource for many species of inland birds, including the Pied and Black Honeyeaters, following the decline in spring flowering of Eucalypts. These birds along with large flocks of Dusky and White-browed Woodswallows were utilizing the FTP blocks as a drought refuge during a climatically adverse period.

10.10 Wetlands



There are a number of wetlands within the TSA, including a Gilgai complex on the low lying plain at site E1A, small (<1 ha) ephemeral wetlands along the drainage line B2B and man-made wetlands where farm dams have large areas of shallow water, e.g. B2B. Most of the plants in these areas were native wetland plants and they provide valuable habitat resources, especially in wet years. The threatened Swamp Wallaby Grass is most likely to be found in these habitats, as well as in some of the more intact stream frontages.

11.0 Guiding principles for the Threatened Species Conservation Strategy

The principles expressed in this section cover the issues of importance required to achieve the stated objectives for the Thurgoona Threatened Species Conservation Strategy. To assist those involved in the implementation of this strategy a series of information sheets, consistent with this section, is provided at the rear of this document .

11.1 Creekline Management

Where possible creekline corridors should be at least 50 metres wide from each bank to:

- allow regeneration to occur away from the drip line of the existing trees;
- enable open areas for the re-vegetation purposes to be retained;
- incorporate access and maintenance tracks away from the tree canopy;
- maintain existing native tree cover, in particular LHB trees; and to
- provide enough width to allow crash grazing to occur, for management purposes, without exascerbating the destabilization of the creekline.

In addition it is considered necessary to:

- plant local native trees where gaps in the canopy of greater than 60 metres exist;
- incorporate all identified LHB trees within 80 metres of the canopy of the drainage line into the corridor by fencing;
- enhance corridors with the planting of local shrubs and understorey plants (see Revegetation principles);
- control long grass by slashing or periodic grazing;
- control Phalaris grass by burning/spraying/physical removal and replacement with preferred native species;
- remove woody weeds including Blackberry, Willows and Briar; and to
- retain fallen logs and sticks for habitat purposes, where possible.

11.2 Wetland development

Where possible, apply wetland enhancement principles when establishing storm water retention basins (Melbourne Water, 2002). Revegetate these sites with the appropriate aquatic vegetation including the rare Swamp Wallaby Grass, *Amphibromus fluitans*.

11.3 Retention of LHB trees and stags.

The retention and maintenance of LHB trees and stags is problematic in an urban setting because of their potential to be a danger to the public as they shed limbs. The very process of limb shedding through decay and wind damage allows hollows to develop and provides ground cover habitat by the way of logs and sticks. These habitat features are vital to the conservation of many species, including Squirrel Gliders, in the TSA.

Therefore consideration should be given to:

- retaining and where possible incorporating all identified LHB trees within 80 metres of a wildlife corridor or block;
- retaining all clusters of LHB trees larger than 0.5 hectare. (Note: trees are considered part of a cluster if they are within 2 canopy widths of the nearest tree.);
- connecting clusters with treed corridors >20 metres wide where possible;
- retaining fallen logs and sticks for habitat purposes where possible;
- discouraging public recreation use in areas containing LHB trees. (This issue is particularly important for the long term survival of LHB trees, because land managers are required to undertake risk assessment and management of that risk in public spaces. Hence habitat in the form of hollow bearing limbs is frequently (necessarily) removed in public spaces and this need not occur if public access is limited.);
- enhancing all retained LHB trees with the planting of local understorey shrubs (See Revegetation Principles); and
- the fact that where LHB trees are cleared, habitat values will be lost.

Consideration needs to be given in the action plan part of the TTSCS to develop appropriate compensatory measures.

(Note: tree or shrub plantings on their own do not adequately compensate for the habitat value lost by the removal of LHB trees.) The compensatory measures need to be developed by the key stakeholders ensuring that the measures are appropriate for the Albury area. (See section 13.0, Future Management.)

11.4 Nest boxes

It is important that:

- in all cases nesting boxes should be established in retained habitat areas as close as practical to where the LHB trees are removed. (Five boxes per tree removed are recommended; three for gliders and one each for possums and bats.);
- nest boxes generally are located where natural hollows are most limited;
- nest boxes are maintained and monitored; and that
- access, height and possible vandalism are considered when locating nest boxes.
- Best Practice Management guidelines should be implemented when managing nest boxes. Refer to the Gould League of Victoria's "Nestbox Book". (See Bibliography.)

11.5 Forward tree plantings

It is important that these areas:

- retain those aspects that provide key habitat for threatened wildlife;
- retain corridors (>20 metres wide) of forward plantings for the movement of Squirrel Gliders between high value sites. These sites could be used for public access purposes;
- retain forward plantings amongst sites retained for LHB tree clusters; and
- retain strategic trees which may provide a link in an arboreal corridor.

11.6 Revegetation and plantings

These will be facilitated if strategies are implemented to:

- prepare the planting bed adequately;
- fence off and apply broad leaf (e.g. Paterson's Curse) weed control to the planting areas in early Autumn and Spring prior to flowering and seed set; hand pulling or chipping of weeds can be conducted where the use of sprays is not advisable (e.g. against some residential housing allotment boundaries);
- remove Bathurst Burr by hand chipping when necessary or herbicide spraying in Spring; prevent Bathurst Burr seeding by spraying or chipping out for four to six years. Removal of hand chipped plants is required immediately to prevent further seed set;
- ensure there is not a proliferation of Phalaris by spot spraying or a combination of spot burning and spraying of regrowth;
- spot or strip spray planting areas several months beforehand;
- mulch plants with compacted weed/seed free straw or recycled cardboard mats or similar means to a radius of 50cm preferably, leaving an air space between the stem of the plant and the mulch to avoid fungal problems for the plant;
- protect plants using a plastic guard and 3 bamboo stakes per tree, ensuring stakes are placed correctly to avoid issues with bags blowing in on young plants (refer to Revegetation Guidelines in information sheet series); and to
- ensure revegetation is kept free of weeds at least for the first year by follow up maintenance spraying.

11.6.1 Strategies for Creekline Revegetation

- Plant by hand using Pottiputki planters to a depth of no greater than 100mm to avoid disturbance of archaeological cultural artefacts;
- Plant indigenous riparian and understorey shrubs between June and September;
- Plant woody shrub species in nodes to allow fire vehicle access;
- The use of species such as Silver Wattle (Acacia dealbata), Sweet Bursaria (Bursaria spinosa), and Long-leaved Hop Bush (Dodonea viscosa ssp. angustissima) is desired (For further recommendations, see species list appendiced.); and
- Stock exclusion should be permanent unless there is excess grass growth, when controlled grazing methods over short periods in early Spring should be employed.

11.6.2 Strategies for Understorey plantings amongst LHB trees

- Hand plant, using Pottiputki planters in nodes around trees to improve habitat values and minimize risk of recreational use;
- Ensure deep ripping does not occur within 2m of the drip lines of established trees and 10m from stag trees; and

- The use of indigenous Wattles such as Hickory, and the prickly stemmed Sweet Bursaria and Hedge Wattle are recommended. (For further recommendations, see species list, Revegetation Guidelines.)

11.6.3 Strategies for Plantings amongst retained forward planting areas

- Plant understorey shrubby species, such as Wattles and Bottlebrush to improve the floristic and structural diversity of these areas for wildlife habitat purposes;
- The incorporation of some proven introduced native species is desired as they lengthen the nectar production period in some areas for a range of honeyeaters, including the Regent Honeyeater. Some bushy, shorter flowering species will also provide resting places for the Regent Honeyeater away from the more aggressive honeyeaters, such as Red Wattlebird, Noisy Miner, Noisy Friarbird and White-plumed Honeyeater; and
- It may be necessary to plant away from tree root zones to minimize competition during initial growth stages.

11.6.4 Strategies for Plantings between wildlife corridor gaps

- Deep rip the ground preferably several months prior to planting;
- Plantings of indigenous tree species such as White Box, Red Box and Blakely's Red Gum on the rises and Blakely's Red Gum on the higher reaches of the creeklines with River Red Gum on the lower reaches, along with Yellow Box and Apple Box is desired. The use of some introduced native species such as Ironbark, Pink flowering Yellow Gum and Spotted Gum is also desired as a foraging resource as they are known to be utilized by threatened species in the Thurgoona area. The use of local and introduced native shrub species is also desired to improve habitat values;
- Tree species should be planted in clumps at intervals of, ideally, about 40 metres to allow successful arboreal movement of gliders; and
- Good ground preparation using methods as above should be employed.

11.7 Fencing habitat retention areas and wildlife corridors

It is important to:

- avoid the use of barbed wire on the top strands of fences, to lessen the chance of Squirrel Gliders and other wildlife being "hooked up" on the barbs;
- ensure all fenced areas have gates to allow access for maintenance purposes;
- ensure all fenced areas include or abut (where narrow) a vehicular track for maintenance purposes; and to
- ensure all fenced areas have access for fire vehicles.

11.8 Wildlife Corridors

It is important to:

- retain corridors of forward plantings (>20 metres wide) that link retained clusters of LHB trees;
- retain all existing linear corridors of LHB trees, including unused and used roadsides and creeklines;
- plant trees between tree canopy gaps in habitat corridors of greater than 60 metres;
- widen corridors to include all identified LHB trees within 80 metres (see Map details);
- plant native plants as per revegetation section above, to enhance corridors; and to
- consider wildlife corridors as possibly incorporating public access tracks.

11.9 Road Reserves

As a rule, provide a 60m total width corridor along road reserves where there are large hollow bearing trees (could be 20m one side, 40m other side). This will allow sufficient room for some revegetation.

11.10 Weed control

It is important to:

- ensure adequate weed control is undertaken preferably 12 months prior to tree or shrub revegetation activities, and as follow up maintenance;
- control and where possible eradicate the following weeds, Bathurst Burr, Phalaris, Blackberry, Hawthorn, Horehound Tree of Heaven ,Sweet Briar, Willow and St Johns Wort;
- control annual pasture grasses and flat weeds with strategic grazing; and to
- discourage the dumping of garden waste into habitat retention areas.

Note that removal of weeds where they are providing habitat for a threatened species requires careful evaluation and possibly staged removal.

11.11 Pest animal management

It is important to:

- undertake annual rabbit and fox warren destruction in consultation with Hume Rural Lands Protection Board, Hume Shire Council or Albury City Council; and to
- explore all avenues of discouraging domestic cat ownership and the confining of them to homes. The Cat Management Manual (NRE 2001) provides a ready reference for Local Government, providing responses to common issues and community enquires. Domestic animal control requires an ongoing community awareness program. Unless adequate cat controls are introduced and enforced much of the work of the strategy could be detrimentally effected. Such cat controls can only be enforced by local government.

11.12 Noisy Miner Management

It is important to:

- promote research into the impacts of Noisy Miners on threatened woodland birds, in particular the Regent Honeyeater; and to
- investigate, with NPWS, the control of Noisy Miners in areas adjoining habitat suitable for Regent Honeyeaters and other threatened woodland birds.

11.13 Grazing of retained sites

It is important to:

- use crash grazing where appropriate as a tool to control long grass in years with high fuel build up. Note: this will mostly involve periodic grazing of the wider, well fenced creeklines in early spring, to coincide with abundant annual grass growth;
- ensure that retention sites are not continuously stocked; and to
- ensure that grazing by domestic stock only be undertaken in habitat retention areas when grass growth is suppressing native plant regeneration or causes a potentially serious fire hazard.

11.14 Recreation pathways

Pathways should be located away from root zones and canopies of large hollow bearing trees and stag trees. Locating pathways on vehicle tracks is preferred.

11.15 On-going management and monitoring

All habitat retention and wildlife areas require regular management. The type and amount of on-ground management will depend on the site characteristics. For example in relatively natural habitat areas a regular inspection looking for potential problems is all that is needed; whereas weedy creeklines may require annual grazing/slashing, weed and pest animal control.

Actions required include:

- checking nest boxes. Nest boxes should be checked, cleaned out if inhabited by bees or starlings, repaired, or replaced twice per year. A long term monitoring contract with TAFE or CSU would be ideal because usage by Squirrel Gliders and other wildlife could be tracked and improvements made;
- replacing dead plants in revegetation areas;
- undertaking regular fence and track maintenance;
- destroying rabbit and fox warrens annually;
- undertaking annual inspection of grass growth in early spring for slashing and grazing purposes;
- undertaking annual inspection of problem weeds for control purposes;
- developing public awareness programs to inform residents of the biodiversity values of the Thurgoona area and their potential role in its maintenance;
- promoting the development of a friends or urban landcare group to aid in urban habitat protection; and
- undertaking regular inspections to discourage inappropriate usage of habitat retention areas and wildlife corridors. (Rubbish and garden waste dumping, for example.)

Table 3.

The management activities likely to have a positive impact on Threatened Species and Endangered Ecological Communities located in the Thurgoona Study Area

Threatened Species & Endangered Ecological Community	**Activity**									
	Creek line Management	Wetland Development	Retention of LHB trees	Nest Boxes	Revegetation	Wildlife Corridors	Weed Control	Noisy Miner Management	Grazing Management	Cat Control
Regent Honeyeater #•	*		*		*			*		*
Black-chinned Honeyeater #	*		*		*			*		*
Swift Parrot #	*		*		*					
Turquoise Parrot #			*			*	*		*	*
Purple-crowned Lorikeet #	*		*							*
Brown Treecreeper #	*		*			*	*	*		*
Speckled Warbler #					*	*	*		*	*
Barking Owl #	*		*	*						
Diamond Firetail #+					*		*		*	*
Squirrel Glider #	*		*	*	*	*				*
Bush Stone Curlew #							*		*	*
Hooded Robin #					*		*		*	*
Painted Honeyeater #			*							
Latham's Snipe •	*	*							*	*

White-bellied Sea-Eagle •	*	*	*							
Swamp Wallaby Grass #	*	*								
Box-Gum Woodland #	*		*		*		*		*	
White Box Grassy Wood Land •	*		*		*		*		*	

Threatened Species, NSW

• Threatened Species, Commonwealth

12.0 Retained Habitat Framework

Fig. 3 provides a map of all the precincts involved in the study. An overlay of the areas recommended to be retained and enhanced for threatened species conservation in the TSA is provided on this map. Figs. 3A to 3G provide maps of each precinct. This allows the AWDC and other interested parties to develop a concept of the likely impacts of this strategy's implementation. The NSW Department of Conservation and Environment National Parks and Wildlife Service is currently liaising with key adjoining landholders in the Thurgoona area with a view to gaining their support in managing their adjoining lands in a sympathetic manner, in keeping with the principles of this strategy. This work is particularly important for the maintainance and enhancement of the wildlife corridor networks. The maps should be viewed as indicative because the exact boundaries are difficult to define at this scale, or may be subject to slight alterations due to changing land use outcomes, eg., use of large block subdivision may mean that more LHB trees can be retained than recommended in the retained habitat network.

1980ha of land currently owned by the AWDC is contained within the precincts study area. The adoption of this retained habitat framework results in approximately 440ha of remnant habitat being retained primarily for threatened species conservation purposes and around 1540ha being available for development purposes. This is equivalent to about 29% of the AWDC land in Thurgoona being retained for biodiversity conservation. Coincidently this closely compares with the primary long term biodiversity goal of the Murray Catchment Blueprint published in 2003, of having 30% of the original extent of vegetation conserved.

13.0 Future Management

In response to the draft TTSCS document stakeholders emphasized the importance of this component of the strategy and sought input into the development of appropriate management procedures for the retained habitat framework.

The NSW Department of Environment and Conservation National Parks and Wildlife Service, the Dept. of Infrastructure, Planning and Natural Resources and Albury City Council provided favourable comment on the draft document.

All responses reinforced the importance of long-term management and the need for further discussion of the issues, but no one put forward a definitive model or mechanism which would provide for on-going management responsibilities.

Interestingly, the Dept. of Infrastructure, Planning and Natural Resources suggests that areas of retained habitat be rezoned to environment protection and not be considered as public open space.

As mentioned previously, officers of the NPWS undertook to consult with other key landowners such as Charles Sturt University, Riverina Institute of TAFE and Norske Skog to seek a wider adoption of the strategy.

Environment Australia, in dealing with the Mitchell Park referral, stated that it believes successful implementation of the strategy is imperative to the long term viability of threatened species. However, EA made no specific suggestions on how to achieve this.

The owner of Noorla Homestead, David Sexton, suggested that a conservation levy be applied to the sale of properties within the Thurgoona Study Area to provide funding for implementation and management of the strategy. The draft document itself, asked "who pays?" and canvassed the idea of compensation payments for habitat removal.

The AWDC has demonstrated its commitment to threatened species conservation and environmentally sound development through the preparation of this strategy. It is also committed to playing its part in the development of a long term management plan.
However, the AWDC is clearly not in a position to be a long term player as it has a limited life, and can only make recommendations or suggestions for others to consider and implement.

Broadly speaking, the management of public open space and bushland in public ownership on the NSW side of the border falls into three categories.

1. NSW Crown Land administered by the NSW Dept. of Lands.
2. NSW Crown Land administered by Local Government Councils as Trustees.
3. Public Open space both owned and administered by Local Government Councils. This includes vegetation and habitat corridors along roadsides.

