



Bathurst Regional Council

Reserve Plan of Management
Albens Reserve



Adopted: March 2014

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Reserve Plan Of Management – Albens Reserve

This Plan of Management (POM) was prepared in 2013 by Bathurst Regional Council in consultation with key stakeholders including the Boundary Road Reserve Landcare Group. The POM was placed on public exhibition in February 2014 and adopted as a working document by Council in March 2014. It is recommended that the POM be reviewed and updated every five years.

This Plan of Management was developed with assistance from the NSW Government through its Environmental Trust as part of the Racing to Save the Mount Panorama Woodlands project.

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Front Cover Image – Albens Reserve Woodland
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INTRODUCTION

All Councils, including Bathurst Regional Council, have a charter under the *Local Government Act 1993* to guide their operations on public and private land. One of the principles identified in this charter is “To properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of ecologically sustainable development”. This principle underpins the development of this plan of management for Albens Reserve.

This particular reserve and its ecological importance were brought to the attention of Bathurst Regional Council through the Bathurst Vegetation Management Plan Reference Group. Chris Marshall, former Chair of Boundary Road Reserve Landcare Group, was instrumental in recognising the significance of this site and in particular the geological formation that permits White Box – *Eucalyptus albens* to dominate the tree cover. This recognition ensured that the site was added to the Bathurst Vegetation Management Plan Reference Group 30 Highest Ranked Projects.

In 2013 Bathurst Regional Council successfully received funding from the NSW Government through its Environmental Trust for a project titled “Racing to Save the Mount Panorama Woodlands” which focused on several sites in the Mount Panorama precinct. This Plan of Management has been developed as part of this project with the project funding to also include on ground works, signage and a public education campaign regarding White Box, Yellow Box, Blakely’s Red Gum Grassy Woodlands.



Photo 1 – White Box Dominant Open Woodland

RESERVE DESCRIPTION

Albens Reserve is a significant conservation and public open space asset for the city, containing one of the few remnants of White Box, Yellow Box, Blakely's Red Gum Grassy Woodland (Box-Gum Grassy Woodland), in the Bathurst urban area (see Photo 1). This vegetation type is listed at both State and National level as an Endangered Ecological Community (EEC). Of particular importance at this site is the dominance of White Box - *Eucalyptus albens*, which does not occur naturally at most of the peri-urban Box-Gum Grassy Woodland remnants around Bathurst.

The Box-Gum Grassy Woodland community is currently in moderate condition throughout the majority of the reserve, with some areas of good grassy understory displaying a wide diversity of forb species.

Albens Reserve is comprised of three parcels of land totaling approximately 23.8Ha, all of which are owned and managed by Bathurst Regional Council. Importantly, a small portion of the land parcel that also comprises Reid and Sulman Parks is part of Albens Reserve. This land represents a part of the fall out zone from the adjacent rifle range and the restricted access to this area is a large contributing factor as to why this site has avoided development, grazing or other land management uses that may have had a detrimental affect on the woodland.

The reserve is used by local residents as access to their homes during periods of track closures on the Mount Panorama Racing Circuit, with an access road for this purpose constructed in 2002. The Albens Reserve internal access road services nine properties with access required during the Mount Panorama Racing Circuit full track closures which occur up to a maximum of five times per year under the Mount Panorama Motor Racing Act 1989; as well as partial track closures which can be enacted for events throughout the year under the Mount Panorama Residents Access Policy. Additionally, a minor access track is located at the southern end of the reserve which provides access to a single property.

The headwaters of one of the branches of Hawthornden Creek originate in Albens Reserve. Active erosion is present along the banks of the creek line with active head-cuts present at the formation of the drainage lines. The degradation of this creek has been caused by several factors including historic clearing at the site, overgrazing by stock, increased run-off from road construction and the presence of rabbits. Significant and active erosion is present on the northern, downstream side of the access road with degradation of this section of stream directly related to road drainage issues.

Albens Reserve provides an important linkage between Boundary Road Reserve and the remnant woodlands of Mount Panorama, forming a corridor for native birds and other wildlife to move across the area. Albens Reserve is identified as an important part of the larger Mount Panorama Woodlands precinct which incorporates the Boundary Road Reserve, Blayney Road Common and other surrounding woodland areas as shown in Figure 3.

LAND CLASSIFICATION AND ZONING IN LEP

Albens Reserve consists of three separate parcels of land which are zoned as follows under the Bathurst Regional (Interim) Local Environment Plan 2005 and the Draft Bathurst Regional Local Environment Plan 2014:

	Bathurst Regional (Interim) Local Environment Plan 2005	Draft Bathurst Regional Local Environment Plan 2014
Parcel Number: 16703 4.934 Ha	1(d) Rural Special Purposes	SP3 Tourist
Parcel Number: 16678 8.068 Ha	1(a) Inner Rural	SP3 Tourist
Parcel Number: 37061 -part only-	6(b) Regional Recreation	SP3 Tourist

*Note – Parcel Number 37061 contains Sulman and Reid Parks as well as the Rifle Club and associated fall out zone with approximately 10.8 Ha on the eastern side of Barry Gurdon Drive forming part of Albens Reserve.

RESERVE LOCATION

Albens Reserve is located to the east of Barry Gurdon Drive on the slopes of Mount Panorama, within the Bathurst Regional Council Local Government Area (refer to Figure 1). Mount Panorama is located within the Central Tablelands Local Land Services area and forms part of the Macquarie River Catchment.

