

Charles Sturt University Albury Wodonga Campus- Biodiversity Conservation Management Plan



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1. Background

The Albury Wodonga Campus of Charles Sturt University (CSU) covers a total area of 88.5 ha and is located on the north east edge of the rapidly growing Albury City. This relatively new campus has been designed on the basis of Environmentally Sustainable Development principles, in which the University has established a reputation for leadership, advocacy and teaching. The current world-wide focus on the application of these principles, both in development of new facilities and in ongoing management of natural resources, has provided the University with a number of opportunities to obtain experience of such an approach, which is attractive to many potential students across a range of subjects, and to obtain a lot of beneficial publicity, both generally and specifically. However, it has also made the University more vulnerable to criticism for any perceived withdrawal from such an emphasis and gives this document particular significance in the ongoing development of this Albury Wodonga Campus.

An Environmental Management Plan for the Albury-Wodonga Campus was prepared in 2001 (Harrison and Mitchell) and was subsequently updated in the Institutional Development Plan (IMP) 2007-2011 (CSU, 2006). This plan aims to build ecological sustainability through ensuring ethical and effective governance practices and the responsible stewardship of resources by being on the forefront of research in sustainability, creating an institutional culture of sustainability and signing the Talloires Declaration for a sustainable future. A key target of the IMP affecting biodiversity conservation is that “by 2011 at least 10% of University land be used to increase biodiversity and 20% by 2015”.

As part of CSU’s commitment to the Talloires Convention the University commissioned this report to ensure that the future expansion of the campus incorporates the above principles, with respect to natural resources on the Campus and in surrounding areas. In 2007 CSU signed the Talloires Declaration joining universities world wide in recognizing the leadership that they provide the community, and making a commitment to lead toward a more sustainable future. This leadership is articulated in ten points which include providing learning opportunities around sustainability (which an intact biodiversity will provide) and to set an environmental example.

The importance of the CSU campus at Albury Wodonga is especially significant not only on CSU land, but in its contribution to the adjoining conservation areas and biodiversity linkage corridors (refer to Figure 1). These are all recognized and recorded in the following conservation strategy documents:

- Albury Ranges Threatened Species Conservation Strategy (Davidson, Datson and McLennan) 2006
- Thurgoona Threatened Species Conservation Strategy (Davidson, Datson and McLennan) 2004
- Mitchell Park Estate Land Management Plan (Datson) 2006

- Albury City Council “Albury Land Use Strategy and Review of Planning Controls 2005” April 2006.

This report primarily deals with the biodiversity conservation issues of the campus and follows the methodology for assessment and management described within the Thurgoona Threatened Species Strategy (TTSCS), which sets a biodiversity conservation framework for the whole Thurgoona area. The Albury Wodonga Campus occurs within Precinct D of the TTSCS.

It is also important to recognize the significance of this biodiversity management plan to the other campuses of Charles Sturt University. The campuses at Wagga Wagga, Bathurst and Orange were developed prior to the current emphasis on efficient sustainable use of environmental resources and the planned development of the campus at Albury Wodonga provides a rationale for ameliorative processes to be introduced to those campuses when it is possible and desirable to do so.

Figure 1 CSU location plan



2. Methodology

The Albury Wodonga Campus was assessed using the same method employed in the TTSCS. (See sample survey sheets in Appendix 1.)

Plants and animals identified on each block were recorded on field survey sheets (refer to tables in Appendix 2) as a result of at least 2 surveys during spring 2007. *Note the author undertook extensive surveys of the surrounding land owned by the Albury Wodonga Corporation during 2002-04 as part of the preparation of the Thurgoona Threatened Species Conservation Strategy.* The overall site condition was rated, land management issues were summarized and ameliorative actions were recommended, as outlined below.

Five site ratings were applied to each block and were considered across three ecological values which included rating:

- Habitat (which included age structure of trees, layers of vegetation and overall habitat diversity e.g. drainage lines);
- Vegetation diversity and richness; and
- Site connectivity value with other habitats, i.e. 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 time alone 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, requiring 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 (This will require complete restoration).