Parklands Albury-Wodonga (PAW) exists as a community based incorporated body which undertakes promotion and maintenance of regional parkland areas in the Albury-Wodonga area. PAW relies on grant funding and funding from Councils and the Corporation. It carries out operational management of a number of areas of bushland on behalf of the relevant authority, although this has mainly occurred on the Wodonga side of the border at this stage. It is expected that PAW, if requested to do so, would undertake management of additional areas if they are provided with the necessary funding.

In discussions between the AWDC and Albury City Council officers, it has been determined that the areas of retained habitat provided by the AWDC within the City boundaries at Thurgoona will be transferred to Council ownership. This will probably occur progressively as developments are released. Enhancement works recommended by the strategy will be completed by the Corporation prior to handover.
It is worth noting that the development consent for the Mitchell Park Estate, includes a condition that the AWDC and the Council jointly prepare a detailed Land Management Plan for the public open spaces and retained habitat framework in Mitchell Park. This process should provide a useful model that can be applied to other open space and habitat areas. It will obviously need to address all management issues, not just those related to threatened species. eg. bushfire protection and recreation usage.

There appear to be three essential components to a successful implementation and management plan for the TTSCS.

These are:-

1. An effective management structure;
2. A detailed management plan or plans for the habitat areas;
3. Funding for implementation.

13.1 Management Structure

The ultimate responsibility for management of habitat areas in Thurgoona and the wider Albury area rests with the land owners or with those entrusted with care of the land by legislation. This includes Albury and Hume Councils, Dept. of Lands, Hume Rural Lands Protection Board, Charles Sturt University, Riverina Institute of TAFE, Department of Defence Wirlinga depot site and private owners such as Norske Skog and the Thurgoona Golf Club. The AWDC is also a landowner until it ceases to exist, and presumably will have a successor with similar responsibilities.

It is suggested that an overall advisory management committee be established to assist with advice on management policies for all public and privately owned land on which there is retained threatened species habitat. The function of such a committee would be to provide expert advice, a uniformity of approach to management issues and access to sources of funding.

The committee could be comprised of representatives from:

- Albury and Hume Councils;
- NSW Dept. of Environment and Conservation NPWS;
- NSW Dept. of Lands;
- NSW Dept. of Infrastructure, Planning and Natural Resources;
- Environment Australia;
- Charles Sturt University;
- Riverina TAFE;
- Parklands Albury-Wodonga;
- Hume Rural Lands Protection Board;
- NSW Rural Fire Service;
- AWDC; and
- Private Landowners.

The final decision on management policies and implementation programs would rest with the individual owners and agencies. For example, the Dept. of Lands may choose to pass on responsibility for day to day management of its areas to Parklands Albury-Wodonga.

13.2 Management Plans

Although the TTSCS provides a framework of the management procedures required for the retained habitat areas, more detail on the specifics of site management will be required in a number of cases. The land management plan to be prepared for Mitchell Park by Albury City Council and the AWDC will provide an ideal opportunity to trial this process.
The advisory committee should be able to build upon the work that will be done by ACC and the AWDC and provide advice upon a uniform approach to dealing with management and implementation issues. This should then be able to translate into action plans prepared by the individual owners and agencies.
Matters which must be provided for in the management plans include:

- Operation and maintenance;
- Enhancement planting;
- Protection of habitat and threatened species;
- Bush Fire protection;
- Weed control;
- Public access and safety;
- Control of feral animals;
- Erosion control;
- Recreation opportunities and constraints.
- Action programs and budgets;
- The ongoing monitoring and evaluation of threatened species populations and strategy outcomes.

13.3 Management Plan Review

Management plans will need reviewing when:

- new information is received about threatened species known to utilize the Thurgoona area;
- any threatened species that have not been previously known to utilize the area are recorded as utilizing the Thurgoona area; and when
- the legislative status of a species known to utilize the Thurgoona area is altered.

13.4 Funding

The availability of adequate funding will either make or break successful implementation of the TTSCS. Seeking and advising on sources of funding is seen as an important role of the advisory committee and its individual members.
Large areas of threatened species habitat are being set aside at least in part because of Commonwealth and State legislation. Whilst this is in the public interest, there does not appear to be adequate recognition of the funding requirements to properly maintain these habitat areas in the future. It is believed this needs to be addressed at Government level.

Potential sources of funding that should be investigated include:

- Special Government funding;
- Grant Fund Applications;
- Dept. and Council budget allocations;
- Environmental Rates or Levies;
- Section 94 Contributions; and
- Compensatory payments for habitat removal. e.g. placing a monetary value on a large tree.

Any funding from these sources should be tied to habitat maintenance and possibly invested in a trust fund to be used specifically for this purpose.

14.0 Conclusion

The Thurgoona area was assessed for its key environmental values, focusing primarily on its native wildlife, plants and ecological communities. As a result over 120 species of animals (mostly birds) were identified as being present in the TSA during the study period, of which six birds and one mammal are listed in NSW as threatened species. A further five threatened bird species are considered likely to utilize the TSA from time to time. The ground and shrub layer native vegetation is mostly not very diverse, reflecting the past and present agricultural activities in the study area. The main remnant native vegetation throughout the TSA is tree cover, much of which is comprised of remnants of the original grassy box woodland. These grassy box woodlands are themselves an endangered ecological community.

The ecological information gathered from these assessments was used to formulate a strategy for the AWDC to enable future urban development whilst protecting and where possible enhancing native flora and fauna. The strategy focused primarily on the threatened wildlife as a surrogate for biodiversity conservation, with particular emphasis on the healthy local population of Squirrel Gliders and the nationally endangered Regent Honeyeater which regularly breed in or near the Corrys Wood urban development. This enabled the authors to develop a system of retained habitats, incorporating retention of the best remnants and their enhancement through understorey plantings, improved linkages between adjoining habitats through creekline, roadside and Forward Tree Plantation protection and revegetation. As well the important habitats nearby, not owned by AWDC, are identified at a landscape scale to assist their owners in biodiversity conservation. The system of retained habitat incorporates around 29% of the land currently owned by AWDC, for threatened species conservation in the Thurgoona area. The area retained accords closely with the current best practice recommendations of the Murray Catchment Blueprint to achieve biodiversity conservation in the catchment.

Throughout the Strategy's development key government stake holders have been consulted to ensure that the strategy complies with the requirements of the NSW Threatened Species Conservation Act and the Commonwealth Environmental Protection and Biodiversity Conservation Act.

As part of the Strategy development the authors gave special consideration to the ongoing management of the retained habitat network, because the future survival of many of the species referred to in this document is dependent on how these habitats are managed in the long term. Sections 11 and 13 of this strategy and the attached management guidelines were developed with future management in mind. **When future Thurgoona residents look at the status of native wildlife in their neighbourhood what they find will be a reflection of not only the habitat remaining but also of how well it is managed.**

The methodology that was applied to assess the environmental values (see attachment 1) of the Thurgoona area is readily transferable to other urban-bush fringe areas.

The authors recognize that our state of knowledge is constantly changing and whilst this document represents the best assessment that can be made at the present time future discoveries may change the current thinking on management principles.

The maintenance and enhancement of biological diversity within the Thurgoona Study Area is a vision worth striving for. Managers will need to make a commitment to realistic and achievable environmental goals. They will also need to have a means of knowing what progress, over time, has been made and of knowing when the goals have been achieved. Thus the short and long term ecological objectives need to be accompanied by processes through which they can be evaluated. Support needs to be gained from all of those affected by the strategies employed: this will include governments and also those who may wish to exploit the opportunities. Above all the commitment required must be financed and it must be sustained.

The authors recommend the adoption by the stakeholders of the Thurgoona Threatened Species Conservation Strategy, the implementation of which will meet all of the proposed objectives set out in Section 4.0, thereby providing a viable, visible and valuable means of conserving and enhancing the habitats of the Thurgoona region.

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16.0 Further Reading

Books:

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Monument Hill Parklands Assoc. Inc. *Bush Invaders, identification & control of Environmental Weeds of Albury Wodonga & Surrounds.* Thomson's Printing, Albury, NSW.

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Australian Museum	www.amonline.net.au
Australian Research Centre for Urban Ecology	www.arcue.rbg.vic.gov.au
Birds Australia	www.birdsaustralia.com.au
Bird Observers Club of Australia	www.birdobservers.org.au
Commonwealth Department of Environment & Heritage	www.deh.gov.au
Charles Sturt University Virtual Herbarium	http://csu.edu.au/herbarium/
Flora for Fauna	www.floraforfauna.com.au
Gould League	www.gould.edu.au
Murray Wetlands Working Group	www.mwwg.org.au
Museum of Victoria	www.museum.vic.gov.au
NSW Department of Agriculture	www.agric.nsw.gov.au/reader/weeds-pubs/
NSW Department of Conservation and Environment National Parks and Wildlife Service	www.nationalparks.nsw.gov.au/
NSW Department of Infrastructure Planning & Natural Resources	www.dipnr.nsw.gov.au/
Wildscape	www.wildscape.com.au

Appendices

Flora and Fauna Assessment Sheet

Appendix 1

Site Rating:

Values:	All	A	B	C
Floristics				
Habitat				
Linkage				

Location:
Date(s):

Surveyor:

Plant List
(Sparse =1, Common = 2, Abundant = 3)

Indigenous Vegetation Species of AW	**Total**	**A**	**B**	**C**		**Total**	**A**	**B**	**C**
Apple Box					Native Oxalis				
Austral Bear's Ear					Native Plantain Sp.				
Austral Cranesbill					Pale Flax-lily				
Austral Indigo					Panic Grass Sp.				
Australian Bindweed					Ploughshare Wattle				
Australian Carrot					Plume Grass Sp.				
Beard Heath					Purple Coral Pea				
Black Cypress Pine					Purple Wiregrass				
Black-anther Flax-lily					Raspwort Sp.				
Blakely's Red Gum					Red Anthered Wallaby Grass				
Blown Grass Sp.					Red Box				
Blue Pincushion					Red Stringybark				
Bluebell Sp.					Red-leg Grass				
Box Mistletoe					Red-stem Wattle				
Bulbine Lily					Rice-Flower Sp.				
Carex Sp.					River Red Gum				
Cat's Claw Albury Grevillea					Rock Fern Sp.				
Chocolate Lily					Scaly Buttons				
Clustered Everlasting					Showy Parrot Pea				
Common Buttercup					Showy Podolepis				
Common Correa					Silver Wattle				
Common Cranesbill					Small St. John's Wort				
Common Fringe Lily					Small-leaf Bush Pea *				
Common Hovea					Spear Grass Sp.				
Common Love Grass					Sticky Everlasting				
Common Wheat Grass					Stinking Pennywort				
Cotton Fireweed					Sundew Sp.				
Creamy Candles					Sweet Bursaria				
Daphne Heath					Tick Indigo *				
Drooping Sheoak					Tiny Star				
Drooping Mistletoe					Tussock Grass Sp.				
Early Nancy					Twiggy Bush Pea				
Erect Guinea Flower					Twining Fringe Lily				
Geebung					Twining Glycine				
Golden Everlasting					Umbrella Sedge Sp.				
Goodenia Sp.					Urn Heath				
Grass Trigger Plant					Vanilla Lily				
Handsome Flat Pea					Variable Glycine				
Hedge Wattle					Variable Sword-sedge				
Hoary Guinea Flower					Varnish Wattle				
Hoary Sunray					Wallaby Grass Sp.				
Hop Bitter Pea					Wattle Mat-rush				
Jersey Cudweed					Weeping Grass				
Juniper Wattle					White Box				
Kangaroo Grass					White Cypress Pine				
Kidney Weed					Willow Herb Sp.				
Kurrajong					Windmill Grass Sp.				
Lightwood					Woodrush				
Long Leaved Box					Yam Daisy				
Many-flowered Mat-rush					Yellow Box				
Milkmaids					Yellow buttons				
Narrow-leaf Hopbush					Yellow Rush Lily				
Native Cherry									
Native Dock									
Other including FTP:									

Summary of vegetation and rating (include any threatened species identified and EVC or EEC type(s)):

Habitat Status

√ tick box

Ground Layer Character	All	A	B	C	Features	All	A	B	C
Weeds sparse					Rocky outcrop				
Weeds Common in Parts					Creek/Drainage				
Weeds Common Throughout					Dam				
Weeds Abundant					Wetland				

Weed Type					Connectiveness				
Annual pasture grass and flat weeds					Part of Larger Remnant				
Perennial pasture grass					Linked (linear link)				
Woody weeds					Clustered				
					Cleared				

List main weed species if known:

Overstorey					Ground Layer				
Open Forest					Grassy				
Woodland					Shrubby				
Sparse – occasional tree					Rush/Sedge				
Some clumps					Herb				
					Bare				

Structural Characteristics				
Tree regrowth				
Shrub layer <1m				
Shrub layer>1m				
Tree hollows				
Fallen timber				

Key to Rating System:

Vegetation:
- High – near natural – few weeds.
- Med/High – near natural – weeds common.
- Med – some native grasses and forbs.
- Med/Low - only some hardy native grasses.
- Low - dominated by weeds.

Habitat:
- High - near natural (LHB trees, shrubs, logs, regeneration).
- Med/High - near natural (one major component missing).
- Med - several components missing (LHB trees and weedy)
- Med/Low – occasional LHB tree.
- Low - cleared paddock.

Linkage significance:
- High - part of larger remnant, connects 2 remnants.
- M/H - creekline, timbered roadside
- M - partial link between 2 remnants.
- M/L - small patch < 500m from another remnant.
- L - isolated > 500m from another remnant.

Key to Plant List:

1. Sparse – scattered, occasional occurrence.
2. Common – regular occurrence throughout.
3. Abundant – major lifeform on site.

Summary of Habitat and Rating:

Summary of Connectivity and Rating

Fauna of the AWH Area

	All	A	B	C		All	A	B	C
Australian Hobby					Magpie-Lark				
Australian King-Parrot					Masked Lapwing				
Australian Magpie					Mistletoe Bird				
Australian Magpie-Lark					Musk Lorikeet				
Australian Owlet-Nightjar					Nankeen Kestrel				
Australian Raven					Noisy Friarb ird				
Australian Shelduck					Noisy Miner				
Australian Wood Duck					Olive-backed Oriole				
Barn Owl					Pacific Black Duck				
Black-chinned Honeyeater					Painted Button-Quail				
Black-eared Cuckoo					Pallid Cuckoo				
Black-faced Cuckoo-Shrike					Peaceful Dove				
Black-shouldered Kite					Peregrine Falcon				
Blue-faced Honeyeater					Pied Currawong				
Blue Wren					Rainbow Bee-eater				
Brown Falcon					Red Wattlebird				
Brown Goshawk					Red-browed Finch				
Brown Thombill					Red-capped Robin				
Brown-headed Honeyeater					Red-rumped Parrot				
BrownTreecreeper					Restless Flycatcher				
Buff-rumped Thombill					Richard's Pipit				
Collared Sparrowhawk					Rufous Songlark				
Common Bronzewing					Rufous Whistler				
Common Starling					Sacred Ibis				
Crested Pigeon					Sacred Kingfisher				
Crested Shrike –Tit					Scarlet Robin				
Crimson Rosella					Shining Bronze Cuckoo				
Diamond Firetail					Silvereye				
Dollarbird					Southern Booboolk				
Dusky Woodswallow					Southern Whiteface				
Eastern Rosella					Speckled Warbler				
Eastern Spinebill					Spotted Pardalote				
Eastern Yellow Robin					Striated Pardalote				
Fan-tailed Cuckoo					Striated Thornbill				
Fairy Martin					Sulphur-crested Cockatoo				
Flame Robin					Tawny Frogmouth				
Fuscous Honeyeater					Tree Martin				
Galah					Varied Sitella				
Gang-gang Cockatoo					Wedge-tailed Eagle				
Golden Whistler					Weebill				
Grey Butcherbird					Welcome Swallow				
Grey Fantail					Western Gerygone				
Grey Teal					White-throated Gerygone				
Grey Shrike-thrush					Whistling Kite				
Hooded Robin					White-plumed Honeyeater				
Horsfield's Cuckoo					White-throated Treecreeper				
Jacky Winter					White-winged Triller				
King Parrot					White-bellied Cuckoo-shrike				
Laughing Kookaburra					White-naped Honeyeater				
Leaden Flycatcher					White-winged Chough				
Little Eagle					Willie Wagtail				
Little Friarbird					Yellow Rosella				
Little Lorikeet					Yellow Thornbill				
Little Raven					Yellow-rumped Thornbill				
Magpie					Yellow-tufted Honeyeater				
Other including Mammals & reptiles:									

Summary of Wildlife (include species of special interest):

Fire hazard vegetation type (refer to map):

Specific management recommendations:

Clearing/retention:

Grazing/Fencing:

Revegetation/Type: (Refer to Strategy)