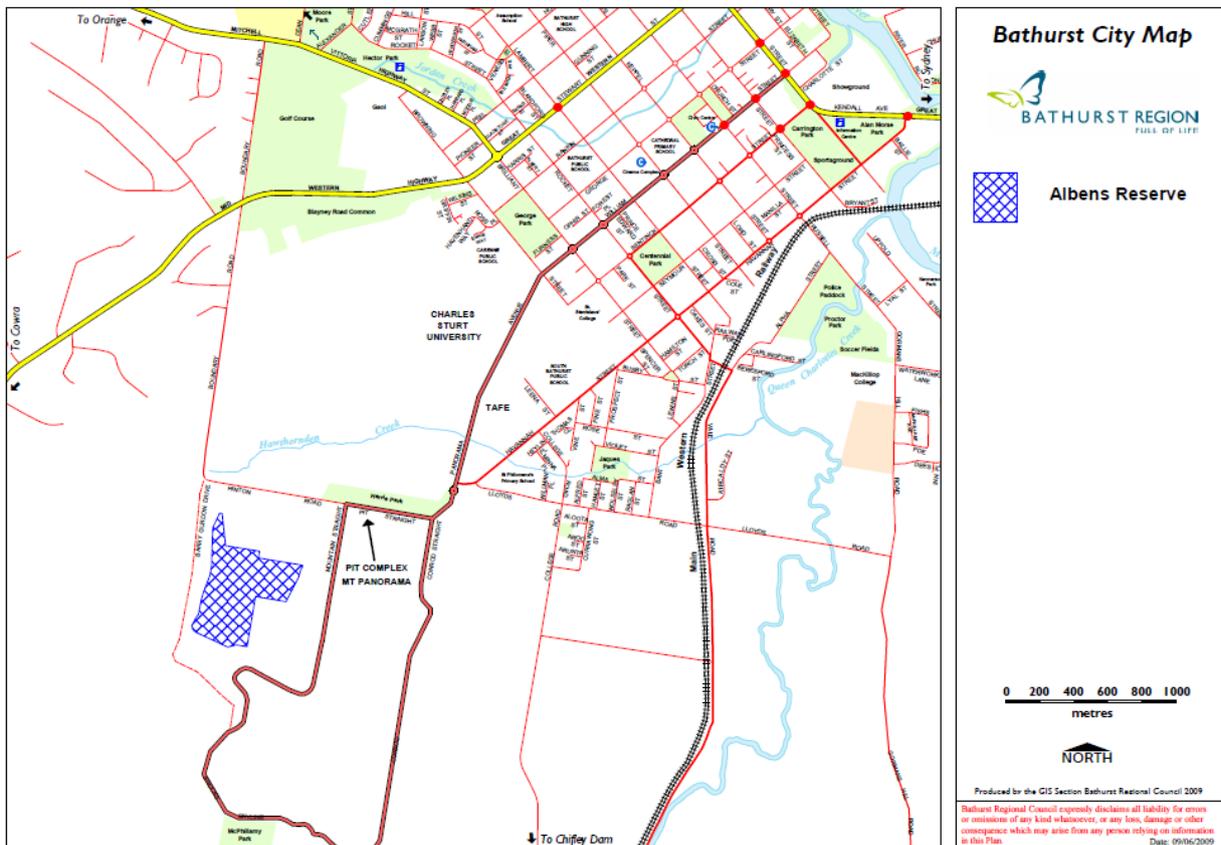


Figure 1 - Location of Albens Reserve

CONSERVATION AND CULTURAL SIGNIFICANCE

Albens Reserve is an important open space reserve for the Bathurst Community and has significant conservation significance, both locally and regionally.

LOCAL SIGNIFICANCE

Albens Reserve is of local conservation significance as it:

- Forms part of a native vegetation corridor, providing strong linkages to the nearby Boundary Road Reserve and is an integral part of the remnant native vegetation that comprises the wider Mount Panorama Woodland Precinct and beyond (See Figure 3). Connectivity between the remnants allows native wildlife to move more easily around the Bathurst area in search of food, shelter and breeding opportunities. Connectivity also occurs along Hawthornden Creek, connecting the woodlands to the Macquarie River.

REGIONAL SIGNIFICANCE

Albens Reserve is of regional conservation significance as:

- A branch of Hawthornden Creek originates in the reserve and is one of several urban waterways in the Bathurst area which feeds into the Macquarie River, a tributary of the Murray Darling Basin via the internationally significant RAMSAR site, the Macquarie Marshes;
- The vegetation community within Albens Reserve has been identified as remnant Box-Gum Grassy Woodland which is classified as an Endangered Ecological Community under both State and Federal Legislation. Although the reserve is currently only in moderate condition, it contains healthy mature eucalypts, mostly from coppice regrowth, with good canopy cover as well as a good native grassy understorey; and
- The Reserve has the potential to provide habitat for a number of listed threatened fauna species. The Diamond Firetail (*Stagonopleura guttata*), Painted Honeyeater (*Granteilla picta*), Gang-gang Cockatoo (*Callocephalon fimbriatum*) and Little Eagle (*Hieraaetus morphnoides*), all listed as vulnerable under the NSW Threatened Species Conservation Act 1995, have been recorded in the reserve. Additionally, several threatened species have been observed in the adjoining Boundary Road Reserve and are likely to occur in Albens Reserve, including the Speckled Warbler (*Chthonicola sagittata*), Regent Honeyeater (*Anthochaera phrygia*), Scarlet Robin (*Petroica boodang*) and the Varied Sittella (*Daphoenositta chrysoptera*).

GEOLOGICAL SIGNIFICANCE

In terms of geodiversity, the reserve contains an excellent showcasing of evidence of an inverted landscape. At about 830m above sea level there is contact between ancient Carboniferous Bathurst granite and a much younger Miocene aged river bed capped with basalt from the Abercrombie lava fields. This feature has been exposed in the manmade excavation within the reserve that may have heritage values as an instance of attempted gold mining the ancient river alluvials. It is highly likely that this was at least part of the source of the alluvial gold that led to the short lived Bathurst Goldfields, the associated diggings at Poor Man's Hollow (South Bathurst) and the deep gulying of the original swampy meadows of Hawthornden Creek.

Geological scale erosion has led to the ancient river and basalt being isolated as a capping of the granite cored Mt Panorama (known as Wahlu to the Wiradjuri). The hill slopes, as well as the eroded drainage plains and drainage lines within Albens Reserve, are covered with a variable blanket of these contrasting eroded and transported materials, creating a diversity of unusual soil profiles.

The unusual mix of soil materials, together with the North East facing aspect and variable frost drainage effectiveness in Albens Reserve, has created the regionally significant instance of White Box (*Eucalyptus albens*). Further to this has been the creation of an excellent example of an unusual topographic sequence over the length of the reserve of Ribbon Gum (*Eucalyptus viminalis*), White Box (*Eucalyptus albens*), Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*Eucalyptus blakelyi*) and Apple Box (*Eucalyptus bridgesiana*).



Photo 2 – Evidence of Miocene Riverbed exposed due to erosion

THREATS TO THE RESERVE

PAST THREATS

There is clear evidence that the majority of the mature trees in Albens Reserve have regrown from coppice following the clearing of this site. It is unknown as to the reason for the trees having been cut down, yet the quality of both White Box and Yellow Box timber for fuel would indicate that firewood collection is a likely cause. Weed incursion and grazing are also issues that have affected the site with evidence suggesting that the lower slopes have been grazed regularly for some period. Additionally, gully erosion has occurred with indications that active erosion had ceased and the stream bed stabilised before further lowering of the stream bed occurred in successive events.

Over time these activities have resulted in degradation of the original woodland and riparian vegetation, reducing natural regeneration and promoting the ingress of many weeds. Clearing and firewood collection have impacted on habitat values for hollow dependant and woody debris dependant species.

PRESENT THREATS

There are a number of threats that continue to contribute to the degradation of the Albens Reserve:

Invasive and Noxious Weed Species

Exotic weeds have become a major problem in the southern, top of slope section of Albens Reserve, out-competing most of the naturally occurring native trees, grasses, forbs, herbs and shrubs. The reduction in vegetative species diversity is expected to have caused a reduction in native fauna diversity, including the number of birds and small mammals utilising this area. The dominance of Serrated Tussock (*Nassella trichotoma*) is of particular concern as it is spreading down slope from this area and invading the high quality woodland of the steeper slopes.

As Box-Gum Grassy Woodland does not naturally have a dense shrub layer the occurrence of woody weeds such as African Box-thorn (*Lycium ferocissimum*), Orange Firethorn (*Pyracantha angustifolia*) and Blackberry (*Rubus fruticosus*) has contributed to a change of structure in this community. It is noted that these species can provide nesting sites for small birds including the Diamond Firetail, a species listed as Vulnerable in NSW, and therefore any control efforts should be carefully managed with consideration given to concurrent revegetation with native species.

Chilean Needle Grass (*Nassella neesiana*) has not been recorded in the reserve to date, however, this weed is present in the region and poses a major threat to the integrity of the woodland community if it becomes established.

Gully Erosion

The upper branches of Hawthornden Creek within Albens Reserve are invariably incised with evidence of active erosion still present. The Bathurst Urban Waterways Management Plan, 2010 (Mactaggart, Goldney, Erskine) identifies this section as reach number H14 with the following description:

“Headwaters of tributary drainage line in open woodland. While the upperstorey community is good the shrub and groundcover layers are very poor due to very high grazing pressure. Sheet, rill and gully erosion is active and the condition of the drainage line and catchment condition is worsening. There is no instream vegetation due to grazing and erosion.”

The creek is classed as degraded with Objectives and Strategies from the Urban Waterways Management Plan listed as appendix 5.