Flora

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*.

* For the purpose of this document weeds are considered as non native plants with particular emphasis on the competition effects a weed has on suppressing native plant growth.

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.

3. Summary of biodiversity assets

The main habitat values now present include small patches of remnant woodland, Forward Tree Plantations (FTPs are large scale urban re-forestation which was undertaken by AWC throughout Albury- Wodonga between the late 1970s-early 1990s), scattered paddock trees, pre-existing farm dams, newly constructed reservoirs on a pre-existing natural drainage course on the landscape and associated seasonal wetlands, constructed artificial streams and in-stream wetlands to capture and “treat” natural run-off, and artificial wetlands constructed to treat greywater from the buildings.

The grounds of Albury Wodonga campus are located on former farmland which had most of its original native vegetation historically cleared for agricultural purposes over a century ago. As a result the flora across the district is degraded throughout, being dominated by introduced pasture grasses and broad-leaf weeds. A weed of particular note is African Lovegrass *Eragrostis curvula* which appears to have been widely planted throughout this part of Thurgoona, in particular in parts of the campus Management Units 1A and 1B.

Remnant Woodland- The original native vegetation across Thurgoona was Box-Gum Grassy Woodland an Endangered Ecological Community (EEC) both under NSW and Commonwealth legislation. Benson (2008) describes this vegetation community as Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South-western Slopes (Community 277) and lists intact examples as Critically Endangered. The endangered status is primarily because it was largely cleared across its range for agriculture, because it grew on fertile soils. The remnant woodland patches on the campus are relicts of this original vegetation community.

In general these woodlands on the campus are degraded with patchy tree cover, little regeneration, no shrubs and a weedy ground layer. In places hardy native grasses still occur e.g. eastern part of 1A, 2C, parts of 4A and 5A. These remnants are the key terrestrial habitat on the campus and the management of these woodlands forms a key part of the plan. Remnant woodland covers 12.5 ha or roughly 14% of the total campus area.

FTP's- CSU purchased the property in 1990s from the Albury Wodonga Development Corporation (AWDC). AWDC was established in 1973 when the Commonwealth Government designated Albury-Wodonga as a national growth centre. The AWDC was established on the 30th May 1974 to ensure that the city

be built “in an orderly, efficient and proper way”. Broad-scale planting of native trees covering over 2000 ha was undertaken by AWDC from 1976 till recent times, including those on the campus. Across the campus FTP’s cover 11.4 ha or ~ 13% of the campus area.

Scattered Paddock Trees- Several remnant trees are scattered across the campus grounds mainly near the western car park. These relict trees are valuable for wildlife because they provide nesting hollows, which are now uncommon in the district and nectar resources.

Wetlands, Waterways and Storage Reservoirs- There are six pre-existing farm dams in 2B, 4A, R3B, R3A and adjacent to 3, three newly constructed reservoirs on a pre-existing natural drainage course and associated seasonal wetlands, two recently constructed “turkey nest dams on the top of the hill, an artificial “stream” starting on the northern side of the central hill and running through 4A including 2 in-stream wetlands to treat run-off from the landscape and eventually connect to the western end of the western reservoir 4D, and 3 artificial wetland systems in 2A, which were constructed to treat greywater from the buildings. The new storage reservoirs and associated wetlands and the artificial stream provide habitat for aquatic plants and wildlife. The wetlands appear to be functioning well with good aquatic bird diversity and an apparently healthy aquatic vegetation community developing.

Paddocks identified for revegetation- These areas denoted R1A, R1B, R1C, R2, R3A, R3B are currently open paddocks dominated by exotic pastures and herbaceous weeds, which have been identified for future revegetation activities. They cover around 20.8 ha or ~23% of the campus.

Wildlife- In general the campus has little vertebrate species diversity except for waterbirds in and around the built wetlands. See wildlife table in Appendix 2 for a list of incidental species recorded during surveys for this report. During the preparation of the TTSCS several notable species were recorded on or nearby the campus including the Squirrel Glider, Regent Honeyeater and Swift Parrot.