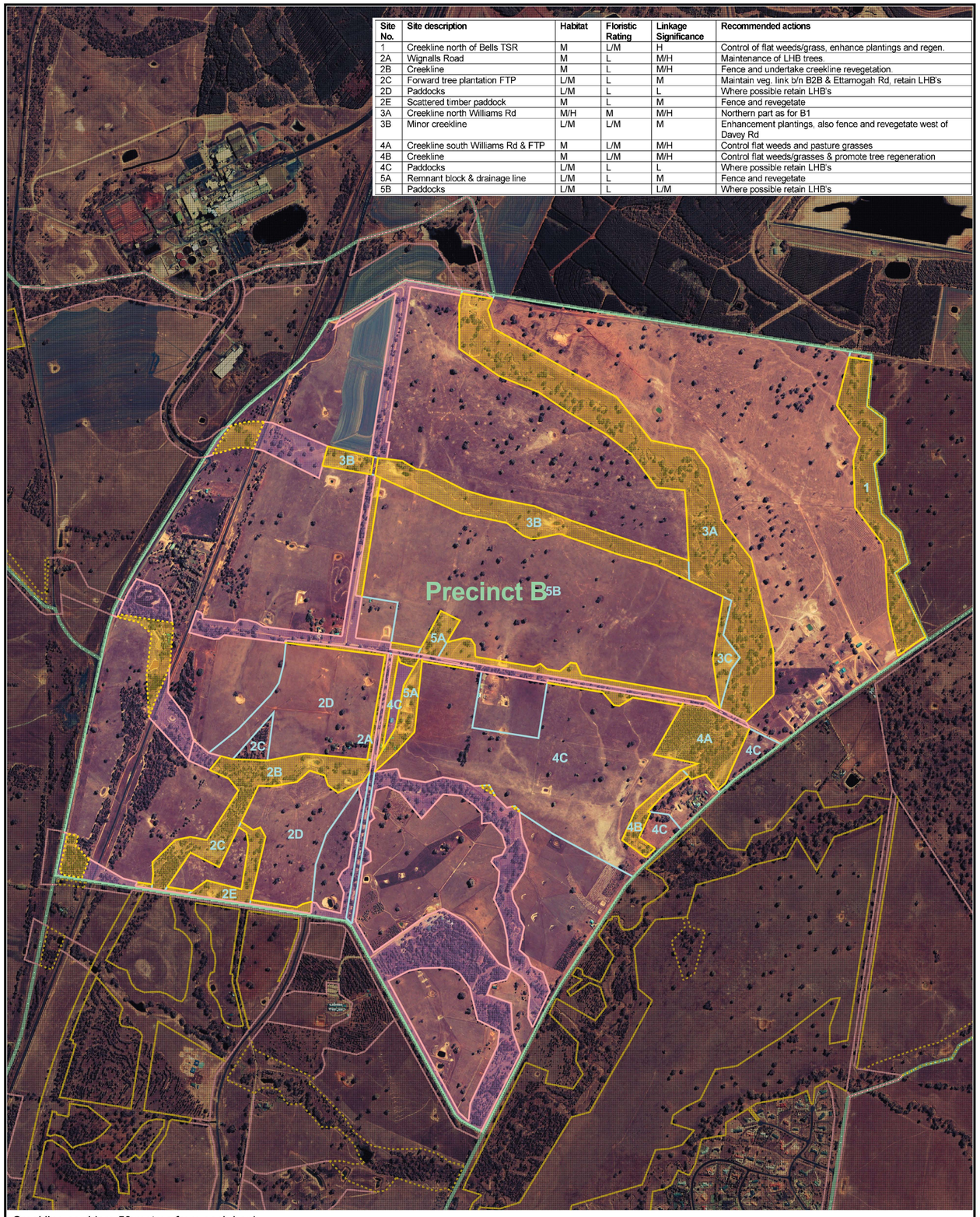
Weed management:
e.g. Creeklines, refer to Strategy

Pest animals/Control:

Threatened species management:

Other:

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
1	Creekline north of Bells TSR	M	L/M	H	Control of flat weeds/grass, enhance plantings and regen.
2A	Wignalls Road	M	L	M/H	Maintenance of LHB trees.
2B	Creekline	M	L	M/H	Fence and undertake creekline revegetation.
2C	Forward tree plantation FTP	L/M	L	M	Maintain veg. link b/n B2B & Ettamogah Rd, retain LHB's
2D	Paddocks	L/M	L	L	Where possible retain LHB's
2E	Scattered timber paddock	M	L	M	Fence and revegetate
3A	Creekline north Williams Rd	M/H	M	M/H	Northern part as for B1
3B	Minor creekline	L/M	L/M	M	Enhancement plantings, also fence and revegetate west of Davey Rd
4A	Creekline south Williams Rd & FTP	M	L/M	M/H	Control flat weeds and pasture grasses
4B	Creekline	M	L/M	M/H	Control flat weeds/grasses & promote tree regeneration
4C	Paddocks	L/M	L	L	Where possible retain LHB's
5A	Remnant block & drainage line	L/M	L	M	Fence and revegetate
5B	Paddocks	L/M	L	L/M	Where possible retain LHB's



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

Scale 1: 15000
0 100 200 300 400 500 Meters

N

BLIS Reference: M611V2L2
File: 03-178
Prepared By: Mike Bydder
Date: 16/02/2004
Amendments:

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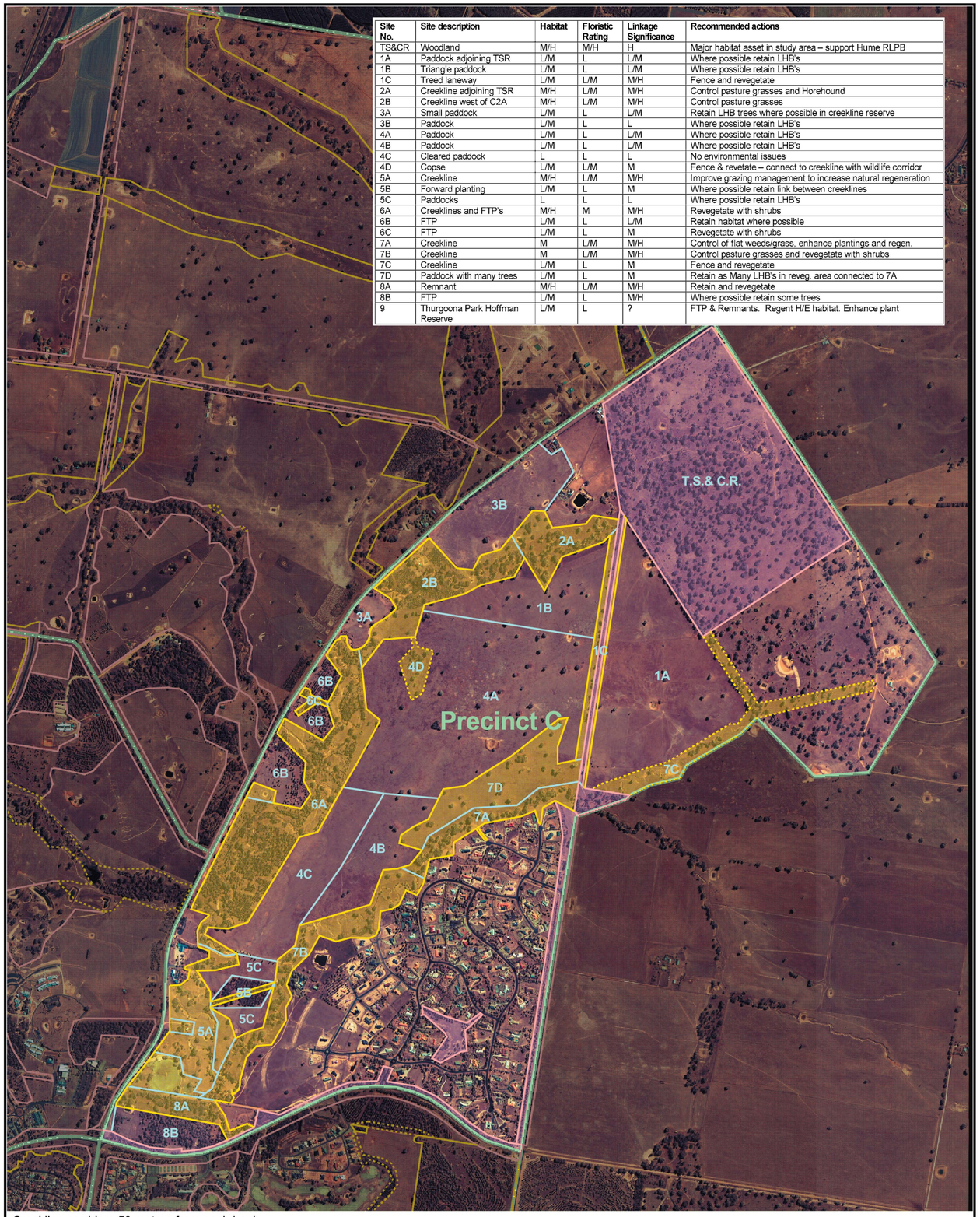
NATURE CONSERVATION RATING THURGOONA - PRECINCT B

Plan Number:TH10/PRO/2122/2 Appendix 2 - Figure 3B A3

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
TS&CR	Woodland	M/H	M/H	H	Major habitat asset in study area – support Hume RLPB
1A	Paddock adjoining TSR	L/M	L	L/M	Where possible retain LHB's
1B	Triangle paddock	L/M	L	L/M	Where possible retain LHB's
1C	Treed laneway	L/M	L/M	M/H	Fence and revegetate
2A	Creekline adjoining TSR	M/H	L/M	M/H	Control pasture grasses and Horehound
2B	Creekline west of C2A	M/H	L/M	M/H	Control pasture grasses
3A	Small paddock	L/M	L	L/M	Retain LHB trees where possible in creekline reserve
3B	Paddock	L/M	L	L	Where possible retain LHB's
4A	Paddock	L/M	L	L/M	Where possible retain LHB's
4B	Paddock	L/M	L	L/M	Where possible retain LHB's
4C	Cleared paddock	L	L	L	No environmental issues
4D	Copse	L/M	L/M	M	Fence & revetate – connect to creekline with wildlife corridor
5A	Creekline	M/H	L/M	M/H	Improve grazing management to increase natural regeneration
5B	Forward planting	L/M	L	M	Where possible retain link between creeklines
5C	Paddocks	L	L	L	Where possible retain LHB's
6A	Creeklines and FTP's	M/H	M	M/H	Revegetate with shrubs
6B	FTP	L/M	L	L/M	Retain habitat where possible
6C	FTP	L/M	L	M	Revegetate with shrubs
7A	Creekline	M	L/M	M/H	Control of flat weeds/grass, enhance plantings and regen.
7B	Creekline	M	L/M	M/H	Control pasture grasses and revegetate with shrubs
7C	Creekline	L/M	L	M	Fence and revegetate
7D	Paddock with many trees	L/M	L	M	Retain as Many LHB's in reveg. area connected to 7A
8A	Remnant	M/H	L/M	M/H	Retain and revegetate
8B	FTP	L/M	L	M/H	Where possible retain some trees
9	Thurgoona Park Hoffman Reserve	L/M	L	?	FTP & Remnants. Regent H/E habitat. Enhance plant



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

Scale 1: 15000
0 100 200 300 400 500 Meters

N

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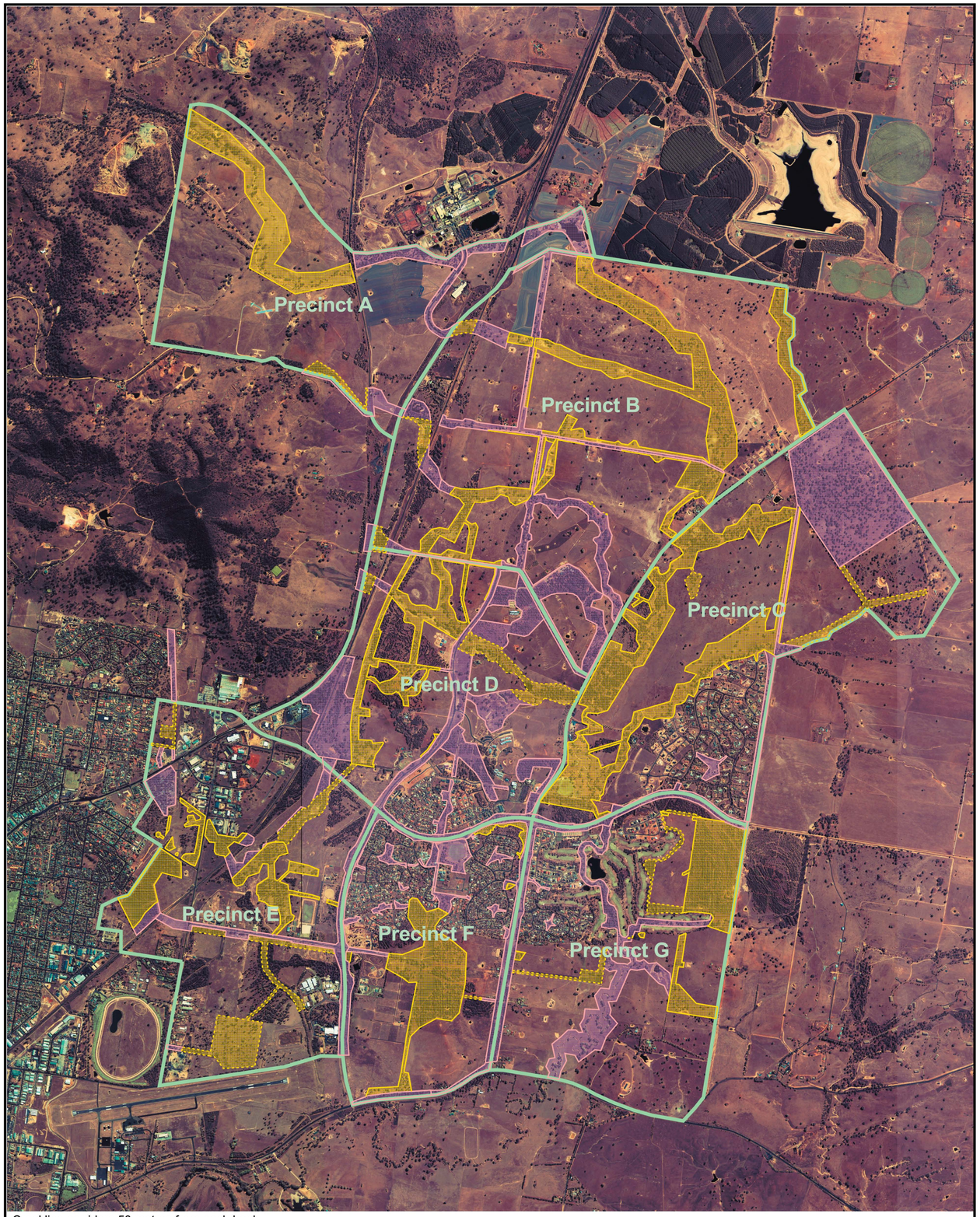
NATURE CONSERVATION RATING THURGOONA - PRECINCT C

Plan Number:TH10/PRO/2122/3 Appendix 2 - Figure 3C A3



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES

Scale 1: 30000
0 250 500 750 1000 1250 Meters

N

GDA

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RETAINED HABITAT NETWORK AND PRECINCT BOUNDARIES THURGOONA

Plan Number:TH0/PRO/2122 Appendix 2 - Figure 3 A3

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
1	Creekline	L/M	L/M	M	Control of flat weeds/grass, enhance plantings.
2	Norske Skog creekline	M	L/M	M/H	Control of flat weeds/grass, enhance plantings.

Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

Scale 1: 15000
0 100 200 300 400 500 Meters

N

GDA

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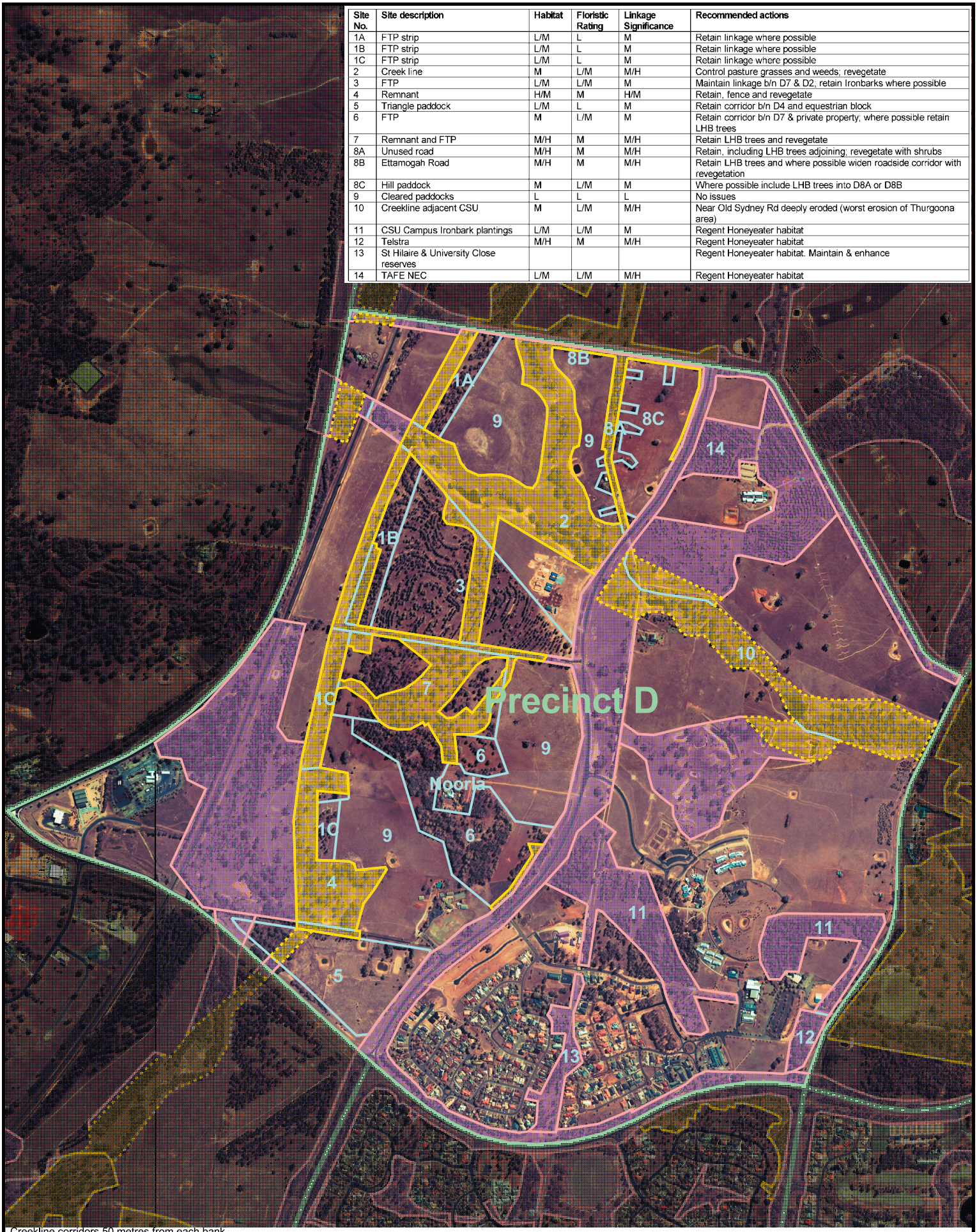
NATURE CONSERVATION RATING THURGOONA - PRECINCT A

Plan Number:TH10/PRO/2122/1 Appendix 2 - Figure 3A A3

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
1A	FTP strip	L/M	L	M	Retain linkage where possible
1B	FTP strip	L/M	L	M	Retain linkage where possible
1C	FTP strip	L/M	L	M	Retain linkage where possible
2	Creek line	M	L/M	M/H	Control pasture grasses and weeds; revegetate
3	FTP	L/M	L/M	M	Maintain linkage b/n D7 & D2; retain Ironbarks where possible
4	Remnant	H/M	M	H/M	Retain, fence and revegetate
5	Triangle paddock	L/M	L	M	Retain corridor b/n D4 and equestrian block
6	FTP	M	L/M	M	Retain corridor b/n D7 & private property; where possible retain LHB trees
7	Remnant and FTP	M/H	M	M/H	Retain LHB trees and revegetate
8A	Unused road	M/H	M	M/H	Retain, including LHB trees adjoining; revegetate with shrubs
8B	Ettamogah Road	M/H	M	M/H	Retain LHB trees and where possible widen roadside corridor with revegetation
8C	Hill paddock	M	L/M	M	Where possible include LHB trees into D8A or D8B
9	Cleared paddocks	L	L	L	No issues
10	Creekline adjacent CSU	M	L/M	M/H	Near Old Sydney Rd deeply eroded (worst erosion of Thurgoona area)
11	CSU Campus Ironbark plantings	L/M	L/M	M	Regent Honeyeater habitat
12	Telstra	M/H	M	M/H	Regent Honeyeater habitat
13	St Hilaire & University Close reserves				Regent Honeyeater habitat. Maintain & enhance
14	TAFE NEC	L/M	L/M	M/H	Regent Honeyeater habitat



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

0 100 200 300 400 500 Meters

Scale 1: 15000

GDA

N

BLIS Reference: M611V4L4
File: 03-178
Prepared By: Mike Bydder
Date: 16/02/2004
Amendments:

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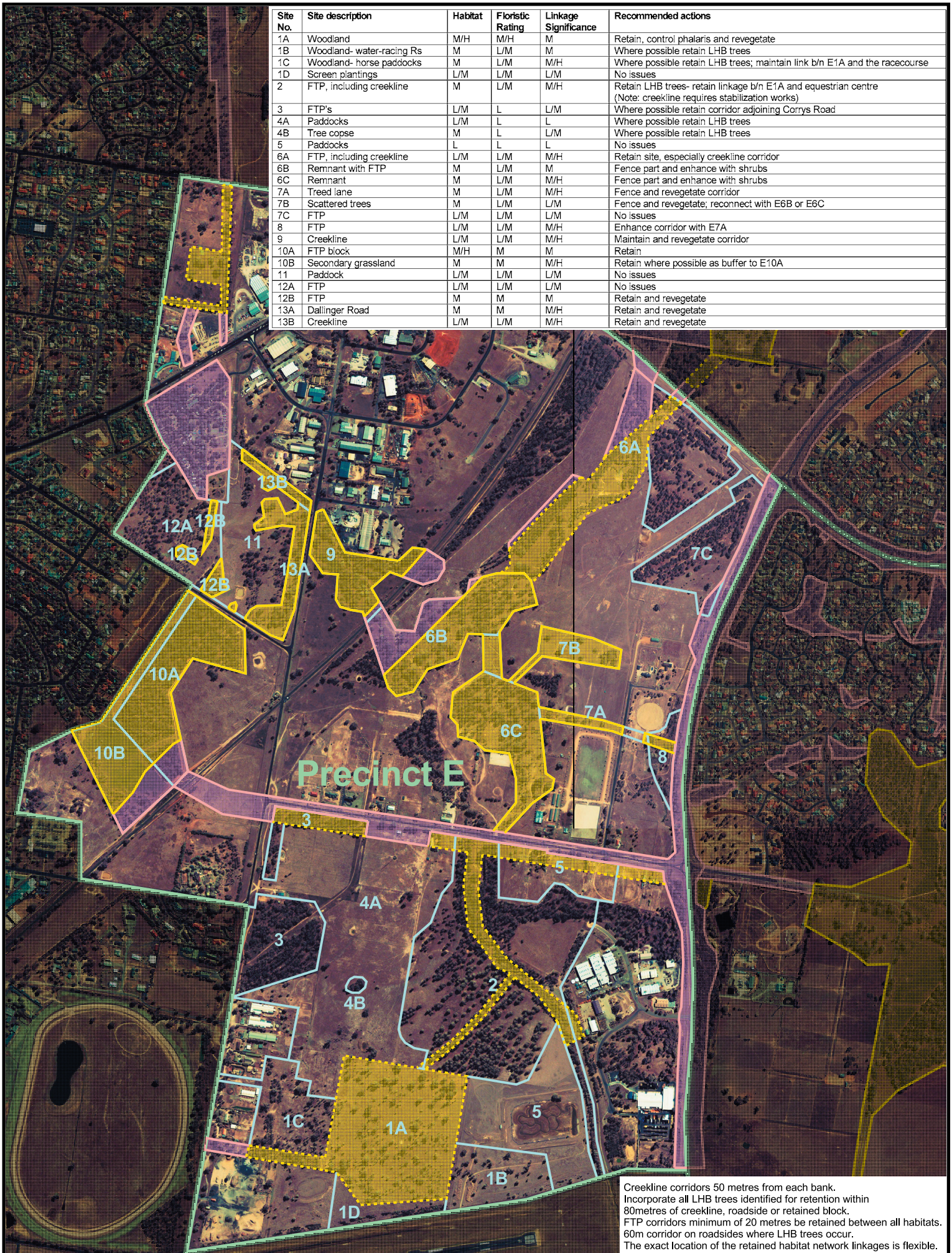
NATURE CONSERVATION RATING THURGOONA - PRECINCT D

Plan Number:TH0/PRO/2122/4 Appendix 2 - Figure 3D A4

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
1A	Woodland	M/H	M/H	M	Retain, control phalaris and revegetate
1B	Woodland- water-racing Rs	M	L/M	M	Where possible retain LHB trees
1C	Woodland- horse paddocks	M	L/M	M/H	Where possible retain LHB trees; maintain link b/n E1A and the racecourse
1D	Screen plantings	L/M	L/M	L/M	No issues
2	FTP, including creekline	M	L/M	M/H	Retain LHB trees- retain linkage b/n E1A and equestrian centre (Note: creekline requires stabilization works)
3	FTP's	L/M	L	L/M	Where possible retain corridor adjoining Corrys Road
4A	Paddocks	L/M	L	L	Where possible retain LHB trees
4B	Tree copse	M	L	L/M	Where possible retain LHB trees
5	Paddocks	L	L	L	No issues
6A	FTP, including creekline	L/M	L/M	M/H	Retain site, especially creekline corridor
6B	Remnant with FTP	M	L/M	M	Fence part and enhance with shrubs
6C	Remnant	M	L/M	M/H	Fence part and enhance with shrubs
7A	Treed lane	M	L/M	M/H	Fence and revegetate corridor
7B	Scattered trees	M	L/M	L/M	Fence and revegetate; reconnect with E6B or E6C
7C	FTP	L/M	L/M	L/M	No issues
8	FTP	L/M	L/M	M/H	Enhance corridor with E7A
9	Creekline	L/M	L/M	M/H	Maintain and revegetate corridor
10A	FTP block	M/H	M	M	Retain
10B	Secondary grassland	M	M	M/H	Retain where possible as buffer to E10A
11	Paddock	L/M	L/M	L/M	No issues
12A	FTP	L/M	L/M	L/M	No issues
12B	FTP	M	M	M	Retain and revegetate
13A	Dallinger Road	M	M	M/H	Retain and revegetate
13B	Creekline	L/M	L/M	M/H	Retain and revegetate



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

0 100 200 300 400 500 Meters

Scale 1: 15000

N

GDA

BLIS Reference: M611V5L5
File: 03-178
Prepared By: Mike Bydder
Date: 12/02/2004
Amendments:

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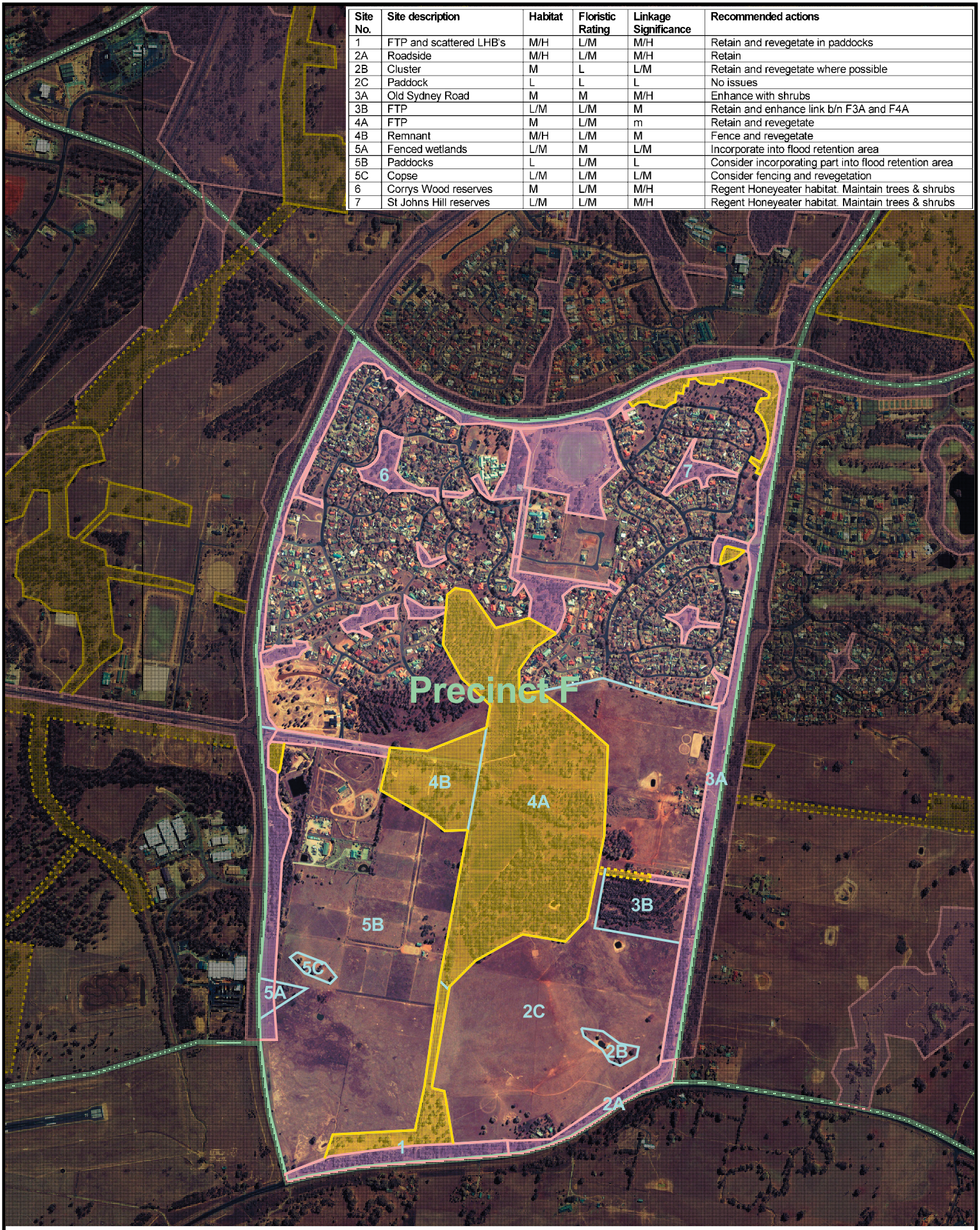
NATURE CONSERVATION RATING THURGOONA - PRECINCT E

Plan Number:TH0/PRO/2122/5 Appendix 2 - Figure 3E A4

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
1	FTP and scattered LHB's	M/H	L/M	M/H	Retain and revegetate in paddocks
2A	Roadside	M/H	L/M	M/H	Retain
2B	Cluster	M	L	L/M	Retain and revegetate where possible
2C	Paddock	L	L	L	No issues
3A	Old Sydney Road	M	M	M/H	Enhance with shrubs
3B	FTP	L/M	L/M	M	Retain and enhance link b/n F3A and F4A
4A	FTP	M	L/M	m	Retain and revegetate
4B	Remnant	M/H	L/M	M	Fence and revegetate
5A	Fenced wetlands	L/M	M	L/M	Incorporate into flood retention area
5B	Paddocks	L	L/M	L	Consider incorporating part into flood retention area
5C	Copse	L/M	L/M	L/M	Consider fencing and revegetation
6	Corrys Wood reserves	M	L/M	M/H	Regent Honeyeater habitat. Maintain trees & shrubs
7	St Johns Hill reserves	L/M	L/M	M/H	Regent Honeyeater habitat. Maintain trees & shrubs



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

0 100 200 300 400 500 Meters

Scale 1: 15000

GDA

N

BLIS Reference: M611V6L6
File: 03-178
Prepared By: Mike Bydder
Date: 12/02/2004
Amendments:

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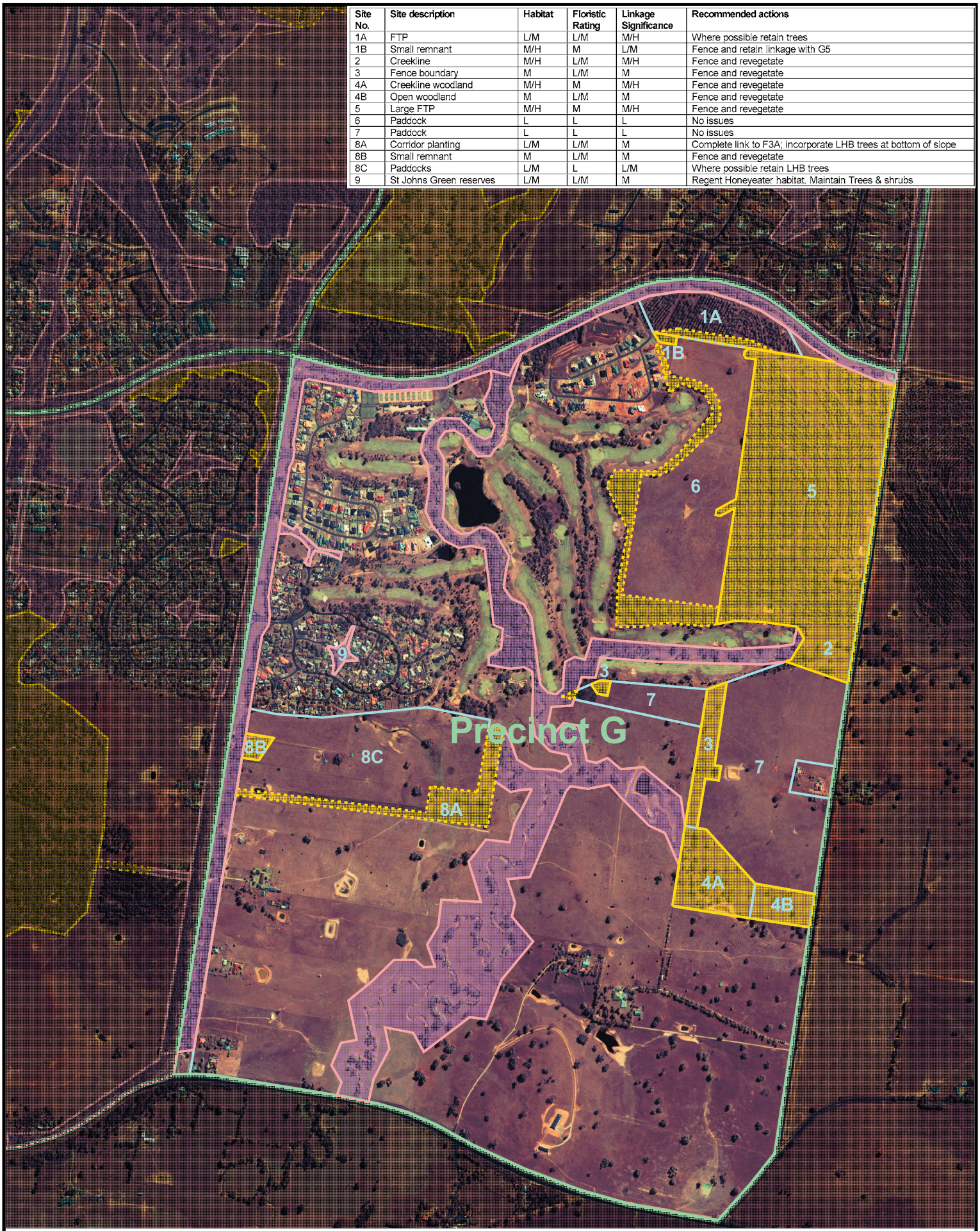
NATURE CONSERVATION RATING THURGOONA - PRECINCT F

Plan Number:TH0/PRO/2122/6 Appendix 2 - Figure 3F A4

Site No.	Site description	Habitat	Floristic Rating	Linkage Significance	Recommended actions
1A	FTP	L/M	L/M	M/H	Where possible retain trees
1B	Small remnant	M/H	M	L/M	Fence and retain linkage with G5
2	Creekline	M/H	L/M	M/H	Fence and revegetate
3	Fence boundary	M	L/M	M	Fence and revegetate
4A	Creekline woodland	M/H	M	M/H	Fence and revegetate
4B	Open woodland	M	L/M	M	Fence and revegetate
5	Large FTP	M/H	M	M/H	Fence and revegetate
6	Paddock	L	L	L	No issues
7	Paddock	L	L	L	No issues
8A	Corridor planting	L/M	L/M	M	Complete link to F3A; incorporate LHB trees at bottom of slope
8B	Small remnant	M	L/M	M	Fence and revegetate
8C	Paddocks	L/M	L	L/M	Where possible retain LHB trees
9	St Johns Green reserves	L/M	L/M	M	Regent Honeyeater habitat. Maintain Trees & shrubs



Creekline corridors 50 metres from each bank.
Incorporate all LHB trees identified for retention within 80metres of creekline, roadside or retained block.
FTP corridors minimum of 20 metres be retained between all habitats.
60m corridor on roadsides where LHB trees occur.
The exact location of the retained habitat network linkages is flexible.