Rabbits

Rabbits are present in Albens Reserve in numbers sufficient to suggest that they are causing degradation to species diversity and soil structure and are likely to be impacting on the occurrence of other small fauna species in the area, due to added pressure on resources such as food and shelter. It is suspected that rabbit warrens have contributed to gully erosion with African Box-thorn noted to be providing harbour for rabbits.

Grazing

While the steeper slopes have largely been protected from grazing due to the topography of the land and the distance from a water source, the flatter areas at the break of slope have been and are currently still heavily grazed by sheep. While there is no current lease or even an informal arrangement for stock to be present on the site, this has occurred due to sections of fencing falling into disrepair. As the area has not previously been under active management the presence of stock has largely gone unnoticed or been ignored. A large stock camp is present in the south-western corner of parcel no. 16703 which has resulted in bare ground and significant weed incursion. Sheep have also contributed to the degraded state of the creek line as mentioned previously.

Loss of Hollows

While loss of hollows for nesting native fauna would generally be associated with timber removal and firewood cutting, this is not at present an active threat at this site. The loss of hollows in Albens Reserve is due to the invasion of exotic species including the European Honeybee (*Apis mellifera*). “Competition From Feral Honeybees” is a listed key threatening process under the Threatened Species Conservation Act, 1995 and should be seen as a serious threat to hollow dependant native fauna. Additionally, European Honeybees compete with native fauna for pollen and nectar which can adversely impact on species such as Sugar Gliders and Honeyeaters.

Removal of Standing and Fallen Dead Wood

There is no recent evidence of dead wood being removed from Albens Reserve, however, it needs to be considered as a present threat as the potential for removal of timber is ever present. “Removal of Dead Wood and Dead Trees” is a listed key threatening process under the Threatened Species Conservation Act, 1995 with many Box-Gum Grassy Woodland fauna species relying on dead timber for their survival.



Photo 3 - Active Rabbit Warren – Management Area 2

CURRENT CONDITION OF THE RESERVE

The overall current condition of Albens Reserve is moderate with a conservation rating of good, as described in the Bathurst Biodiversity Management Plan (Mactaggart, Goldney 2012). The remnant Box, Gum Grassy Woodland has become degraded through prior clearing, infestation with exotic weeds, stock access, erosion issues and degradation associated with rabbits.

The fencing in the reserve has in areas fallen into disrepair which has resulted in sheep freely accessing the site. This has led to the spread of weeds through transportation of weed seeds and propagules as well as contributing to higher nutrient levels of soils, through excrement, which invariably favours exotic species. Additionally, the presence of sheep may be leading to compaction of the granite derived soils and vegetation disturbance and there is evidence of stock tracks through actively eroding gullies suggesting that the presence of sheep is also contributing to this problem.

The proportion and density of native grasses and forbs is very good, however exotic forbs are present at the site and the Weed of National Significance, Serrated Tussock is present throughout the reserve and in dense swathes in sections. Woody weeds are also present and require management to prevent their spread and active contribution to providing harbour for rabbits, however, management must be completed with consideration for the small native birds that nest in this exotic vegetation.



Photo 4 – Narrow-leaf New Holland Daisy (*Vittadinia muelleri*)

The condition of native vegetation, topography and tree cover varies considerably across the site, therefore the reserve has been divided into four management areas, as outlined in Figure 2 and described below. Initial site assessments completed in October 2013 rated the individual management areas as follows:

MANAGEMENT AREA	1	2	3	4
Area (Ha)	4	10	9	0.8
Groundlayer Vegetation Condition Ranking	Moderate	Moderate	High	Very Low
Habitat Condition Rating	High	Moderate	Very High	Moderate

ALBENS RESERVE MANAGEMENT AREAS



Bathurst Regional Council expressly disclaims all liability for errors or omissions of any kind whatsoever, or any loss, damage or other consequence which may arise from any person relying on information in this Plan.

Note: The colours on this Plan do not indicate landuse zones under the Bathurst Regional (Interim) Local Environment Plan 2005.

Date 03/10/2013

"Base Maps: © Department of Lands 2006"

Figure 2 – Albens Reserve Management Areas

MANAGEMENT AREA 1

The vegetation in this management area is dominated by an overstorey of White Box (*Eucalyptus albens*) which is significant as this tree specie is not locally common in Box-Gum Grassy Woodlands in the Bathurst area. The tree cover is good despite the majority of the trees having regrown from coppice with densities consistent with healthy open woodland

Management Area 1 begins as a very narrow reserve adjacent to the security area on Barry Gurdon Drive, and extends into a broader zone as the elevation of this site increases. The site is presently grazed by sheep which have free access to this management area due to the boundary fencing having fallen into disrepair on the eastern side of the reserve. This has contributed to several issues including stock tracks and compaction, weed incursion and a reduction in groundcover vegetation.

The understorey at this site is dominated by native Tussock Grasses (*Poa spp.*), however, there are significant areas of bare earth or litter (leaves, bark, sticks etc.). There is some diversity in the native grasses and forbs present at the site, yet evidence of noxious weeds beginning to become established in the area is shown through the presence of Thistles (*Onopordum spp.*) and Serrated Tussock (*Nassella trichotoma*). Other environmental weeds are also present including Clover (*Trifolium spp.*), Horehound (*Marrubium vulgare*) and Shepherds Purse (*Capsella bursa-pastoris*).

A small dam is located at the northern end of Management Area 1 which appears to have filled with sediment over time and holds only a very small amount of water. It is unclear as to when this dam was constructed but it now functions primarily as a sediment trap and is dominated by vegetation with no areas of open water. Further assessment would be required to determine the habitat values of this dam.

A heavily incised section of Hawthornden Creek runs through the south-eastern corner of Management Area 1. There is evidence of the creek bed having stabilised in this section before secondary incision occurred inside the already lowered creek bed as seen in Photo 5.



Photo 5 – Creek Incision – Management Area 1

MANAGEMENT AREA 2

This area of Albens Reserve has been subjected to extensive clearing in the past resulting in areas of open grass plains with patches of open woodland. There are scattered trees throughout this management area with good tree cover remaining along the branch of Hawthornden Creek present at this site.

Due to grazing pressure at the time of initial vegetation surveys, it was difficult to identify many of the grass species in this area, although there is a solid representation of native Tussock Grass (*Poa spp.*) and some Speargrass (*Austrostipa spp.*) present. The presence of sheep in this section of the reserve appears to have been permanent in recent times with the fence on the northern boundary being damaged in sections and evidence of a stock camp in the south-western corner of the reserve. Several rabbits were seen in this area during site surveys with warrens existing under the cover of large African Box-thorn bushes (*Lycium ferocissimum*). Despite the existing pressures on this area, the vegetation is still predominantly native and is likely to improve under active conservation management.

One area of particular interest in this section of the reserve is the presence of a small dam which has been created as a result of the access road construction. The dam is in the existing creek line and acts as a small ephemeral wetland containing native sedges and rushes. Additionally, there is evidence that this dam has successfully acted as a sediment trap, preventing sediments mobilised during active erosion events from being transported downstream beyond this point. The overflow for this dam consists of a large diameter (300mm) pipe which transports high flows of water to the downstream side of the road. As the creek on the downstream side of the road is heavily incised there is a large drop from the pipe outlet into the creek bed which is causing active erosion in an otherwise stable section of creek.

MANAGEMENT AREA 3

The steep slopes that comprise Management Area 3 contain the best quality and range of vegetation within Albens Reserve featuring a broad range of grass and forb species, some mid-storey shrubs consistent with the open woodland vegetation community, and several species of Eucalypts forming the canopy.