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 Bennett 2003). Recent studies have shown that an important local viable population of Squirrel Gliders exists in Albury, centred in the Thurgoona area (van der Ree, 2003). They are capable of gliding up to 80 metres from a tall tree but prefer 30 – 50

metres (van der Ree, et al, 2003). Maintenance of the large hollow bearing trees and the connectedness of habitat through treed corridors are vital for this species survival. Habitat for this species is further enhanced by providing large acacias e.g. Silver Wattle, Golden Wattle and Lightwood within woodlands upon which gliders feed on manna (sap) during winter when other protein food resources are often low. Systematic and incidental fauna surveys conducted on the campus by the School of Environmental Sciences in previous years should be recommenced, and designed to provide data on relative abundances of different species in different areas across different seasons and years. This will yield the necessary information to determine the effect of different habitat modifications on avian and other populations, allowing intensification and/or modification of the revegetation programs as appropriate.

The nationally endangered Regent Honeyeater appears to be a spring migrant to the district, coinciding with the flowering of the White and Yellow Box, an ideal nectar resource. In recent years this species has been regularly recorded, often breeding, in the Albury district. The Thurgoona housing estates in particular are utilised, with the planted Ironbarks along with the large retained trees thought to be a major attractant.

The nationally endangered Swift Parrot is a winter migrant to mainland Australia from its breeding areas in Tasmania. In some years birds are seen in and around Albury foraging on nectar or lerps, mainly associated with White Box and Blakelys Red Gum which is scattered throughout the hills and lower slopes. Swift Parrots have a preference for large trees as they tend to have more nectar and sap-sucking insects like lerp (Swift Parrot Recovery Team, 2002). The author recorded a flock of 20+ birds during the winter in 2006 foraging upon the nectar of large White Box trees along the old lane adjoining the western boundary of the campus.

Table 1 Results and site recommendations

Site No.	Site characteristics	Habitat	Flora	Link value	Recommendations	Priority
1A	Scattered woodland remnant	M ↓ M/H	L/M ↓ M/H	M/H ↓ H	Protect existing remnant trees and native grass patches along eastern boundary. Control weeds (ALG, PC, APG) through spray, burn and scalping techniques to promote natural regeneration- also revegetate open parts with shrubs.	High
1B	FTP and scattered roadside remnant trees	L/M ↓ L/M	L ↓ M	M ↓ M/H	Protect existing remnant trees and native grass patches along eastern boundary. Control weeds (e.g. ALG, PC, and APG) through burn and spray techniques to promote natural regeneration- also revegetate open parts with shrubs.	Med
2A	FTP	L/M ↓ L/M	L ↓ L	M ↓ M	Proposed future campus development zone- retain individual trees in healthy condition, especially Mugga Ironbark and White Box where possible within the building design. Leave undergrowth under remnant trees. Remove planted trees with large amounts of decorticated bark to reduce fire hazard. These non-endemic eucalypts are mostly high rainfall species e.g. Manna Gum <i>Eucalyptus viminalis</i> and create a fire hazard by providing a pathway for fire from the ground to reach the canopy of trees, causing "Crowning". <i>Note the Rural Fire Service (RFS) advise that all new buildings constructed in this area require a Fuel Management Zone (clear of trees and shrubs) of at least 20m or opening of the canopy in the adjoining plantation. Contact Albury RFS for further information.</i>	Low
2B	Linear FTP	L/M ↓ M	L ↓ M	M ↓ M/H	Retain existing FTP and remnant tree near small dam. Manage as wildlife corridor by planting trees and shrubs into gaps. Control ALG.	Med
2C	Linear Grassy woodland remnant	M ↓ M/H	M ↓ M	M ↓ M	Protect existing remnant- control weeds (e.g. ALG) by spot spraying. Plant clusters of Kangaroo Thorn in open degraded parts for small birds <i>Note the recent/current construction has degraded this site and active management will be required to maintain the medium rating</i>	High
2D	FTP	L/M ↓ L/M	L/M ↓ L/M	L/M ↓ L/M	Proposed future residential precinct- retain individual trees in healthy condition, where possible within the building design. <i>Note the Rural Fire Service (RFS) advise that all new buildings constructed in this area require a Fuel Management Zone (clear of trees and shrubs) of at least 20m or opening of the canopy in the adjoining plantation. Contact Albury RFS for further information.</i>	Low