RETAINED HABITAT NETWORK (AWDC Ownership)
RETAINED HABITAT NETWORK LINKAGES (AWDC Ownership)
DESIRABLE HABITAT NETWORK (Other Ownership)
PRECINCT BOUNDARIES
NATURE CONSERVATION RATING

0 100 200 300 400 500 Meters

Scale 1: 15000

GDA

N

BLIS Reference: M611V7L7
File: 03-178
Prepared By: Mike Bydder
Date: 12/02/2004
Amendments:

PRODUCED BY: BORDER LAND INFORMATION SYSTEM

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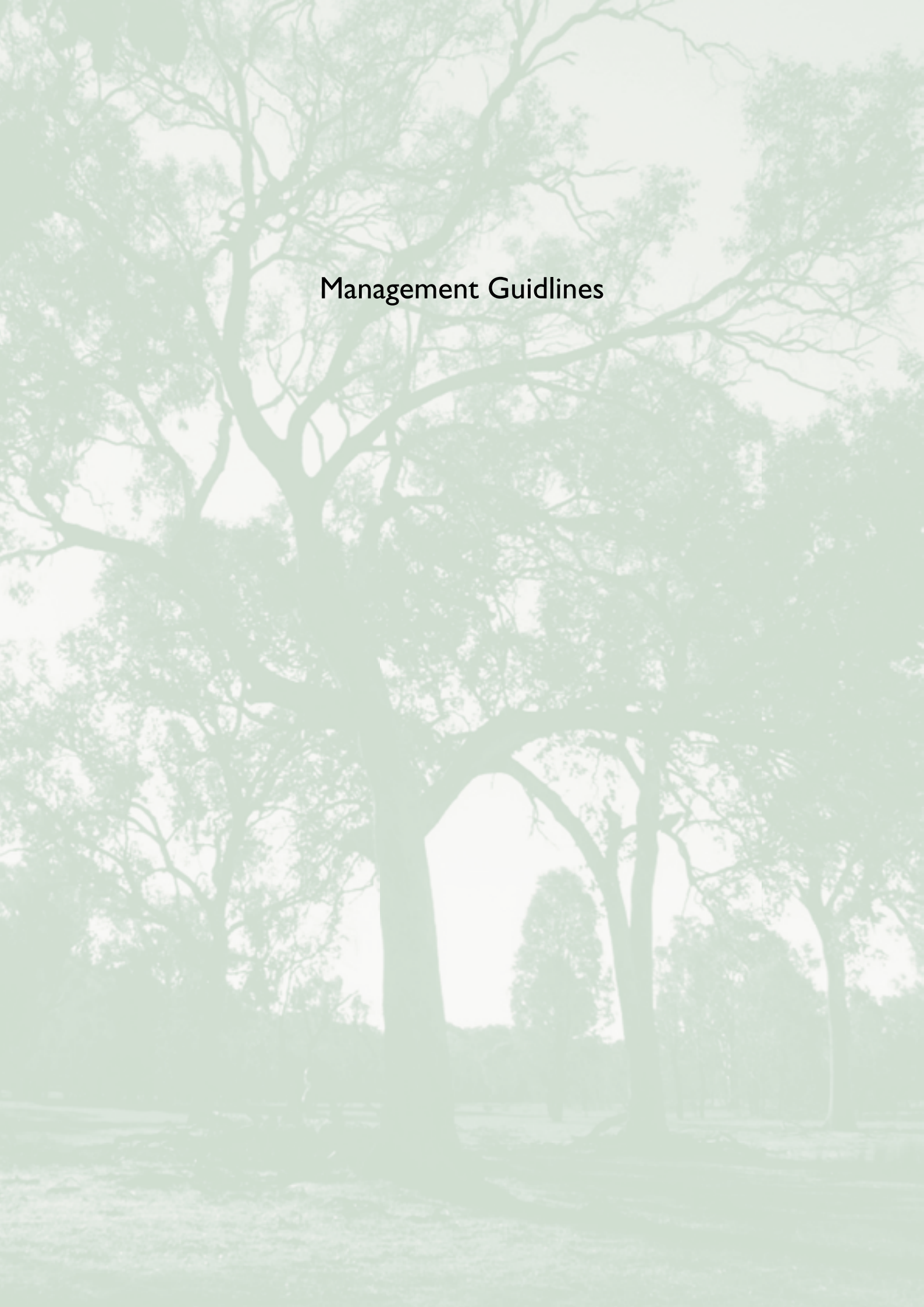
NATURE CONSERVATION RATING THURGOONA - PRECINCT G

Plan Number:TH0/PRO/2122/7 Appendix 2 - Figure 3G A4



Management Guidlines

Creeklines

Issues

Many Large Hollow Bearing Trees along the creekline corridors make up core habitat for the hollow dependant wildlife including the Squirrel Glider, other Possums, Parrots, Kingfishers and Brown Treecreepers, and need to be retained for storm water drainage purposes. As well, it is important to retain native vegetation along creek lines to assist with the abatement of stormwater drainage.

Thurgoona creeklines
Typically, weeds, erosion, poor regeneration.

Management Changes

Where creeklines are degraded a complete rebuild may be needed, including:

- Fencing to manage grazing. (Exclude stock permanently unless there is excessive grass growth.) Avoid the use of barbed wire on the top strands to prevent wildlife being "hooked up";
- Replanting with local native species;
- Plant woody shrub species in nodes to allow fire vehicle access;
- Planting shrubs and grasses at top of bank and on face where banks are 3 metres or higher or have slumped;
- Planting Tall Sedge at toe of banks;
- Direct seeding where appropriate, e.g. grassed access trails.

Management Tools

Consider Slashing/Grazing/Chemical options to control weedy vegetation or Scalping of soil to prepare an ideal seedbed prior to sowing. Native grasses have evolved with nutrient poor soils so the removal of nutrient build up from stock grazing areas may be necessary for the best results.

On more intact sites (less disturbed with good swards of native grasses) it may be necessary to manage the site by encouraging native grasses, through specific grazing methods, +/- revegetation. This needs to be decided on site.

Control long grass in spring by slashing or periodic grazing (see Grazing Management). Spot spray weeds and sow grasses in bare patches to prevent reinvasion of weeds. Control Phalaris, remove woody weeds (see Weed Control).
Retain fallen logs and sticks for habitat purposes.

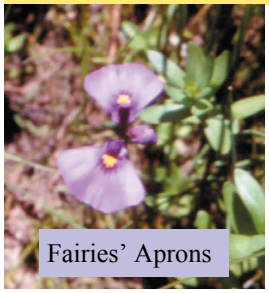
Are there recreation issues?

Place any recreational path on the vehicle access trail away from the canopy of trees.
Slash grassed access trails as fire breaks.
Plant thickly around the dripline of trees to keep people away.

Further information?

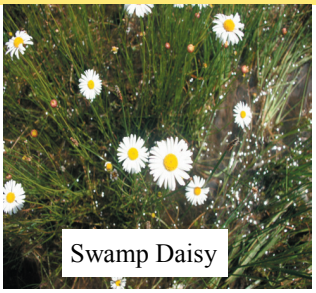
Contact Dept. of Infrastructure,
Planning & Natural Resources.

Wetlands


Fairies' Aprons


White Purslane


Swamp Goodenia


Swamp Daisy


Scaly Buttons

There are several small wetlands scattered throughout the drainage systems and low lying areas of the Thurgoona Study Area, e.g. in the upper reaches of 8 Mile Creek and east of the airport. These wetlands are the core habitat for many water birds and frogs which use the TSA. The threatened Swamp Wallaby Grass, *Amphibromus fluitans,* is found north of Williams Road in the upper reaches of 8 Mile Creek.

The development of flood retention basins to handle storm water in the urban developments provide an ideal opportunity to enhance local wetland values, if built using wetland enhancement principles. The key elements to be considered in wetland design are shape, source of water and their pattern of flooding and drying (hydrology) and the water depth.

Actively plant aquatic species into these areas.

Exclude grazing when the wetlands are wet.


Billy Buttons in Fallon Street Gilgai complex.

Photos: GD

Further reading: "Wetlands Watch"
www.mwwg.org.au
or contact the Dept. Infrastructure, Planning & Natural Resources.

A range of aquatic plants including Swamp Wallaby Grass *(Amphibromus fluitans)*

Note: Wetlands in the Thurgoona Study Area should be allowed to dry out as they would naturally in summer, to allow water plants to complete their life cycles.

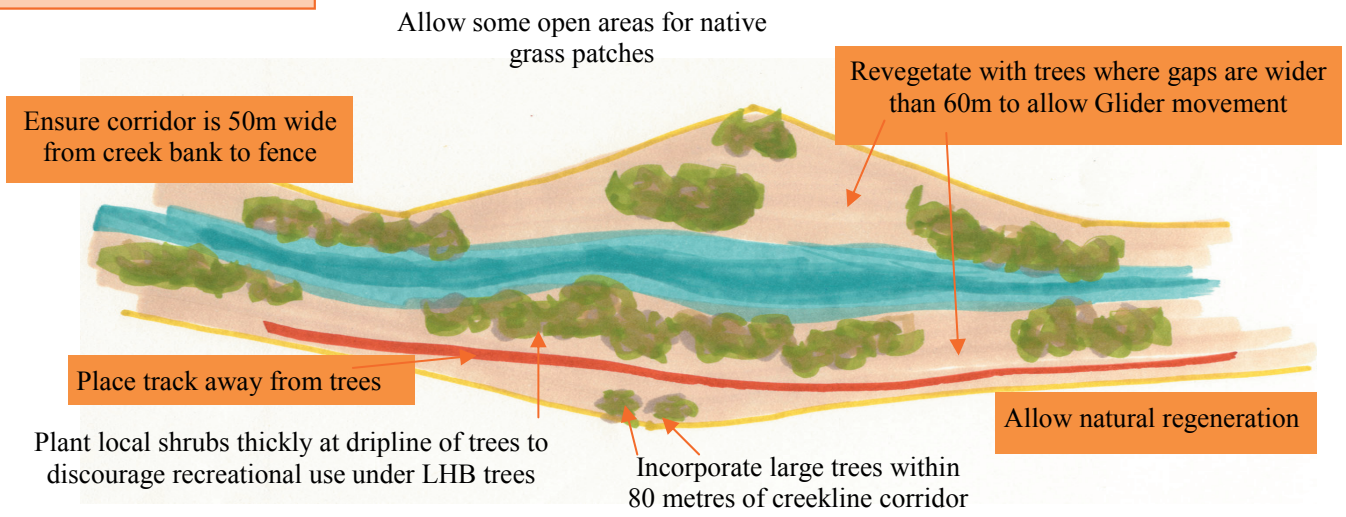
Exclude grazing when wetlands are wet.

Wildlife Corridors

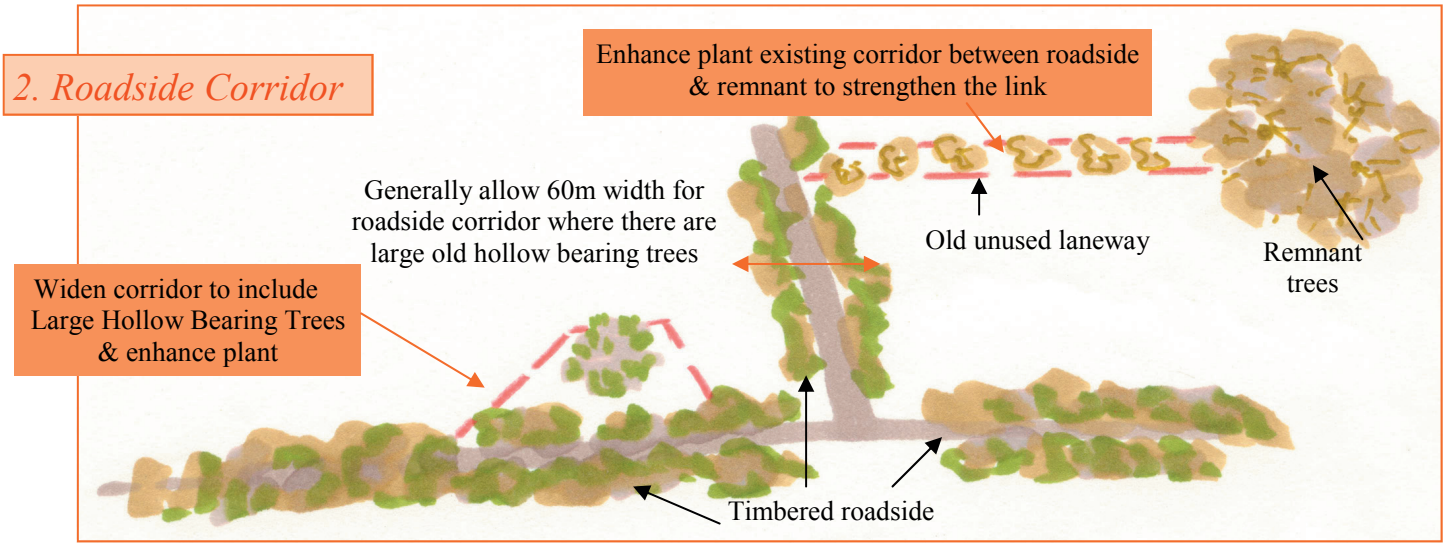
To ensure wildlife populations survive in a mostly cleared, e.g. agricultural or urban landscape, habitat linkages (wildlife corridors) between retained habitat are essential. For example, gaps in the tree canopy of >60 metres make it difficult for Squirrel Gliders to cross the gap.