Gully erosion in this area is largely stable, however, active erosion is present in some locations. Active headcuts should be seen as a priority management issue as the work required to stabilize these areas at present would be relatively small in cost and resources, yet left unattended have the potential to lead to further soil loss and gullying throughout the system.

A range of weeds are present throughout this management area with most being restricted to very minor infestations due to the health of the native vegetation which provides effective competition to weed incursion. Areas where weeds are posing greatest threats are typically close to the boundaries with some garden escapes present on the eastern boundary, a range of woody weeds on the southern boundary and of most concern, a large and dense infestation of Serrated Tussock – *Nassella trichotoma* – spreading from Management Area 4. This noxious weed has the potential to spread throughout the reserve if left unchecked which could significantly alter the biodiversity present at this site.



Photo 6 - Management Area 3, Albens Reserve

MANAGEMENT AREA 4

The final management area of Albens Reserve consists of highly modified vegetation, approximately 1ha in size. There is very little tree cover in this area with a grouping of young Eucalypts estimated to be less than 20 years of age surrounding a mature tree. A cluster of naturally regenerated Silver Wattle (*Acacia dealbata*) has shown that natural recruitment of native species in this area is achievable if active management takes place.

Of significant risk to the reserve is the dominance of exotic grasses in the ground layer vegetation in this management area. Phalaris – *Phalaris aquatica* – in combination with declared noxious weeds Serrated Tussock (*Nassella trichotoma*), African Lovegrass (*Eragrostis curvula*) and St John's Wort (*Hypericum perforatum*) comprise over 50% of the understorey vegetation. Additionally, woody weeds are spreading into the site from the east. While this management area represents the smallest and most modified section of Albens Reserve, the risk posed to the healthy woodland community if left unmanaged makes weed control in this section a priority action.

VISION FOR FUTURE PUBLIC USE OF THE RESERVE

Albens Reserve contains valuable ecological and natural landscape values and forms an important link in the woodland connectivity of the Mount Panorama precinct as shown in Figure 3. It is critical that future management and use enhances these values.

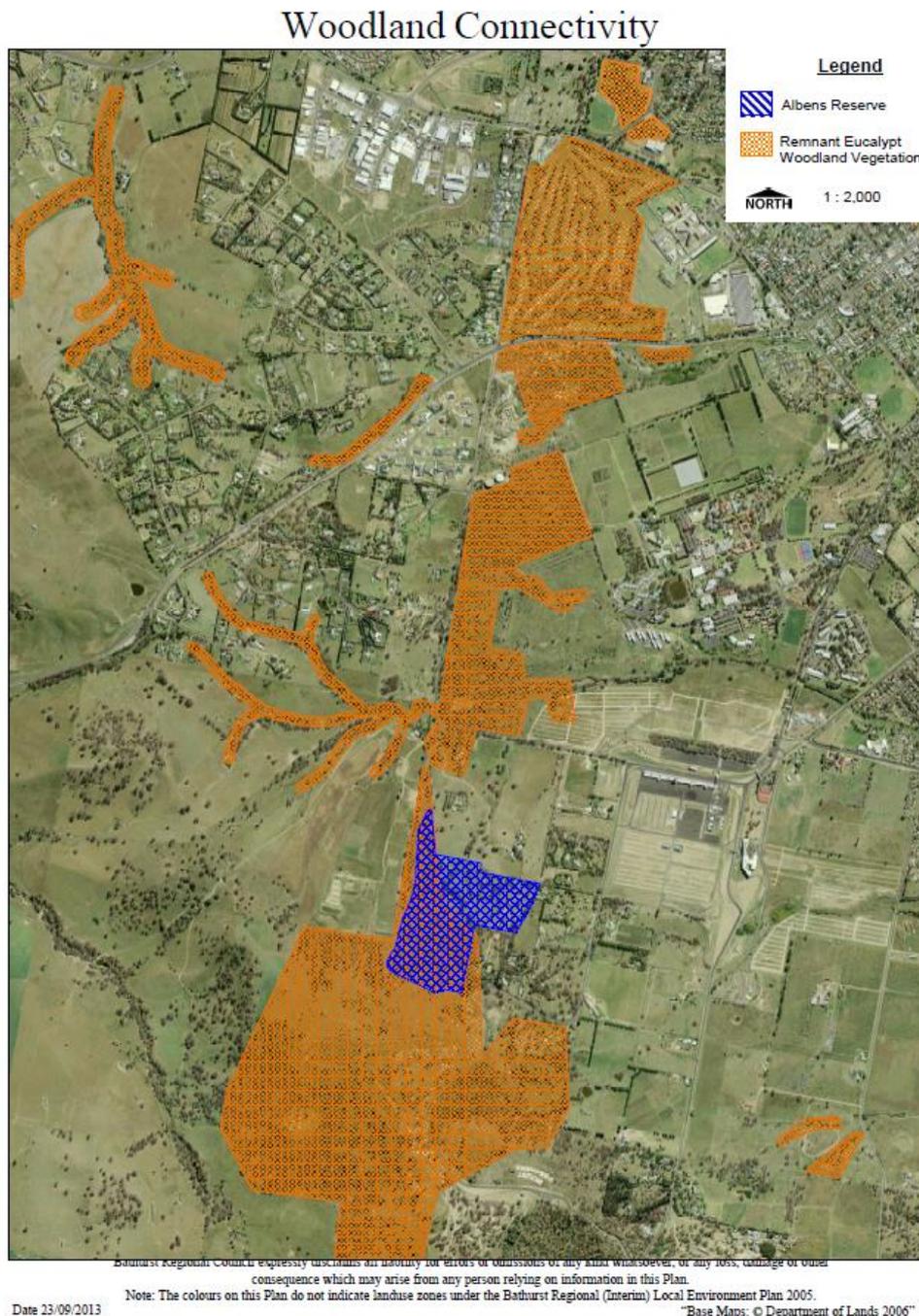


Figure 3 – Albens Reserve as a Link in Woodland Connectivity

At present there is little evidence of any significant public use of the reserve. This is largely due to restricted vehicle entry due to fencing, as well as part of the reserve forming the fall out zone from the rifle range. Albens Reserve is known amongst a small section of the community as an important woodland remnant and is noted for its range of native vegetation and bird watching attributes. Known use of the reserve by members of the public is very limited and restricted to passive recreation pursuits such as bird watching.

GROUPS INVOLVED IN THE MANAGEMENT AND USAGE OF THE RESERVE

Albens Reserve does not have a community group directly involved in the management and use of the reserve, however, the neighbouring Boundary Road Reserve has an active Landcare Group which has been operating effectively since 1997. This group has expressed a willingness to work with Council to assist in the integration of high quality management across the different reserves in the Mount Panorama precinct and is actively contributing to the “Racing to Save the Mount Panorama Woodlands” project.

GOALS FOR THE CONSERVATION AND MANAGEMENT OF THE RESERVE

The long term vision for Albens Reserve is for the site to be a part of an extended, healthy woodland community that is predominantly free of weeds and feral animals, is under active management and has increased habitat features resulting in increased numbers of native fauna.

Goals for Albens Reserve are to:

1. Improve the condition of the 23.8Ha of Endangered Ecological Community Box-Gum Grassy Woodland present at Albens Reserve by instituting best practice management actions in relation to bush regeneration and natural area management.
2. Protect and rehabilitate 300m of ephemeral waterways with a high propensity to erosion by controlling stock access to Albens Reserve as well as the construction of targeted in-stream erosion control structures with associated in-stream revegetation works.
3. Integrate management of Albens Reserve with neighbouring lands and existing land uses by engaging and working together with stakeholders such as the Boundary Road Reserve Landcare Group and Sporting Shooters Association of Australia.
4. Improve overall community awareness and support for the planned management and values of the reserve and encourage responsible use of the area through a targeted media campaign including radio advertising, posters and flyers, educational signage and newsletters.