3	L shaped FTP	L/M ↓ M	L ↓ L/M	M ↓ M	Retain existing FTP. Manage for woodland birds by planting dense clusters of shrubs into gaps. Control weeds (e.g. ALG) by spot spraying. Control Noisy Miners.	Med
4A	Open woodland remnant	M ↓ M/H	L/M ↓ M	M/H ↓ M/H	Protect existing remnant trees and native grass patches. Promote natural tree regeneration via scalping and weed control methods. Plant clusters of shrubs into weediest parts for small bird habitat. Control Noisy Miners	High
4B	New plantings	L ↓ M	L ↓ M	L ↓ L	Control weeds (e.g. APG) to ensure planted trees and shrubs thrive. Consider techniques trialed in site 4A for applicability. Enhance the wetland to grassland transition vegetation profile	Med
4C	Paddock tree cluster	L/M ↓ M	L ↓ M	M ↓ M	Fence and manage as for 4A. Note that this area has been used as a stock camp and the nitrogen enriched soil should be removed by scalping.	High
4D	Built wetlands	M/H ↓ M/H	M ↓ M	M ↓ M	Weeds appear to be minimal in areas regularly inundated- monitor regularly to ensure aquatic weeds e.g. Lippia do not get a foothold. The tree regrowth appears to be mostly Blakelys Red Gum which is unlikely to tolerate longer, more regular inundation which is liable to occur in wetter years- consider planting River Red Gum from the Murray floodplain. Also consider planting more aquatic shrubs e.g. River Bottlebrush	High
5A	Woodland cluster	M ↓ M	L/M ↓ L/M	M ↓ M	Note- Note adjoins Telstra land. Promote the protection of existing remnant trees include 3 large Red Box and native grass patches. Promote natural tree regeneration via scalping and weed control methods. Plant clusters of shrubs into weediest parts for small bird habitat	High
5B	Linear FTP	L/M ↓ M	L ↓ L/M	M ↓ M	Retain existing FTP. Manage as wildlife corridor by planting trees and shrubs into gaps	Med
R1A	Fallowed paddock	L ↓ L/M	L ↓ L/M	L ↓ L/M	Maintain weed control. Direct seed with preferred native species- where seed stocks limited concentrate on buffering adjoining remnant e.g. roadside, 4A and creekline. Re-vegetate to create a patchy woodland effect, with open areas of native grasses (e.g. Wallaby Grasses) to allow passive recreation use.	Med
R1B	Fallowed paddock	L ↓ M	L ↓ M	L ↓ L	Maintain weed control. Direct seed with preferred native species- where seed stocks limited concentrate on buffering adjoining remnant e.g. 4A and creekline.	Med