Types of Corridors in Thurgoona

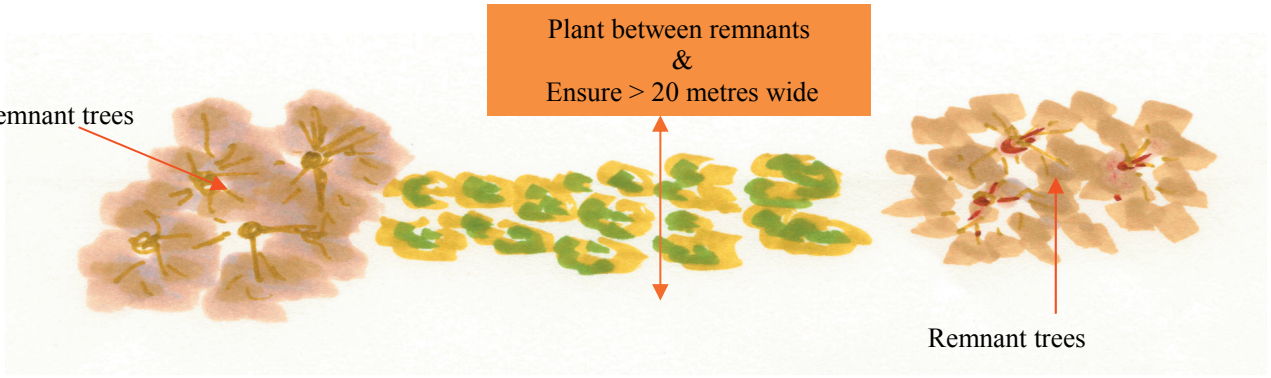
1. Creekline corridor



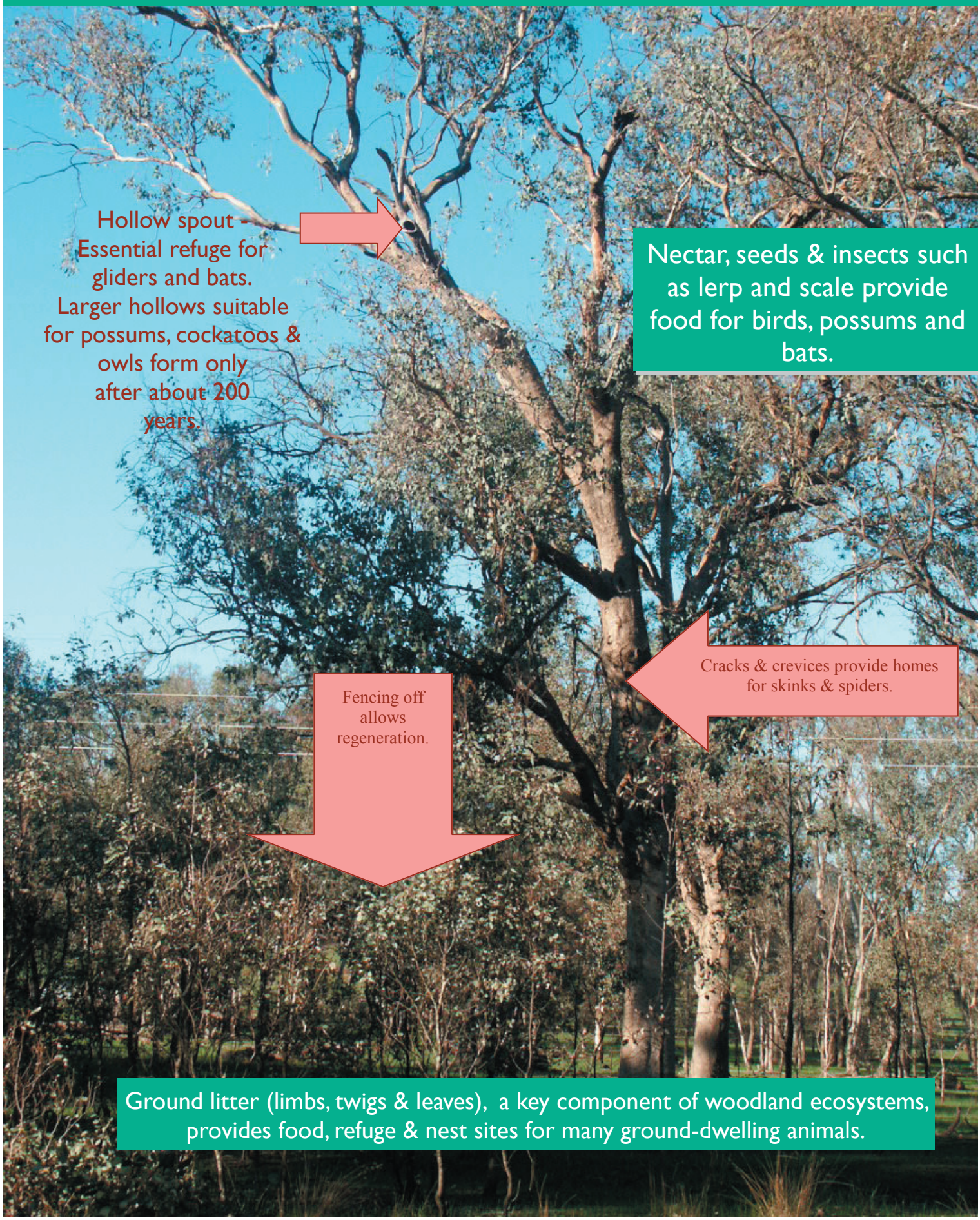
2. Roadside Corridor



3. Paddock Trees



Retention of Large Hollow Bearing Trees and Stags



What are they?

LHB trees are local eucalypt trees that are large and old enough to have developed hollows for wildlife. In many cases these trees are more than 200 years old, i.e. they are irreplaceable! Stags are dead standing trees with hollows.

Why are they important?

LHB trees and stags are vital for species of wildlife that rely fully on hollows for shelter or raising young, such as parrots, possums, gliders and bats. Squirrel Gliders are dependant on the retention of LHB trees along with Owls, Parrots, Kingfishers and Brown Treecreepers.

How common are they?

Overall, LHB trees and stags are common across the Thurgoona Study Area, mostly occurring along the creeklines, along roadsides and as scattered paddock trees. Throughout the Albury district, hollows for wildlife are a very limited resource, with the forested area of the Nail Can Hill Range being mostly younger regrowth trees.

What should be done to retain them?

The retention and maintenance of LHB trees and stags is problematic in an urban setting because of their potential to be a danger to the public when they shed limbs. The very process of limb shedding, through decay and wind damage, allows hollows to develop and provides ground cover habitat by the way of logs and sticks. These habitat features are vital to the conservation of many species, including Squirrel Gliders, in the TSA. Therefore consideration should be given to:

- retaining and where possible incorporating all identified LHB trees within 80 metres of a wildlife corridor or block;
- retaining all clusters of LHB trees larger than 0.5 hectares. (Note: trees are considered part of a cluster if they are within 2 canopy widths of the nearest tree.);
- where possible connecting clusters with treed corridors > 20 metres wide;
- where possible retaining fallen logs and sticks for habitat purposes;
- discouraging the use of areas containing LHB trees for public recreation. (This issue is particularly important for the long term survival of LHB trees, because land managers are required to manage risk in public spaces, hence habitat in the form of hollow bearing limbs is frequently removed.);
- enhancing all retained LHB trees with the planting of local shrubs and understorey plants (see Revegetation Principles);
- the fact that where LHB trees are cleared, habitat values will be lost. **(Note: tree plantings on their own do not adequately compensate for the habitat value lost by the removal of LHB trees.)**

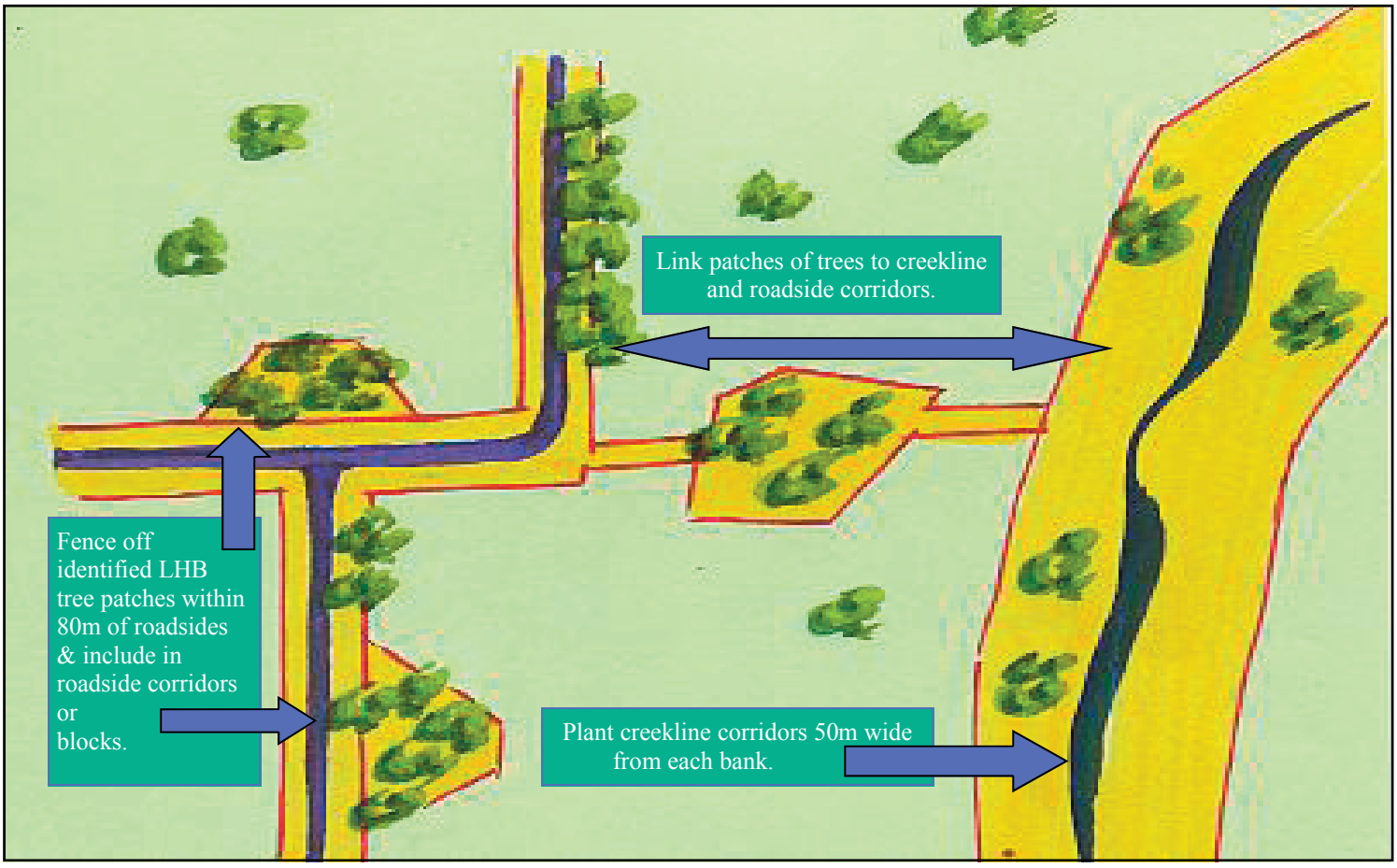
Natural woodland with diverse understorey including prickly shrubs such as Hedge Wattle which deters recreational use.

Underplant LHB trees and stag trees with dense prickly shrubs.
Leave fallen logs and other ground litter as homes for lizards and beetles.

Natural woodland with dense understorey & fallen logs.

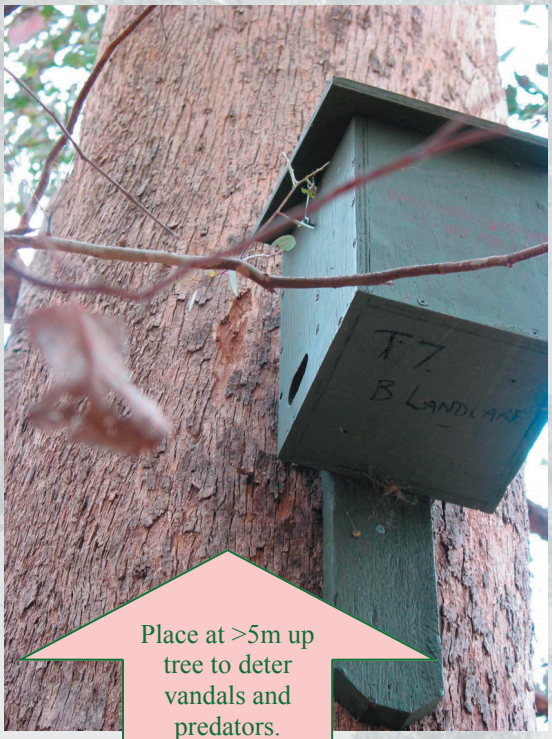
Best Management Revegetation Practice for Large Hollow Bearing Trees

Typical layout of Large Hollow Bearing trees in the Thurgoona area.



Nest Boxes

One of the most important habitat characteristics of eucalypt trees is their ability to develop hollows as they age. It may take a tree over 200 years to develop hollows suitable for wildlife. Nest boxes are a valuable tool which can act as a temporary replacement measure (for ten years if well constructed and maintained) for the loss of naturally occurring tree hollows.



Place at >5m up tree to deter vandals and predators. Design nest boxes to suit specific species (see Gould League book). Materials must be durable.

Did You Know?

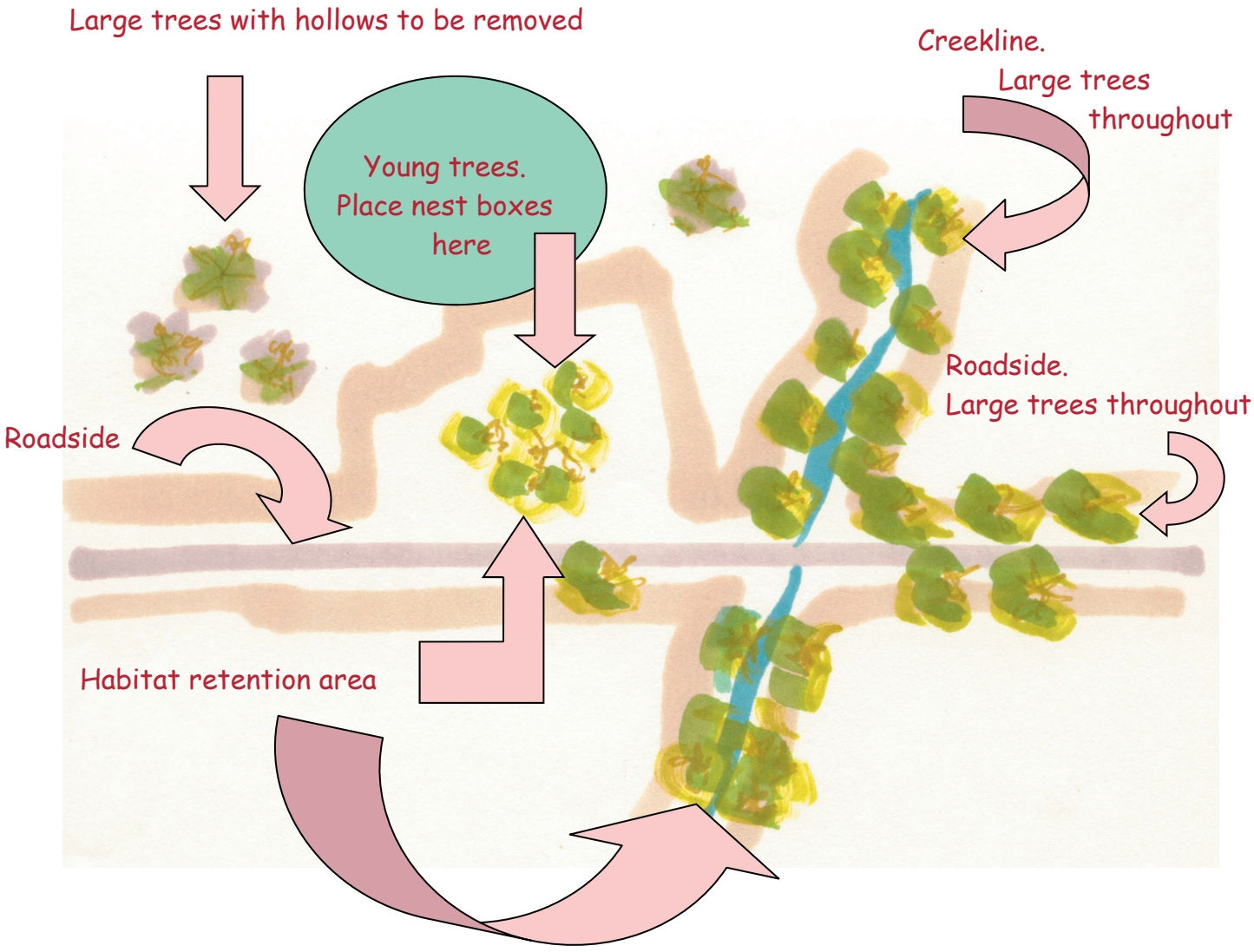
Recent studies on the threatened Squirrel Glider in the Thurgoona area showed that Gliders readily used nest boxes located in the area.

Photos: Glen Johnson

Important Features to Maximise Value of Nest Boxes

Location:	Nest boxes should be located in the retained habitat network, near to where Large Hollow Bearing trees are removed. It is often best to locate nest boxes where natural hollows are limited.
Design:	All nest boxes should be purpose built and made out of good quality durable materials. (See Best Practice Guidelines, *The Nestbox Book, Gould League of Victoria Inc., 03 9532 0909*)
Numbers:	Replace 5 nest boxes (3 Squirrel Glider, 1 Possum and 1 Bat) per isolated LHB tree exluded from habitat retention network.
Maintenance:	Check external condition of nest boxes 4 times per year. Remove pests, e.g. feral Bees and Starlings. Repair or replace as required. (This is a 100+ year commitment.)
Monitoring/Education:	Under supervision of a suitably qualified person, check nest boxes twice a year and record usage. Note: Local schools may wish to be involved.

Nest Box Placement



Grazing Management Within A Retained Habitat Framework


GD

Most areas of remnant habitat and Forward Tree Plantings have been historically grazed. The grazing method has usually been via continual stocking of sheep and/or cattle. When feed was limited, during dry periods, stock was free fed with hay and grain. As a result, the introduced annual pasture grasses, e.g. Barley Grass or flat weeds such as Cape Weed and Paterson's Curse (as shown left) now dominate the native perennial grasses and forbs.

Current grazing practices prevent tree and shrub regeneration (see below).

The paddock on the left has been grazed, whereas the paddock on the right has not. Natural regeneration of shrubs, trees native grasses and many other ground layer plants is providing habitat for many birds, lizards, skinks and other animals.