PAST AND CURRENT MANAGEMENT ACTIONS WITHIN ALBENS RESERVE

CURRENT

The current level of management is low. Grant funding from the NSW Environmental Trust has provided for the development of this Plan of Management as well as funding to carry out initial management activities.

PAST

There is no evidence of any active management of this reserve in the recent past with any information regarding the site proving very difficult to find. Of note is a concrete slab with associated sewer pipes located in Management Area 2 which may have been a clubhouse or similar building at some point in the past. Further information will continue to be sought.

RESPONSIBILITIES FOR ACTIVITIES AT THE RESERVE

As owner of Albens Reserve, Bathurst Regional Council has responsibility for management of the site. Under present arrangements the management of Albens Reserve is the responsibility of the Recreation Section, Engineering Department. It is recommended that management of the site is carried out in accordance with the Objectives and Strategies contained within this Plan of Management. Additionally, it is recommended that an annual allocation of \$5,000 from the Vegetation Management Plan contribution be directed to management of Albens Reserve.

RELEVANT COUNCIL MANAGEMENT PLANS

BATHURST URBAN WATERWAYS MANAGEMENT PLAN

The Bathurst Urban Waterways Management Plan (CenWest Environmental Services 2010) was prepared for Bathurst Regional Council to assist in managing and rehabilitating urban waterways within the Bathurst City area. Actions that are relevant to Albens Reserve are listed in the Hawthornden Creek section of the document.

The Bathurst Urban Waterways Management Plan, 2010, classifies this section of Hawthornden Creek as degraded with the following description:

BRC owned land – BRC grazing lease. Headwaters of tributary drainage line in open woodland. While the upperstorey community is good the shrub and groundcover layers are very poor due to grazing pressure. Sheet, rill and gully erosion is active and the condition of the drainage line and catchment condition is worsening. There is no instream vegetation due to grazing and erosion.

The plan recommends a number of strategies and actions to improve the condition of this reach of Hawthornden Creek which are included in the section on recommended management in this Plan.

BATHURST VEGETATION MANAGEMENT PLAN

The Vegetation Management Plan (VMP) (Terra Consulting, 2003) was prepared for Bathurst City Council to provide a working tool to manage vegetation resources and to plan for the future. The area that represents Albens Reserve is referred to in several parts of this document as part of the greater Mount Panorama environs. Recommended Actions from the VMP that cover Albens Reserve include:

- Manage existing areas of remnant vegetation using best management practices.
- Enhance the extent, viability and diversity of native grasses and groundcover plants where they occur.
- Create a link of native vegetation from Boundary Road along the western and southern face of Mount Panorama to Vale Road.
- Establish native vegetation along all waterways.
- Change management practices in parks and reserves with remnant vegetation.

BATHURST BIODIVERSITY MANAGEMENT PLAN 2012

The Bathurst Biodiversity Management Plan makes a number of recommendations in relation to Albens Reserve, which include:

- Develop a master plan for the protection, enhancement and linkage of the Box-Gum Grassy Woodland EEC in the former Bathurst LGA;
- Implement rehabilitation or restoration works of the Box-Gum Grassy Woodlands in the former Bathurst City LGA as recommended in the proposed Master Plan;
- Develop nature based tourist opportunities that ensure the protection of biodiversity and enhances nature appreciation;
- Review existing BRC management plans to update and where necessary include natural resource management and biodiversity issues.

RECOMMENDATIONS FOR MANAGEMENT

Through consultation with key stakeholders a number of strategies and actions are recommended to improve the condition of the Albens Reserve woodlands and to enhance its conservation value. These are outlined in the following tables.



Photo 7 – Shingleback Lizard (*Tiliqua rugosa*), Albens Reserve

Reserve Plan Of Management – Albens Reserve

Strategies	Actions	Priority	Estimated Cost	Management Area/s
1. To exclude all stock from Albens Reserve unless controlled grazing is being utilised as a fuel management tool.	S1A: Repair/replace all boundary fencing to ensure that stock cannot access the reserve	Very High	\$7,000	1,2,3,4
	S1B: Lock all gates that border private property or remove gates and replace with fencing	High	\$500	1,2,3,4
2. Conduct regular monitoring of the site to guide future management actions	S2A: Complete photo point monitoring in January and July of each year	Very High	Staff Time	1,2,3,4
	S2B: Complete step point monitoring in January and July of each year	Very High	Staff Time	1,2,3,4
	S2C: Complete site field survey annually using standard forms attached as appendix no. 1	Very High	Staff Time	1,2,3,4
	S2D: Utilise monitoring data to assess success of completed management actions and to guide future management actions	Very High	Staff Time	1,2,3,4
3. Control noxious and environmental grass and forb weeds within Albens Reserve and institute management actions to prevent further weed incursions	S3A: Utilise National Best Practice Management Manuals where they exist to plan and monitor noxious weed control	High	Staff Time	1,2,3,4
	S3B: Undertake, at a minimum, an annual weed control program	Very High	\$1500/annum	1,2,3,4
	S3C: Use integrated weed management techniques to control weeds including appropriate combinations of herbicide application, physical removal, mulching, revegetation and controlled burning	Very High	\$4,000 initial cost reducing with annual works	1,2,3,4
	S3D: Control noxious and environmental grass and forb weeds on adjacent Council Land where they threaten to spread into Albens Reserve	High	\$1,000/annum	External to Albens Reserve - includes Reid/Sulman Parks
	S3E: Where noxious weeds are known to exist on neighbouring properties, notify residents of their obligations under the Noxious Weed Act 1993 to control noxious weeds	Moderate	Staff Time	External to Albens Reserve
	S3F: Where mowing equipment is brought onto the site ensure that it is clean of weed seeds	High	Staff Time	1,2,3,4

Reserve Plan Of Management – Albens Reserve

Strategies	Actions	Priority	Estimated Cost	Management Area/s
4. Control noxious and environmental woody weeds within Albens Reserve and institute management actions to prevent further weed incursions	S4A: Utilise National Best Practice Management Manuals where they exist to plan and monitor noxious weed control	High	Staff Time	1,2,3,4
	S4B: Undertake, at a minimum, an annual weed control program	Very High	\$1500/annum	1,2,3,4
	S4C: Use integrated weed management techniques to control weeds including appropriate combinations of herbicide application, physical removal, mulching, revegetation and controlled burning	Very High	\$4,000 initial cost reducing with annual works	1,2,3,4
	S4D: Control noxious and environmental woody weeds on adjacent Council Land where they threaten to spread into Albens Reserve	High	\$1,000/annum	External to Albens Reserve - includes Reid/Sulman Parks
	S4E: Plan all woody weed control works with consideration to the habitat values they provide to small native birds	Very High	Staff Time	1,2,3,4
	S4F: Where noxious weeds are known to exist on neighbouring properties, notify residents of their obligations under the Noxious Weed Act 1993 to control noxious weeds	Moderate	Staff Time	External to Albens Reserve
5. Institute fuel management techniques to reduce the risk of wildfire	S5A: Slash/mow a five meter buffer adjacent to private property, where possible	High	\$3,000/annum	1,2,3,4
	S5B: Investigate opportunities to conduct ecological and/or fuel reduction burns at the site at no greater than 8yr intervals	Moderate	\$10,000	1,2,3,4
	S5C: Where fuel loads are deemed excessive, investigate options for management including crash grazing or slashing	Moderate	\$1,500	1,2,3,4
6. Reduce risk of predation on native fauna by domestic animals	S6A: Institute education campaign aimed at residents keeping cats indoors at night	Moderate	\$280	N/A
	S6B: Institute an education campaign regarding keeping dogs on a lead in bushland reserves	Moderate	\$280	N/A