R1C	Drainage overflow	L ↓ M	L ↓ M	M ↓ M	Seek expert drainage advice to deal with increases runoff from the adjoining Mitchell Park subdivision. Manage as a riparian wildlife corridor between roadside and 4A and plant appropriate trees, shrubs, sedges and rushes	Very High
R2	Western entry paddock	L ↓ L/M	L ↓ L/M	L ↓ L	Maintain current management until resources available then manage as for R1A. Concentrate on re-introduction of native grass lands	Low
R3A	Scattered small FTP's	L/M ↓ L/M	L ↓ M	M ↓ M	Retain existing FTP. Manage as wildlife corridor by planting trees and shrubs into gaps	Med
R3B	NE paddocks	L ↓ L	L ↓ M	L ↓ L	Maintain current management until resources available then manage as for R1A. Re-vegetate to create a patchy woodland effect, with open areas of native grasses (e.g. Wallaby Grasses) to allow passive recreation use.	Low
T		L/M	L	M	Retain wherever possible, ensure no development occurs under the canopies of trees to avoid removal as a result of public risk	High
6 Mile Creek	Treeline along creek- retained by AWC/Lands for habitat purposes	M ↓ M/H	L/M ↓ M	M/H ↓ H	Contact AWC, NSW Lands Dept. and Murray CMA to express interest in CSU contributing to managing the creekline as part of the campus biodiversity management plan- consistent with objectives of the TTSCS. Liaise with TAFE (neighbour) regarding potential joint management	Very High
AWC land 1	Land not included in TTSCS b/n creek and campus	L/M ↓ M	L ↓ L	M/H ↓ M/H	As for 6 Mile Creek above, except that this land is potentially available for development/sale because it is not part of the retained habitat in the TTSCS	Very High
AWC land 2	Land not included in TTSCS b/n creek, campus and Old Sydney Road	L/M ↓ L/M	L ↓ L	M ↓ M	Contact AWC to negotiate over boundaries for the developable land as this block includes the drainage from the campus wetland system and therefore would preferably be part of the campus	Very High

Major weed categories

ALG- African Lovegrass, PC- Patersons Curse, APG- Introduced annual pasture grasses e.g. brome, barley, rye, silver grasses and wild oats

Note 1 Included above are the proposed improvements required to each zone showing the expected improvement, indicated by the arrow.

Note 2 CSU will determine the timeframe for the implementation of re-vegetation program to each zone.

Table 2 Recommendations for built Zone

Site	Characteristics	Recommendations
Development Zone	Area of campus set aside for the development of University facilities. (Current and future)	<p>No rankings applied to these areas as they are not seen as areas of significant bio-diversity. This area will be the prime space for human activity on the campus. It is expected that these areas need to incorporate significant amounts of planting for the aesthetic appeal, creation of welcoming places of reflection and learning and the thermal performance of buildings and the comfort of people using outside spaces. It is expected that once the campus relocation program is complete that the vegetation in these areas will “settle down” and start to contribute to the campus bio-diversity.</p> <p>The re-vegetation of this area needs to comply with the <i>“Albury Wodonga campus rehabilitation and landscaping plan 2005”</i></p> <p>The central “top of the hill” space is suitable for a comprehensive mix of vegetation that is anchored to the water storage reservoir.</p>
Treed Development Zone	Area of campus set aside for the development of residential and University facilities, set amongst FTPs.	<p>This incorporates 2A and 2D; refer to the recommendations Table 1.</p> <p>Note that the linear remnant 2C must be retained and excluded from development</p> <p>In the future it is expected that this area will need to incorporate significant amounts of landscape planting for the aesthetic appeal, creation of welcoming and “homely” places to enhance the residential village and the thermal performance of buildings and surrounding spaces.</p> <p>The re-vegetation of this area needs to comply with the <i>“Albury Wodonga campus rehabilitation and landscaping plan 2005”</i></p> <p>It is expected that once the residential village is complete that the vegetation in these areas will “settle down” and start to contribute to the campus bio-diversity.</p> <p>Refer to Fire Hazard management section.</p>

4. General Actions

Tree and shrub species recommended for revegetation

- Within remnants- Silver Wattle and Lightwood for Squirrel Gliders, Kangaroo Thorn, Sweet Bursaria and White Cypress Pine for small bird habitat. For other appropriate species refer to the Revegetation Guide for Holbrook, Hume and Urana districts page 114 and the Albury Wodonga Campus Rehabilitation and Landscaping report. Note no eucalypts recommended because adequate recruitment should occur from natural regeneration within sites.
- Within wildlife corridors- As above with the addition of good nectar providers (See planting of non-indigenous trees below) where significant gaps occur in the connectivity of the corridor.
- Wetlands and drainage lines- Consider introducing River Red Gum to survive regular inundation and riparian shrubs including River Bottlebrush, River Teatree and Rough-barked Honey-myrtle.
- Planting ratios- Remnants- all shrubs, amongst FTPs- all shrubs, patchy corridors- 1:1 shrubs to trees, green field revegetation- 6:4 shrubs to trees

Figure 2 Built wetland



- Individual trees- Companion plant Silver Wattle, Kangaroo Thorn and Lightwood.