To improve the habitat value of these sites ensure that grazing by domestic stock is only undertaken in habitat retention areas when grass growth is suppressing native plant regeneration or is causing a potentially serious fire hazard.


GJ

In some cases management issues will arise with the removal of constant stock grazing. These are:

Fire hazard— In years when there is a high build up of grass fuels, crash grazing or slashing should be used in spring to control long grass. Note: this will most often happen on the wider, well fenced creeklines. (See over)

Weed Control -

In habitat retention areas where grass growth is suppressing native plant regeneration, crash grazing by domestic stock may be used as a tool to control the grass. This will also aid in fire hazard abatement.

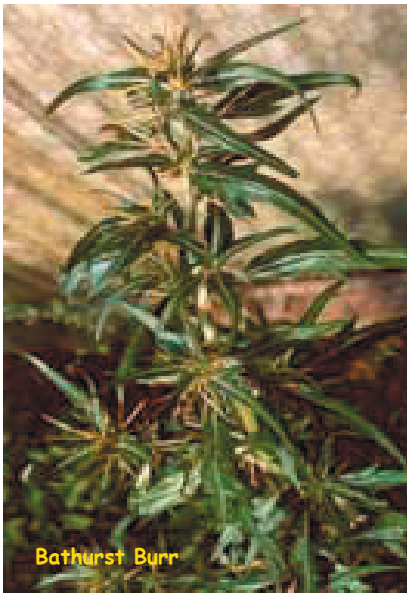
Grazing of Horses -

There is a lot of evidence of horse grazing leading to ring barking of large native trees in the Thurgoona area (as shown below). Continual horse grazing should not occur in retained habitat sites.

Weed Control

It is important to ensure that adequate weed control is undertaken in retained habitat areas and elsewhere.
Control and where possible eradicate the following weeds: Bathurst Burr, Blackberry, Hawthorn, Tree of Heaven, African Boxthorn, Willow, Sweet Briar, Paterson's Curse and St. John's Wort. Black Willow and Chilean Needlegrass have recently been found in the Hume Shire and the Albury City boundaries respectively. Be on the alert for these noxious weeds and keep an eye out for Serrated Tussock.
In many of the retained habitat areas pasture grasses such as Barley grass, Rye grass and Bromes along with flat weeds dominate the ground layer. These weeds, whilst not necessarily agricultural pests, limit the ability for trees and shrubs to regenerate and therefore control measures such as handpulling, control grazing and spraying may be necessary.
Discouragement of the dumping of garden waste into habitat rention areas is important and the removal of environmental weeds such as Privet, Tree Lucerne and Broome is encouraged.

Note that the removal of weeds, where they are providing habitat for a threatened species, requires careful evaluation and possibly, staged removal.
(Diamond Firetails and other Finches and Wrens often nest in Blackberry.)



Further reading:

Monument Hill Parklands Association Inc.
"Bush Invaders, Identification & Control of Environmental Weeds of Albury Wodonga & Surrounds"

Contact:
Parklands Albury-Wodonga 6023 6714

Further information?

Hume Shire Council	6051 3900
Albury City Council	6023 8111
Hume Rural Lands Protection Board	6040 4210
Riverina Noxious Weeds Project Officer	6051 3916

www.agric.nsw.gov.au/reader/weeds-pubs/
www.northwestweeds.nsw.gov.au/images

Revegetation Guidelines

This brochure lists a selection of plants, most of which are indigenous to the Thurgoona area and which belong to Box-Gum Woodland and Grassy White Box Woodland Endangered Ecological Communities. These can provide many benefits such as soil erosion control and wildlife habitat enhancement and protection, whilst also providing aesthetically pleasing revegetation within our urban areas.

For revegetation to be more effective the recognition of habitat values and the integration of those values in the management of conservation areas must be the primary objective for revegetation activities. Within the Thurgoona area it is imperative that consideration be given to the threatened species of Squirrel Glider and Regent Honeyeater and this makes the need for revegetation all the more urgent. To achieve this we present the four main steps of the revegetation guidelines for the area and follow this with a means of assessing your planting area in relation to its environmental asset type.


LL Squirrel Glider


RS Regent Honeyeater


PM Superb Blue Wren

1. Preparation (including Weed Control).

The better the planning, the better the result! Planning should be enacted 18 months to 2 years ahead. What environmental asset type are you planting into? (See Planting Area notes, opposite.) Are you going to direct seed or use containerized trees and shrubs? Many areas of Thurgoona are suitable for direct seeding. Other areas (creeklines where cultural artefacts may be found) are more suited to traditional tubestock plantings.

Direct seeding.

Seed is not always readily available. If you are going to direct seed, work out the size of the area and contact the Murray Indigenous Seed Centre to order your requirements at least 12 months ahead (this enables the seed to be collected). Seed bed preparation is required 12 months ahead for best results. If the ground has high levels of nutrients from prior sheep or cattle camps, and a minimum of native grasses, then removal of topsoil may be necessary to drop the soil fertility (by scalping with a blade). Burning where appropriate or low mowing/grazing to reduce trash levels may be required and weed control with glyphosphate will be necessary. Spring sowing after soil disturbance is the best time in this area. A direct seeding contractor will provide the necessary advice.

Container planting.

Place your order in the Spring prior to the planting season to ensure availability of stock. To ensure you receive good quality stock, provide the supplying nursery with specifications for stock which will meet your requirements. That is, container size, balanced root to shoot ratio, stem taper, good rootball occupancy, sufficient hardening off, no J rooting, etc.
Prepare the site by cross-ripping and control weeds by spraying with glyphosphate and a pre-emergent agent at two six-monthly intervals prior to planting. Plant between June and September and water in and mulch well with seed free straw or weed mats.
If it is considered necessary to protect plants with treeguards, ensure that the stakes are inserted well into the ground and angled out at the top to prevent the plastic sleeve from moving about (which causes damage to plants in hot weather).

2. Pest eradication.

Pest animals which will have an impact on the proposed project sites should be controlled prior to the commencement of revegetation works, with the aim of eliminating them in the longer term. Rabbits and hares are likely to feed on new seedlings, where soil has been recently worked, making control of these species important. Foxes and feral Cats will predate on wildlife including birds and lizards. Contact the ACC or Hume Rural Lands Protection Board for advice on control measures.

3. Fencing and Access.

Fence off creeklines to prevent stock trampling. Faeces and urine are harmful to plants, aid in weed invasion and establishment and find their way into waterways. Use plain wire on at least the top two strands to prevent Squirrel Gliders from becoming caught up in the wire. Provide access gates and gaps for vehicles for maintenance and fire protection purposes.
Consider pathways and recreational use.

4. Management and Maintenance.

What are the site issues? Exotic weeds can out-compete indigenous species. Control by using a combination of hand removal and poisoning. When dealing with creeklines and wetlands remember that frogs are sensitive to herbicides. Use only recommended sprays.

Depending on the location, different management techniques may be employed. During spring, areas which contain exotic grasses and weeds should be managed by slashing, herbicide spraying or control grazing. Stock should be excluded from revegetated areas for the first 3-4 years. After this, “crash grazing” to control specific weeds and grasses may be used if monitored carefully.

Advice on a range of activities may be sought from a number of local experts:

- National Environment Centre, Riverina TAFE, Thurgoona on 6043 6700
- Hume Rural Lands Protection Board on 6040 4210
- Albury City Council on 6023 8111, Hume Shire Council on 6051 3900
- Gumnut Seeding on 6020 3250

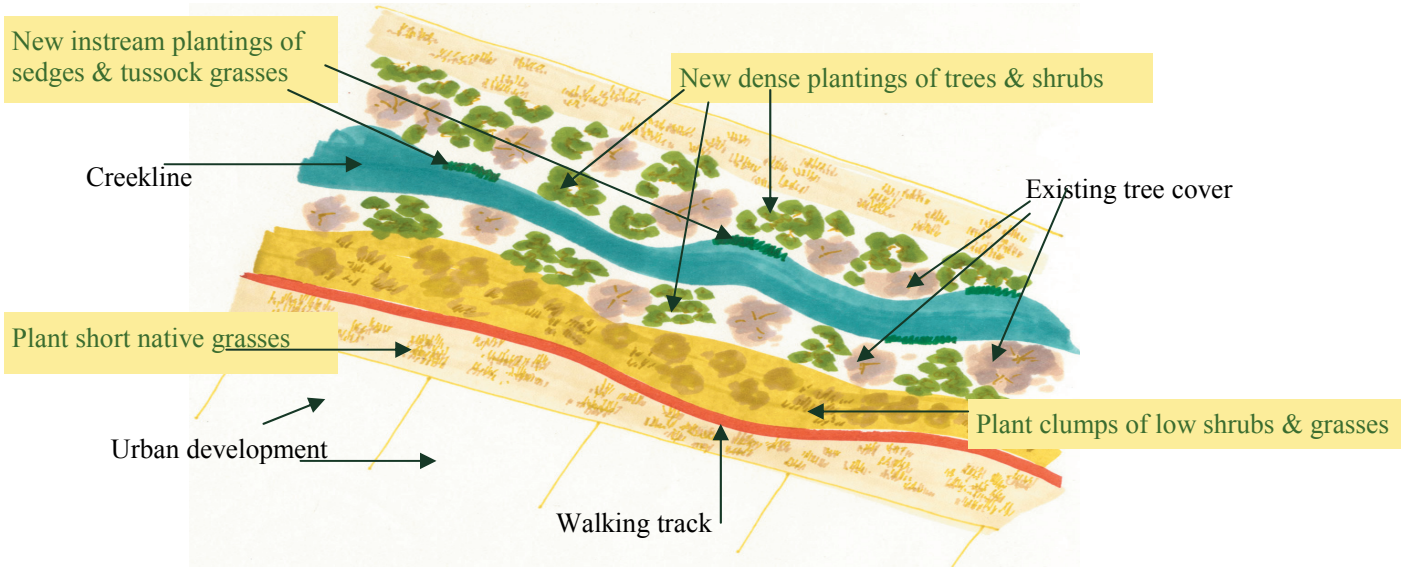
Seed may be sourced from the Murray Indigenous Seed Centre on 6051 9881. Seedlings can be sourced from nursery suppliers listed in the South-West Slopes Revegetation Guide.

Planting areas.

Choose your environmental asset type from the following:-

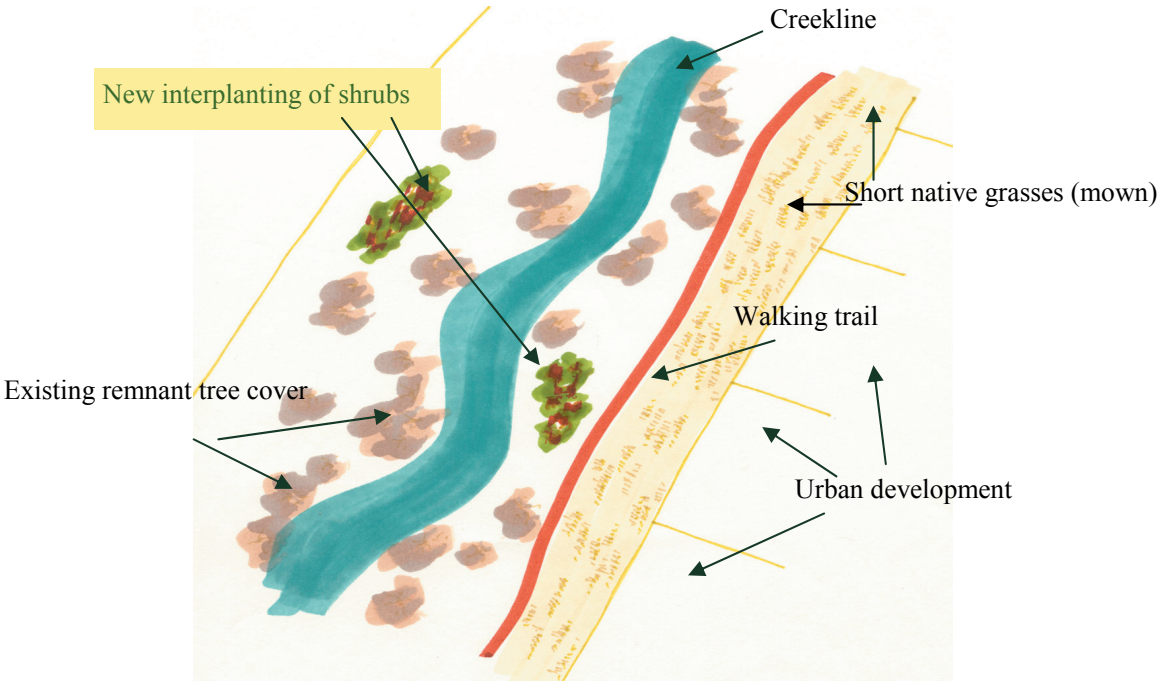
A. Creeklines (degraded creeklines with exotic annual and perennial grasses).

Plant indigenous species by hand using Pottiputki planters to a depth no greater than 100mm to avoid disturbance of cultural artefacts. Do not rip areas which have been identified as containing such artefacts. Batter back eroded banks where necessary. Erosion control matting could be used as an aid for stabilization. Consider dense plantings in order to shade out exotic annual and perennial grasses where they occur. Do not plant close to recreational pathways.
Plant Sedges and Rushes into bottoms of creeks where banks are toeing in. For bank stability plant a lot of vegetation as close as possible to the low-water level. Plant understorey shrubs above the high water line. Where banks are higher than 3 metres and where soil slumping has occurred, plant large trees low on the slope near the bank toe or on the bank top. Shallow rooted species should be planted on the bank face to help bind banks and prevent further erosion. Grass filter strips could be planted on the outside edge of stream banks. Multi-layered vegetation buffers streams against nutrient and sediment run off, limits erosion of the streambank, controls light and temperature and provides aquatic and terrestrial food and habitat. Fallen trees provide habitat for animals.



B. Creeklines (with some native grass cover and less erosion).

Encourage natural regeneration. Control weeds by hand removal or spraying. If necessary "crash" graze in spring to control abundant growth of specific grasses such as Wild Oats, Rye Grass and Barley Grass. Some hand planting may be necessary to introduce a shrub layer. This should be concentrated into weedy patches.



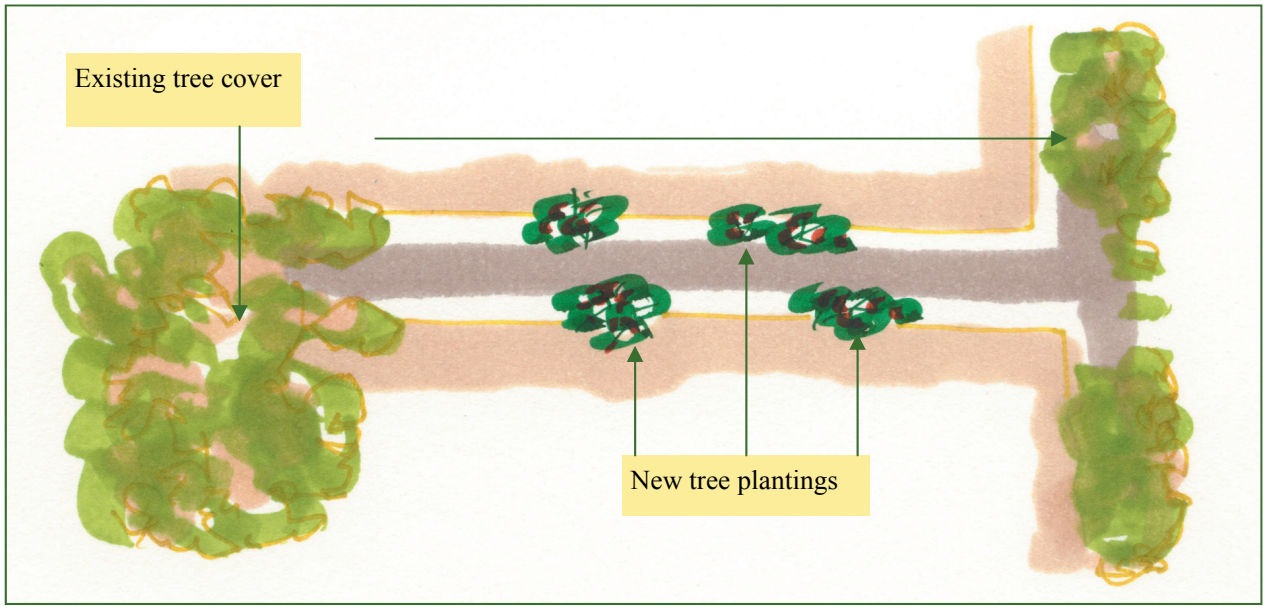
C. Retained Forward Tree Planting Areas.

Plant shrubby understorey species to improve the floristic and structural diversity for wildlife habitat purposes. Include some introduced native species such as Pink flowering Yellow Gum and Ironbark to increase the nectar production period for Honeyeaters. Also include some prickly shrubs such as Kangaroo Thorn and Sweet Bursaria to provide small bird nesting habitat. Plant away from tree root zones to minimize plant growth competition.