Reserve Plan Of Management – Albens Reserve

Strategies	Actions	Priority	Estimated Cost	Management Area/s
7. Manage feral animals for the benefit of native fauna	S7A: Undertake, at a minimum, an annual rabbit fumigation control program	High	\$1,500/annum	1,2,3,4
	S7B: Utilise best practice control manuals such as the Vertebrate Pest Control Manual to guide control programs	Moderate	Staff Time	1,2,3,4
	S7C: Coordinate rabbit control works with other Council land and where possible, private residences in the Mount Panorama precinct	Moderate	Staff Time	N/A
	S7D: Where accessible and ecologically responsible, consider options for destruction of existing rabbit warrens	Low	\$10,000	1,2,3,4
	S7E: Assess the need for a fox control program as well as the control options available	Low	\$2,000	1,2,3,4
	S7F: Where feral honeybees exist in hollows, contract control works to eradicate them	High	\$2,500	1,2,3,4
8. Retain all standing and fallen dead timber and where dead timber is absent, import it to the site.	S8A: Institute an education campaign aimed at increasing the awareness of the importance of dead timber to woodland communities	High	\$280	N/A
	S8B: Install signage at the site notifying that collection of firewood is strictly prohibited	Very High	\$250	1 - Locate at Main Entrance
	S8C: Where dead timber is absent from an area arrange to import native hardwood timber to the site that is being removed for roadworks etc.	High	\$1,600	2 & 4
9. Manage active erosion throughout Albens Reserve and initiate works to rehabilitate existing incised gullies	S9A: Identify active headcuts and apply appropriate remediation techniques	Very High	\$4,000	1,2,3,4
	S9B: Install 'one rock dams' at strategic locations to assist in raising the stream bed	High	\$4,000	1,2,3,4
	S9C: Revegetate stream bed in locations where suitable soil and moisture conditions exist	High	\$3,000	1,2,3,4
	S9D: Exclude stock from the site and control rabbits as identified in Objectives 1 & 7	Very High	See Objectives 1 & 7	1,2,3,4

REFERENCES

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Oliver, L., Rehwinkel, R. and McLeish, T., 2008. Possible Management Actions for Box Gum Woodlands

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APPENDICES

Appendix 1: Site Field Survey Forms

Step 1: Summary of site characteristics

For each management unit, note the characteristics that apply (Tables A and B).

Date: / / Recorder:

Land management unit									
Land class									
Area (in hectares)									
Water drainage									
Soil drainage									
Aspect									
Landform									
Soil depth									
Fire history									
Current management									
Current land use									

Notes:

Step 2: Site condition assessment

For each land unit management record the condition score and calculate the rating ranking related to the condition assessment (Tables C and D).

Date: / / Recorder:

Site Characteristics	Management Units								
Biomass management (grazing, slashing, fire)									
Cultivation and soil disturbance									
Establishment of introduced pasture species									
Fertiliser application									
Herbicide application (historical)									
Tree planting and shrub planting									
Total site condition score									
Site condition ranking									

Notes:

Step 3a: Vegetation composition field sheet: (i) groups of native and introduced species

1. In each management unit, record as a tally the times that each group of species is 'hit' in the 100 step transects. Each step counts as a 'hit'.
More than one species may be 'hit' at each step.
2. Record also the number of 'hits' of rocks and bare ground or litter.
3. Total up the number of 'hits' of each group of species, rocks and bare ground in each management unit.

Species name																			Growth form	Native introduced
	Tally	Total																		
Bare ground or litter																				
Lichen or fungi																				
Native Grasses																				
Native wildflowers (incl. sedges, ferns, orchids etc)																				
Introduced grasses																				

Step 3a: Vegetation composition field sheet: (i) groups of native and introduced species (cont'd)

Species name																				Growth form	Native introduced
Tree % cover:																					
Native trees																					
Native non-indigenous trees																					
Introduced trees																					
Introduced shrubs																					

**Step 3b: Vegetation composition summary sheet:
(i) groups of native and introduced species**

1. Summarise the abundance of the plants identified in the land units from Sheet 3a.

Indicate if the species is:

- C: Common (more than 20 hits in 100 steps);
- O: Occasional (5 to 20 hits in 100 steps); or
- U: Uncommon (less than 5 hits in 100 steps).

2. Record the tree and shrub cover.

3. Use Figures 1 and 2 to identify the ecological community present in each management unit.

Date of survey: / / Surveyor/s:

Native grasses									
Native wildflowers									
Introduced grasses									
Introduced broadleaved plants									
Native indigenous trees (% cover)									
Native non-indigenous trees (% cover)									
Introduced trees (% cover)									
Introduced shrubs (% cover)									
Vegetation community (from Figures 1, 2)									

Notes: IP: Introduced pasture; GW: Grassy woodland; NG: Native grassland; 2NG: Secondary native grassland;
NP: Native pasture; PLN: Tree Plantation.

Step 3b: Vegetation composition summary sheet: (ii) all species identified (cont'd)

Introduced grasses									
Introduced broadleaved plants									
Tree % cover									
Native non-indigenous trees									
Introduced trees									
Introduced shrubs									
Total number indigenous native species									
Total number introduced species									
Vegetation community (from Figures 1, 2)									

Notes: IP: introduced pasture; GW: Grassy woodland; NG: Native grassland; 2NG: Secondary native grassland; NP: Native pasture; PLN: Tree Plantation.

Step 4: Groundlayer vegetation condition assessment

Write the score for each indicator group for each land management unit, based on Sheet 3b and using Tables E and F.

Date: / / Recorder:

	Management units							
Introduced perennial grasses								
Introduced annual grasses								
Introduced disturbance specialists								
Introduced perennial weeds								
More disturbance tolerant native wildflowers								
More disturbance tolerant native grasses								
Disturbance sensitive native daisies								
Disturbance sensitive native orchids or lilies								
Other disturbance sensitive native wildflowers								
Disturbance sensitive native grasses								
Lichen and fungi								
Total vegetation score								
Total groundlayer vegetation condition ranking								

Notes:

Step 5a: Habitat condition assessment

Answer with a y or yes if present. Add up the number of yes answers at the end.

Date: / / Recorder:

	Management Units									
Assessment Questions										
Signs or sightings of native fauna										
1. Have you heard or seen small native birds?										
2. Have you seen birds of prey, including kestrels, falcons, kites, goshawks or eagles										
3. Are there nests and burrows, including spider holes, but excluding rabbit burrows?										
4. Are there ant or termite mounds?										
5. Have you seen different reptiles such as snakes goannas, dragons, skinks or turtles?										
6. Have you seen other native animals, their droppings (scats) or animal tracks, trails and markings, including wallabies, wombats and echidnas, but excluding kangaroos?										
7. Is there a very low incidence of feral animals?										
Groundlayer and grassland habitat features										
8. Are there dense patches of tall native tussocks?										
9. Are there more than 10 native species in the groundlayer?										
10. Are mosses or lichens present?										
11. Are there loose surface rocks or rocky outcrops present?										
12. Are there leaves, bark and twigs, or grass litter on the ground?										
Native woodland habitat features										
13. Is there a mix of tree ages present, i.e. seedlings, saplings, young trees, mature trees and very old trees?										
14. Are there particularly large trees growing in low parts of the landscape?										
15. Is there a variety of types of indigenous eucalypts present (i.e. two or more of: smooth barked gums, rough barked boxes or peppermints, fibrous barked stringybarks, or deeply fissured ironbarks)?										
16. Are the trees mainly healthy, with little or no dieback?										
17. Are there less than 20% of trees affected by mistletoe?										
18. If trees are present, are there also native grasses and forbs present?										