Figure 3 Example of planting Kangaroo Thorn



Native tree and grass regeneration trials

Dense swards of introduced annual pasture grasses and broad-leaf weeds inhibit tree and other native plants regeneration by monopolizing the available space and resources, so that seedlings are unable to germinate. Without controlling these dense swards regeneration of native plants within woodland remnants will be limited. The consultant recommends trialing two simple techniques, soil scalping and herbicide spraying to achieve this sward control.

- Scalping

Scalping involves the removal of the uppermost soil layer to a depth of 1-3 cm thereby removing the annual weed seed layer and the most nutrient enriched soil. The soil is usually stockpiled off the site and composted to destroy many of the weed seeds before being used for other purposes. This method is best used where there is evidence of vigorous weed growth e.g. old stock camps and where nitrogen loving broad-leaf weeds e.g. Capeweed, Marshmallow, and Nettles etc. Note care needs to be taken not to impact on the roots of remnant trees during scalping and to not promote water erosion by avoiding drainage lines.

Figure 4 Stock camp in 4C



- Spraying
Use spray topping techniques timed to coincide with active growth of weeds and the dormant stage of native grasses- usually winter early spring. Consult weed control expert.

5 Key issues

AWC land

As a matter of high priority CSU should negotiate with AWC (and probably the NSW Lands Department as future owners of the AWC environmental lands) regarding the university managing Six Mile Creek (12.6 ha) and AWC land 1 & 2 (~6.5 ha). This would ensure that the biodiversity conservation outcomes on both CSU's and AWC's environmental lands is maximized through more efficient, focused management. Riverina TAFE as the neighbour should be included in discussions with AWC.

Drainage run-off

Block R1C receives drainage overflow from the currently developing Mitchell Park residential estate and the flows occurring across this site are likely to increase as development increases and the drought effects subside. The site has no formed drainage path and therefore the previously terrestrial landform on this site is likely to erode. As well there are several remnant trees in block 1A that are

affected by drainage and may fall if their roots continue to be undermined by the drainage water. As a result the site should be assessed by a drainage expert and block R1C managed accordingly.

Figure 5 Constant runoff from Mitchell Park Estate across R1C



Passive recreation opportunities

Apart from in the built zone areas the revegetation of R1A and R3B is recommended to be a mix of woodland and open grassy patches. These areas would be suitable for passive recreation opportunities into the future.

Fire hazard management

The Rural Fire Service has prepared statewide fire hazard maps (draft) which cover the treed parts of Albury Wodonga campus. The major effect of this overlay is for new developments, which require the establishment of 20m FMZ buffers (clear of trees and shrubs) adjoining all new buildings or opening of the canopy in the adjoining plantation. Contact Albury RFS for further information.

The local RFS advises that the heavily decorticated trees in 2A and 2B represent a significant hazard from wildfire as they facilitate the movement of fire from the ground via the bulk loose bark up into the canopy and can create major embers as loose bark is blown into the air to spot ahead of any fire. The heavily decorticated trees are non-endemic eucalypts e.g. Manna Gum are inappropriate species in Albury Wodonga because their natural range is in high rainfall habitats (> 800mm rainfall). These should be removed immediately to reduce the fire hazard and thereby start the process of thinning single age trees which offer little environmental value due to the homogenous vegetation structure.

Figure 6 Heavy bark decortications in 2A



Noisy Miners

There is very little terrestrial bird diversity across the campus even in the remnant woodland sites. The dominance of most habitats on Albury Wodonga Campus by Noisy Miners, a large aggressive native honeyeater, is the likely cause of the low numbers of small birds. In fact the only place that common, small insectivores e.g. Willie Wagtail, Blue Wren were found on campus was around the buildings and the eastern car park. Noisy Miners were absent from these areas.