Pink Flowering Yellow Gum

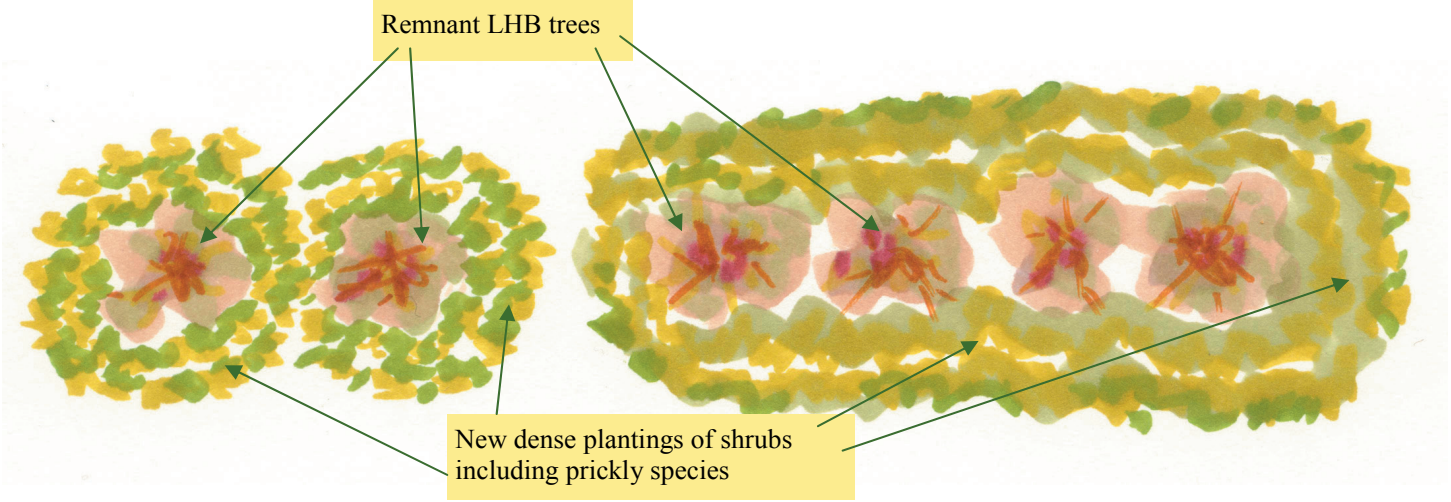
D. Wildlife Corridor Gaps.

Plant indigenous and other native trees and shrubs for foraging resources and to improve habitat values.
Plant tree species in clumps about 40 metres apart to allow successful movement of gliders.



E. Understorey plantings amongst Large Hollow Bearing Trees

Hand plant Wattles and other shrubs including prickly ones, around trees to improve habitat values and discourage recreational use of the area.



Thurgoona Revegetation

To increase the biodiversity local provenance trees and shrubs should be chosen from the list provided. (See over.)

On this list, shrubs which grow up to about 1m are denoted with an *.
Plants which are suitable for areas subject to temporary water inundation are denoted with a "w".

A variety of small local plants may be used where appropriate, along creeklines, landscaped garden beds and also in home gardens. To increase bird diversity (small birds in particular) and to improve the habitat along the creeks, shrub plantings should be weighted towards Sweet Bursaria and Hedge Wattle. (Denoted with !!)
Pictures and additional information on many of these species are presented in "Garden Guide for Albury Wodonga", available from ACC, and "Along the Bush Tracks, Albury-Wodonga", available from Parklands Albury-Wodonga.

For further information refer to "South West Slopes Revegetation Guide" available from the NSW Dept. of Infrastructure, Planning & Natural Resources; also see http://csu.edu.au/herbarium/

Wandoo Aboriginal Corporation Nursery, Sandy Creek Farm Trees and Mountain Creek Nursery grow many other small indigenous species such as lilies, grasses, peas and daisies.

The Murray Indigenous Seed Centre supplies local seed.

Hedge Wattle—Suitable for small bird nesting habitat

Diverse understorey

Natural woodland with diverse understorey.

Photo credits front cover: Squirrel Glider-Lindy Lumsden; Regent Honeyeater-Bob Shepherd; Superb Blue Wren-Peter Merritt.
Page 2: Seed-Donna Stone; This page: Photo 2– Sue Brunskill; All others—Glenda Datson.
Illustrations—Anita George.

Thurgoona Revegetation Species List

(Selections from White Box-Yellow Box-Blakely's Red Gum (Box-Gum) Woodland or Grassy White Box Woodland Endangered Ecological Communities)

Botanic Name	*Common Name*
Aristida ramosa	Kerosene Grass
Acacia acinacea *	Gold-dust Wattle
Acacia genistifolia	Spreading Wattle
Acacia implexa	Hickory Wattle, Lightwood
Acacia paradoxa !!	Hedge Wattle
Acacia rubida	Red-stem Wattle
Acacia ulicifolia var. brownei	Heath Wattle
Acacia verniciflua	Varnish Wattle
Amphibromus fluitans *w	Swamp Wallaby Grass
Amphibromus macrorhinus *w	Long-nosed Swamp Wallaby Grass
Arthropodium strictum	Chocolate Lily
Austrodanthonia spp.*	Wallaby Grasses
Allocasuarina verticillata	Drooping She-oak
Austrostipa spp.*	Spear Grasses
Bothriochloa macra *	Red-leg Grass
Brunonia australis *	Blue Pincushion
Bulbine bulbosa *	Bulbine Lily
Burchardia umbellata *	Milkmaids
Bursaria spinosa !!	Sweet Bursaria
Brachyloma daphnoides *	Daphne Heath
Callitris glaucophylla	White Cypress Pine
Carex appressa *w	Tall Sedge
Chrysocephalum semipapposum *	Clustered Ever-lasting
Craspedia variabilis * w	Billy Buttons
Daviesia latifolia	Hop Bitter Pea
Dianella longifolia	Tall Flax Lily
Dianella revoluta *	Black-anther Flax Lily
Dichelachne crinata *	Long hair Plume Grass
Dodonea viscosa ssp. angustifolia	Long-leaved Hop Bush
Dillwynia sericea *	Silky Parrot Pea
Elymus scaber *	Common Wheat-grass
Eryngium rostratum *w	Blue Devil
Goodenia spp.*w	Swamp Goodenia
Eucalyptus albens	White Box
Eucalyptus blakelyi (Pictured)	Blakely's Red Gum
Eucalyptus bridgesiana	Apple Box
Eucalyptus camaldulensis	River Red Gum
Eucalyptus goniocalyx	Bundy, Long-leaved Box
Eucalyptus macrorhyncha	Red Stringybark
Eucalyptus melliodora	Yellow Box
Eucalyptus polyanthemos	Red Box
Glycine clandestina *	Twining Glycine
Grevillea alpina (Albury form) * (Pictured)	Cat's Claw Grevillea
Grevillea lanigera	Woolly Grevillea
Hardenbergia violacea *	Sarsparilla
Hibbertia obtusifolia *	Grey Guinea Flower
Hibbertia stricta *	Erect Guinea Flower
Indigofera adesmiifolia	Tick Indigo
Indigofera australis	Austral Indigo
Leptorhynchus squamatus *w	Scaly Buttons
Leucochrysum albicans * (Pictured)	Hoary Sunray
Lomandra filiformis *	Wattle Mat-rush
Lomandra multiflora *	Many-flowered Mat-rush
Melichrus urceolatus *	Urn Heath
Microlaena stipoides *	Weeping Grass
Microseris lanceolata *	Yam Daisy
Myoporum montanum	Water Bush
Pimelea humilis (Pictured)	Small Rice Flower
Poa seiberiana*	Poa Tussock
Platylobium formosum *	Handsome Flat Pea
Podolepis jaceoides *	Showy Copper-wire Daisy
Pultenaea foliolosa *	Small-leaf Bush Pea
Stackhousia monogyna *	Creamy Candles
Stylidium graminifolium *	Grass Trigger Plant
Themeda triandra	Kangaroo Grass
Thysanotus patersonia *	Twining Fringe Lily
Thysanotus tuberosus *	Common Fringe Lily
Tricoryne elatior *	Yellow Rush-Lily
Themeda triandra *	Kangaroo Grass
Wahlenbergia stricta *	Bluebell
Xerochrysum viscosum *(Pictured)	Sticky Everlasting

And also, in Forward Tree Planting habitat linkages, parks and reserves, include the following:

Corymbia maculata	Spotted Gum
Eucalyptus sideroxylon	Mugga Ironbark
Eucalyptus leucoxylon 'Rosea'	Pink flowering Yellow Gum

Sticky Everlasting

Hoary Sunray

Rice-flower

Blakely's Red Gum

Cat's Claw Grevillea

You can help to protect our wildlife by:-

- keeping as many of your native trees as possible;
- planting native trees, shrubs and wildflowers (including some prickly ones);
- leaving fallen limbs, twigs and leaves on the ground , where possible;
- Considering not having a cat or keeping puss inside.

Get the kids to keep an eye out for birds. Relax and grab a bird book and a pair of binoculars. You'll be amazed at the wonderful world which opens up. Think about learning more by joining a local club such as the Albury-Wodonga Field Naturalists Club or the Bird Observers Club of Australia. Maybe you could join a local landcare group. Your interest can make a difference.

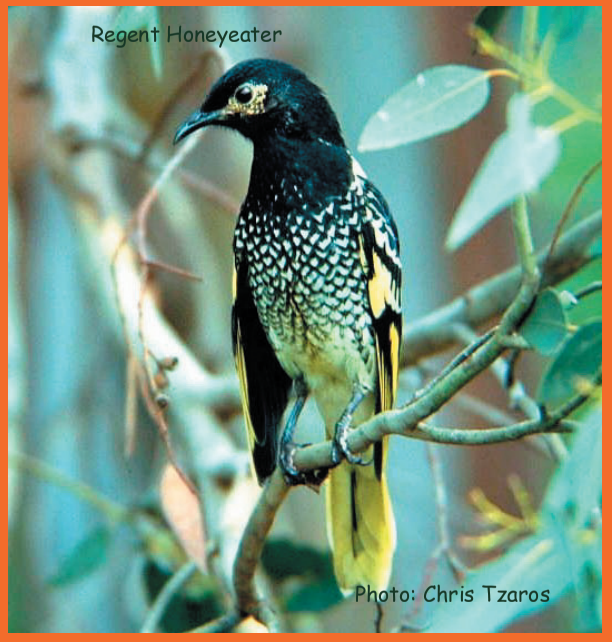

Regent Honeyeater

Photo: Chris Tzaros

The beautiful Regent Honeyeater , an endangered species, has made its home in Thurgoona. Consider planting some Bottlebrushes to provide nectar for food and places to nest.

Photos credits, front cover: Brown Treecreeper: P. Seely. Speckled Warbler: P. Merritt, Hooded Robin: C. Tzaros, Regent Honeyeater: R. Shepherd. Landscape: G. Datson.

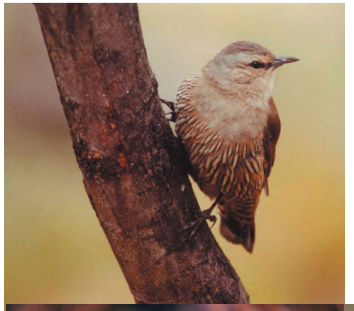
It has been found that the native shrubs already planted in gardens in Thurgoona are providing important food sources for many of the birds in the area. You are also encouraged to plant appropriate native trees and shrubs in your gardens. Advice can be sought from the Albury City Council and their publication, "Garden Guide for Albury-Wodonga", is a helpful reference.

A study of birds and animals has been completed in Thurgoona. As a result, a Threatened Species Conservation Strategy has been developed to protect our wildlife, including many of the trees which provide homes and food for them. You can get details of this study relating to your area from the Albury City Council Parks and Recreation or Planning and Engineering Departments or the AWDC.


Squirrel Glider

Photo: Peter Merritt

Albury-Wodonga Development Corporation
P.O. Box 913
Albury NSW 2640
Ph: (02) 6023 8000 email: awdc@awdc.gov.au
www.awdc.gov.au



Birds and Animals of Thurgoona

What a Great Place!

Thurgoona is a great place to live! We have private and public schools, a TAFE college and a university. There's an equestrian centre and many walking and riding trails. Lots of native trees and shrubs have been planted to make Thurgoona a pleasant place to live. Did you know about the wildlife which lives here as well? It's really important that we look after our birds, lizards, gliders and bats. The best way to do this is to look after the trees and shrubs and to keep at least some of the fallen branches and leaves in which they live and forage for food.

Small birds such as Blue Wrens and Diamond Firetail Finches need prickly shrubs to hide and nest in, to protect them from cats which readily eat native birds.

Photos: Peter Merritt

The Speckled Warbler, a threatened species, moves about on the ground and nests at the base of shrubs or in clumps of grass.

Lizards and skinks and some birds need fallen limbs, twigs and leaves to hide and nest in. So it's important not to "tidy up" too much. If you think the yard looks a bit untidy, plant some screening shrubs. If you live on a larger block with areas of bush, then leave limbs and twigs on the ground to provide habitat for these animals.

Photo: Glenda Datson

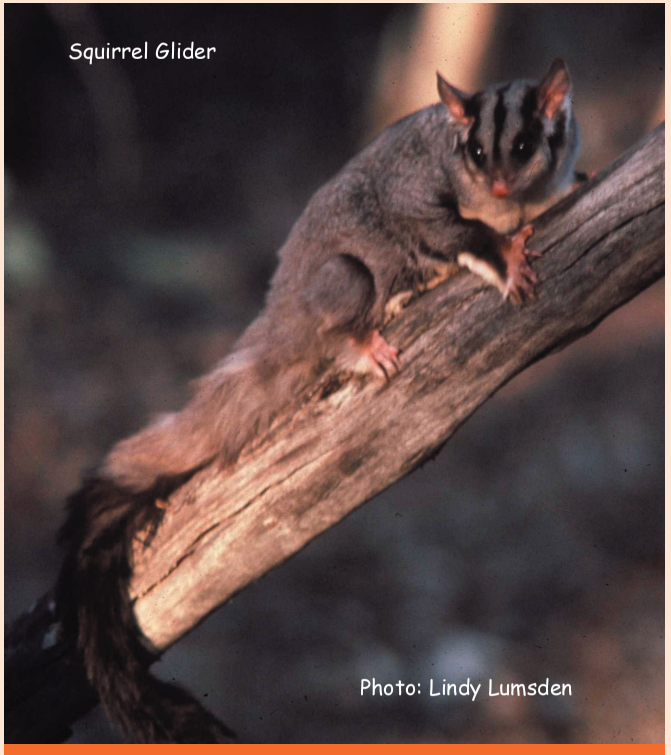
Ironbarks and other planted trees in the Thurgoona area provide seed and nectar for many birds, including the endangered Regent Honeyeater. Many other interesting birds, such as Honeyeaters and Woodswallows, use the planted trees of Thurgoona as drought refuges. It's important to keep these trees.

Did you know that remnant trees such as White Box, Yellow Box and Blakely's Red Gum are protected under NSW and Commonwealth legislation? This means a permit from your local Council is required if you wish to remove them.

Photo: Peter Merritt

Photo: Peter Merritt

The beautiful Squirrel Glider is rare throughout NSW but is more common in Thurgoona. It needs old hollow bearing trees to nest and roost in. Hollows form only after about 150 to 200 years so it is important to retain these large old trees. These animals glide from tree to tree looking for food and it is important that, where they live, tree spacings of no more than 40 metres are provided, otherwise these animals will have to go to ground where they would be likely to be eaten by cats and dogs or may be caught on barbed wire fences.



Produced by Glenda Datson and Ian Davidson
for the Albury Wodonga Development Corporation
as a community information project

About the authors

Ian Davidson

Ian is a wildlife biologist who has had many years of experience researching various species of threatened fauna, and he has a particular interest in their habitat requirements. He has been associated with many professional organisations including the NSW Murray Catchment Management Board, the Murray Wetlands Working Group, the Murray and Lower Darling Community Reference Committee (Environmental Water Flows), Northeast Victoria Vegetation Committee and the Regent Honeyeater National Recovery Team. As a consultant he has been called upon to assess remnant vegetation in the Victorian Box Ironbark Ecosystems and he has also provided biodiversity criteria to enable the evaluation of bushland proposed for urban development in the Albury area, and has proposed strategies for conservation management of travelling stock reserves in southern NSW as well as wetlands in the Upper Murray and Murrumbidgee catchments.
Ian worked for 14 years with the Department of Natural Resources and Environment in Northern Victoria and for six years with Greening Australia in southern NSW. He now works as an independent consultant.

Glenda Datson

Glenda is an environmental horticulturist who has worked for over 20 years in the wholesale nursery industry. She has had considerable involvement in the production of indigenous and exotic plants and with the use of these plants in amenity landscape and large scale revegetation projects. She is a member of the Australian Institute of Horticulture and, as a keen field naturalist, she retains active memberships of the Bird Observers Club of Australia, Victorian and Albury-Wodonga Field Naturalists Clubs, the Australian Plants Society and the APS North-East Garden Design Study Group. She now works as a consultant in the field of conservation and land management and has conducted flora and fauna surveys in NSW and Victoria over the past 14 years for private landowners and developers and local government authorities.

Brian McLennan

Brian McLennan is a Project Manager, responsible for urban land development, carried out by the Albury Wodonga Development Corporation in the Thurgoona area of Albury. Prior to working for the Corporation, he had many years of experience in Local Government, at senior management level, most recently as Director of City Services for the City of Albury. His experience has encompassed all aspects of urban growth and environmental management.
He is a Chartered Professional Engineer and a Fellow of the Institution of Engineers, Australia.