Step 5a: Habitat condition assessment (cont'd)

	Management Units							
Assessment Questions								
20. Are there locally indigenous wattle trees present?								
21. Are there hollows in the older trees?								
22. Are there logs and/or fallen timber on the ground?								
Other habitat features								
23. Are there wetlands or springs in the management unit (include dams fringed with vegetation and drainage lines)?								
24. Is there a permanent creek or river lined with in native trees or shrubs present?								
Site condition								
25. Is evidence of ringbarking or rubbing of trees by stock absent?								
26. Is the area free from salinity and/or high water tables or the threat of these?								
27. Are stock camps absent?								
Grassland or woodland?								
Total number of 'yes' answers								
Habitat condition rating								

Step 5b: Animal sightings

Indicate when the animals were sighted or heard, and the dates.

Management Units	Species	Date	Comments

Step 6: Summary of conservation significance of each land management unit

Use the map, overlays and Sheets 1-5 for reference.

Date of assessment: / /

	Reference									
1. Area of management unit (hectares)	Sheet 1									
2. Site condition ranking	Sheet 2									
3. Dominant species	Sheet 3b									
4. Vegetation community	Sheet 3b									
5. Vegetation condition ranking	Sheet 4									
6. Habitat condition ranking:	Sheet 5									
7. Patch connectivity ranking	Table H									
8. Threatened species or other species of significance and endangered ecological communities	Expert advice									

Appendix 2: Flora of Albens Reserve

Genus	Species	Common Name
<i>Acacia</i>	<i>dealbata</i>	Silver Wattle
<i>Acacia</i>	<i>implexa</i>	Hickory Wattle
<i>Acaena</i>	<i>ovina</i>	Sheep's Burr
<i>Amyema</i>	<i>miquelii</i>	Box Mistletoe
<i>Aristida</i>	<i>ramosa</i>	Purple Wiregrass
<i>Asperula</i>	<i>conferta</i>	Common Woodruff
<i>Austrostipa</i>	<i>scabra subsp. scabra</i>	Speargrass
<i>Austrostipa</i>	<i>bigeniculata</i>	Tall Speargrass
<i>Bothriochloa</i>	<i>macra</i>	Redgrass
<i>Brachyscome</i>	<i>dentata</i>	Lobe-seed Daisy
<i>Bulbine</i>	<i>bulbosa</i>	Bulbine Lily
<i>Calotis</i>	<i>lappulacea</i>	Burr Daisy
<i>Carex</i>	<i>inversa</i>	Knob Sedge
<i>Cassinia</i>	<i>quinquefaria</i>	Dogwood
<i>Chrysocephalum</i>	<i>apiculatum</i>	Yellow Buttons
<i>Convolvulus</i>	<i>erubescens</i>	Bindweed
<i>Coronidium</i>	<i>scorpioides</i>	Button Everlasting
<i>Cymbonotus</i>	<i>lawsonianus</i>	Bear's Ear
<i>Desmodium</i>	<i>varians</i>	Slender Tick-trefoil
<i>Dichondra</i>	<i>repens</i>	Kidneyweed
<i>Dichopogon</i>	<i>fimbriatus</i>	Nodding Chocolate Lily
<i>Dichopogon</i>	<i>strictus</i>	Chocolate Lily
<i>Dodonaea</i>	<i>viscosa subsp. angustifolia</i>	Narrow-leaf Hop Bush
<i>Einadia</i>	<i>nutans subsp. nutans</i>	Climbing Saltbush
<i>Elymus</i>	<i>scaber</i>	Wheatgrass

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Genus	Species	Common Name
<i>Eucalyptus</i>	<i>albans</i>	White Box
<i>Eucalyptus</i>	<i>bridgesiana</i>	Apple Box
<i>Eucalyptus</i>	<i>melliodora</i>	Yellow Box
<i>Eucalyptus</i>	<i>blakelyi</i>	Blakely's Red Gum
<i>Eucalyptus</i>	<i>viminialis</i>	Ribbon Gum
<i>Exocarpus</i>	<i>cupressiformis</i>	Cherry Ballart
<i>Geranium</i>	<i>solanderi</i>	Native Geranium
<i>Glycine</i>	<i>tabacina</i>	Variable Glycine
<i>Goodenia</i>	<i>pinnatifida</i>	Scrambled Eggs
<i>Hydrocotyle</i>	<i>laxiflora</i>	Stinking Pennywort
<i>Leptorhynchos</i>	<i>squamatus</i>	Scaly Buttons
<i>Lomandra</i>	<i>filiformis</i>	Wattle Mat-rush
<i>Lomandra</i>	<i>longifolia</i>	Spiny-headed Mat-rush
<i>Microlaena</i>	<i>stipoides</i>	Weeping Rice Grass
<i>Microseris</i>	<i>lanceolata</i>	Yam Daisy
<i>Panicum</i>	<i>effusum</i>	Hairy Panic
<i>Pimelea</i>	<i>glauca</i>	Smooth Rice-flower
<i>Poa</i>	<i>sieberiana</i>	Snowgrass
<i>Pterostylis</i>	<i>bicolor</i>	Black-tip Greenhood
<i>Senecio</i>	<i>quadridentatus</i>	Cotton Fireweed
<i>Stackhousia</i>	<i>monogyna</i>	Creamy Candles
<i>Swainsona</i>	<i>reticulata</i>	Kneed Swainson-pea
<i>Themeda</i>	<i>australis</i>	Kangaroo Grass
<i>Tricoryne</i>	<i>elator</i>	Yellow Rush Lily
<i>Vittadinea</i>	<i>cunneata</i>	Fuzzweed
<i>Vittadinea</i>	<i>muelleri</i>	Narrow-leaf New Holland Daisy

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Genus	Species	Common Name
<i>Wahlenbergia</i>	<i>communis</i>	Tufted Bluebell
<i>Wahlenbergia</i>	<i>stricta subsp. stricta</i>	Tall Bluebell
<i>Wahlenbergia</i>	<i>leuteola</i>	Bluebell
<i>Wurmbea</i>	<i>dioica</i>	Early Nancy

Appendix 3: Birds of Albens Reserve

Genus	Species	Common Name	
<i>Coturnix</i>	<i>ypsilophora</i>	Brown Quail	
<i>Geopelia</i>	<i>striata</i>	Peaceful Dove	
<i>Ocyphaps</i>	<i>lophotes</i>	Crested Pigeon	
<i>Cacatua</i>	<i>galerita</i>	Sulphur Crested Cockatoo	
<i>Cacatua</i>	<i>roseicapilla</i>	Galah	
<i>Glossopsitta</i>	<i>concinna</i>	Musk Lorikeet	
<i>Alisterus</i>	<i>scapularis</i>	Australian King Parrot	
<i>Platycercus</i>	<i>elegans</i>	Crimson Rosella	
<i>Psephotus</i>	<i>haematonotus</i>	Red-rumped Parrot	
<i>Cuculus</i>	<i>pallidus</i>	Pallid Cuckoo	
<i>Eudynamys</i>	<i>scolopacea</i>	Common Koel	
<i>Todiramphus</i>	<i>sanctus</i>	Sacred Kingfisher	
<i>Cormobates</i>	<i>leucophaeus</i>	White-throated Tree Creeper	
<i>Malurus</i>	<i>cyaneus</i>	Superb Fairy Wren	
<i>Pardalotus</i>	<i>striatus</i>	Striated Pardalote	
<i>Pardalotus</i>	<i>punctatus</i>	Spotted Pardalote	
<i>Sericornis</i>	<i>frontalis</i>	White Browed Scrubwren	
<i>Smicornis</i>	<i>brevirostris</i>	Weebill	
<i>Gerygone</i>	<i>fusca</i>	Western Gerygone	
<i>Acanthiza</i>	<i>chrysorrhoea</i>	Yellow Rumped Thornbill	
<i>Anthochaera</i>	<i>carunculata</i>	Red Wattlebird	
<i>Philemon</i>	<i>corniculatus</i>	Noisy Friarbird	
<i>Manorina</i>	<i>melanocephala</i>	Noisy Miner	
<i>Lichenostomus</i>	<i>pencillatus</i>	White Plumed Honeyeater	
<i>Pachycephala</i>	<i>rufiventris</i>	Rufous Whistler	