Figure 7 Noisy Miner (Photo Ian Montgomery)



Degraded ground flora

The ground flora throughout the campus is weedy, consistent with most remnant sites throughout Thurgoona. The dominant annual pasture grasses and broad-leaf weeds is typical of most of the land previously managed for agriculture in the district. It is important to improve the composition of the ground layer by reducing weeds and increasing native perennial grasses to reduce the competition for native species to regenerate and reduce the need for grass control. African Love Grass is a particularly problematic species as it is well established on parts of the campus e.g. 1B and suppresses other vegetation because of its strong allelopathic properties and its control needs to be addressed as a priority.

Figure 8 African Love Grass infestation in 2B



Note Riverina TAFE has been attempting to regenerate native ecosystems and may have developed methods applicable to some of the CSU land.

Planting non-indigenous species

Consider planting high nectar producing non-local species e.g. Mugga Ironbark, Spotted Gum, Bottlebrushes etc. in wildlife corridors and FTP's to increase the foraging opportunities for nectivores on campus. Note these species should not be planted within the existing remnants e.g. eastern part of 1A, 2C, parts of 4A and 5A and without control of Noisy Miners nectivores diversity will remain low.

6. Key Recommendations

1. Implement site management actions recommended in table 1.
2. Negotiate ownership/management of 6 Mile Creek and the adjoining AWC land
3. Experiment with scalping/spraying to improve the ground layer plant composition
4. Develop drainage management plan for water entering from Mitchell Park residential park (Site R1C)
5. Investigate Noisy Minor control on campus and in the surrounding area. This should be done in collaboration with current research in the region, perhaps as part of a more formal research project by the School of Environmental Sciences, and in conjunction with the fauna surveys described on page 8.
6. Maintain existing grazing/slashing management in revegetation areas until restoration activities begin

7. Summary

Albury Wodonga Campus covers an area of 88.5 ha of which roughly 50% has been identified in this report as being available for biodiversity conservation purposes, whilst still providing ample opportunity for the university to develop suitable infrastructure. Prompt implementation of the recommendations contained in this report would enable CSU to achieve an important stated target of the Institutional Development Plan 2007-2011 affecting biodiversity conservation, that “by 2011 at least 10% of University land be used to increase biodiversity and 20% by 2015”.

This does not include the adjoining 19 ha of AWC land on and surrounding 6 Mile Creek which would further enhance the biodiversity outcomes of the area. Implementation of this plan will affirm CSU Albury Wodonga as an important leader in Biodiversity Conservation within the region.

The University should also work with the Woolshed Creek/Thurgoona Landcare Group, Trinity Anglican College and the Murray Catchment Management Authority (CMA) to plan and institute a major rehabilitation of 6 Mile Creek and Woolshed Creek to become a rehabilitated core through Thurgoona as it is progressively developed by the City Council as a major suburb of Albury.

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Appendix 1 Survey Sheets

Site Rating:

Values:	All	A	B	C
Floristics				
Habitat				
Linkage				

Date(s):

Surveyor:

Location:

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

Indigenous Vegetation Species	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				

Key to vegetation abundance:

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

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:

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. (This 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 (this will require complete restoration).

Flora

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.

- *Threatened species management:*

- *Other:*

Appendix 2 Native plants and animals identified during surveys

Table of Native plants recorded (not including plantings)

Indigenous Vegetation Species		Indigenous Vegetation Species	
Apple Box		Native Oxalis	x
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	x	Red-Anthered Wallaby Grass	
Blown Grass Sp.	x	Red Box	x
Blue Pincushion		Red Stringybark	
Bluebell Sp.		Red-leg Grass	x
Box Mistletoe		Red-stem Wattle	
Bulbine Lily		Rice-Flower Sp.	
Carex Sp.	x	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.	x
Common Love Grass		Sticky Everlasting	
Common Wheat Grass	x	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.	x
Hop Bitter Pea		Wattle Mat-rush	x
Jersey Cudweed	x	Weeping Grass	x
Juniper Wattle		White Box	x
Kangaroo Grass		White Cypress Pine	
Kidney Weed		Willow Herb Sp.	x
Kurrajong	x	Windmill Grass Sp.	x
Lightwood		Woodrush	
Long Leaved Box		Yam Daisy	
Many-flowered Mat-rush		Yellow Box	x
Milkmaids		Yellow buttons	
Narrow-leaf Hopbush		Yellow Rush Lily	
Native Cherry			
Native Dock			

Table of Wildlife recorded

Fauna of the AWH Area:			
Australian Hobby		Magpie-Lark	
Australian King-Parrot		Masked Lapwing	x
Australian Magpie	x	Mistletoe Bird	x
Australian Magpie-Lark	x	Musk Lorikeet	
Australian Owllet-Nightjar		Nankeen Kestrel	
Australian Raven		Noisy Friarbird	x
Australian Shelduck		Noisy Miner	x
Australian Wood Duck	x	Olive-backed Oriole	
Barn Owl		Pacific Black Duck	x
Black-chinned Honeyeater		Painted Button-Quail	
Black-eared Cuckoo		Pallid Cuckoo	
Black-faced Cuckoo-Shrike	x	Peaceful Dove	
Black-shouldered Kite		Peregrine Falcon	
Blue-faced Honeyeater	x	Pied Currawong	
Blue Wren	x	Rainbow Bee-eater	
Brown Falcon	x	Red Wattlebird	x
Brown Goshawk	x	Red-browed Finch	
Brown Thornbill		Red-capped Robin	
Brown-headed Honeyeater	x	Red-rumped Parrot	x
Brown Treecreeper		Restless Flycatcher	
Buff-rumped Thornbill		Richard's Pipit	
Collared Sparrowhawk		Rufous Songlark	x
Common Bronzewing	x	Rufous Whistler	x
Common Starling	x	Sacred Ibis	x
Crested Pigeon	x	Sacred Kingfisher	
Crested Shrike –Tit		Scarlet Robin	
Crimson Rosella		Shining Bronze Cuckoo	
Diamond Firetail		Silvereye	x
Dollarbird		Southern Boobook	
Dusky Woodswallow		Southern Whiteface	
Eastern Rosella	x	Speckled Warbler	
Eastern Spinebill		Spotted Pardalote	
Eastern Yellow Robin		Striated Pardalote	x
Fan-tailed Cuckoo	x	Striated Thornbill	
Fairy Martin		Sulphur-crested Cockatoo	x
Flame Robin		Tawny Frogmouth	
Fuscous Honeyeater		Tree Martin	
Galah	x	Varied Sitella	
Gang-gang Cockatoo		Wedge-tailed Eagle	
Golden Whistler		Weebill	x
Grey Butcherbird		Welcome Swallow	x
Grey Fantail		Western Gerygone	
Grey Teal	x	White-throated Gerygone	
Grey Shrike-thrush	x	Whistling Kite	x
Hooded Robin		White-plumed Honeyeater	x
Horsfield's Cuckoo		White-throated Treecreeper	
Jacky Winter		White-winged Triller	
King Parrot		White-bellied Cuckoo-shrike	
Laughing Kookaburra	x	White-naped Honeyeater	
Leaden Flycatcher		White-winged Chough	
Little Eagle		Willie Wagtail	x
Little Friarbird		Yellow Rosella	x
Little Lorikeet		Yellow Thornbill	x
Little Raven	x	Yellow-rumped Thornbill	
Black-fronted Dotterel	x	Hardhead	x
Black-tail Native Hen	x	Purple Swamphen	x
Glossy Ibis	x	Dusky Moorhen	x
Latham's Snipe	x	Australasian Grebe	x
White-faced Heron	x	Little Pied Cormorant	x
Pacific Heron	x	Masked Plover	x

Figure 9 Campus Biodiversity Plan



Figure 10 Vegetation Management Zones