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Genus	Species	Common Name	
<i>Falcunculus</i>	<i>frontatus</i>	Crested Shrike-tit	
<i>Colluricincla</i>	<i>harmonica</i>	Grey Shrike-thrush	
<i>Grallina</i>	<i>cyanoleuca</i>	Magpie Lark	
<i>Myiagra</i>	<i>rubecula</i>	Leaden Flycatcher	
<i>Rhipidura</i>	<i>leucophrys</i>	Willy Wagtail	
<i>Rhipidura</i>	<i>fuliginosa</i>	Grey Fantail	
<i>Oriolus</i>	<i>sagittatus</i>	Olive-backed Oriole	
<i>Coracina</i>	<i>novaehollandiae</i>	Black-faced Cuckoo Shrike	
<i>Artamus</i>	<i>cyanopterus</i>	Dusky Woodswallow	
<i>Cracticus</i>	<i>torquatus</i>	Grey Butcherbird	
<i>Gymnorhina</i>	<i>tibicen</i>	Australian Magpie	
<i>Strepera</i>	<i>graculina</i>	Pied Currawong	
<i>Corvus</i>	<i>coronoides</i>	Australian Raven	
<i>Corcorax</i>	<i>melanorhamphos</i>	White Winged Chough	
<i>Turdus</i>	<i>merula</i>	Common Blackbird	Introduced
<i>Sturnus</i>	<i>vulgaris</i>	Common Starling	Introduced
<i>Hirundo</i>	<i>neoxena</i>	Welcome Swallow	
<i>Hirundo</i>	<i>ariel</i>	Fairy Martin	
<i>Dicaeum</i>	<i>hirundinaceum</i>	Mistletoe Bird	
<i>Cinclorhamphus</i>	<i>mathewsi</i>	Rufous Songlark	
<i>Passer</i>	<i>domesticus</i>	House Sparrow	Introduced
<i>Taeniopygia</i>	<i>bichenovii</i>	Double Barred Finch	
<i>Stagonopleura</i>	<i>guttata</i>	Diamond Firetail	
<i>Granteilla</i>	<i>picta</i>	Painted Honeyeater	
<i>Merops</i>	<i>ornatus</i>	Rainbow Bee-eater	
<i>Platycercus</i>	<i>eximius</i>	Eastern Rosella	
<i>Hieraaetus</i>	<i>morphnoides</i>	Little Eagle	

Appendix 4: Fauna (excluding birds) of Albens Reserve

Genus	Species	Common Name	
<i>Tiliqua</i>	<i>rugosa</i>	Shingleback Lizard	
<i>Amphibolurus</i>	<i>muricatus</i>	Jacky Dragon	
<i>Macropus</i>	<i>giganteus</i>	Eastern Grey Kangaroo	
<i>Macropus</i>	<i>robustus</i>	Common Wallaroo	
<i>Oryctolagus</i>	<i>cuniculus</i>	European Rabbit	Introduced
<i>Vulpes</i>	<i>vulpes</i>	European Red Fox	Introduced
<i>Apis</i>	<i>mellifera</i>	European Honeybee	Introduced

Appendix 5: Objectives & Strategies from the Bathurst Urban Waterways Management Plan

Description	Identifier Nos. (H)	Suggested strategies and actions	Responsibility
BRC owned land – BRC grazing lease. Headwaters of tributary drainage line in open woodland. While the upperstorey community is good the shrub and groundcover layers are very poor due to very high grazing pressure. Sheet, rill and gully erosion is active and the condition of the drainage line and catchment condition is worsening. There is no instream vegetation due to grazing and erosion.	14	Strategies S1, S7, S8, S11, S12, S14, S28, S30 Action H4: as above	BRC owned land, grazing lessee

Action H4: Develop best management practice grazing plan – educate and enforce plan (refer Appendix D)

Objective 1

To maintain or improve catchment condition to reduce hillslope erosion, rapid overland movement of water, and nutrient and sediment transport into waterways

Strategy (S1) Adopt good soil conservation practices to prevent erosion, conserve and hold water and to prevent excessive sediment and nutrients entering the waterways

- Grazing management needs to maintain high groundcover of perennial grasses
- Grazing should be restricted from areas already eroded by sheet, rill or gully erosion
- Encourage the permanent exclusion of stock in fenced off areas
- High slope areas – retain vegetation, exclude stock and revegetate where appropriate
- Maintain adequate vegetation cover by grazing and pasture management and rabbit control
- Remove stock from actively eroding sites
- Strategically place stock watering points in stable areas
- Care needs to be taken with any earthworks on the red and yellow duplex soils due to the highly dispersible nature of the soils (Soil Conservation Service of NSW, 1980)
- Concentrated flows should be diverted to stable permanently grassed waterways which should be fenced to exclude stock (Soil Conservation Service of NSW, 1980)
- Land should be managed and developed according to its capability, with cultivation excluded from areas prone to erosion (Soil Conservation Service of NSW, 1980)
- Develop grazing management plan and review lease agreements for all BRC owned or controlled land

Strategy (S7) Reinstate or enhance natural channel hydrology and floodplain/bank storage in peri-urban and rural areas

- Remove stock or manage their grazing pressure to allow vegetation to increase channel roughness, which reduces stream flow velocity and reduces the risk of instream erosion and consequent channel deepening
- Do not slash instream vegetation
- Rehabilitate or restore deeply channelled waterways to re-instate floodplain connectivity
- Retain or reinstate naturally functioning channel obstructions
- Protect waterways with good channel/floodplain connectivity
- Recreate or rehabilitate swampy meadow systems
- Adopt recommendations given in Objective 1

Objective 3

To improve water quality entering the waterways from the rural and urban landscapes

Strategy (S8) Improve water quality sourced from the rural and peri-urban areas

- Adopt recommendations outlined in Objective 1
- Undertake willow removal and indigenous species replacement program using best management practices (see Appendix D)
- Integrate bio-retention and sediment basins in peri-urban areas and in new developments with high sediment movement
- Create dense groundcover buffers along waterways. Recommend minimum of 20m from each streambank
- Protect instream vegetation or improve habitat for its growth
- Exclude stock and install alternate stock watering points away from waterways
- Recreate or rehabilitate swampy meadow systems
- Use best management practices to fertilise agricultural land and when applying pesticides and herbicides

Objective 4

To improve or protect the condition, ecological value and natural hydrological functioning of the riparian zone, floodplains and associated wetlands

Strategy (11) Protect riparian vegetation community remnants in good condition

- Exclude stock
- Fence off to stop vehicular access if necessary
- Control hares and rabbits, whilst simultaneously controlling cats and foxes
- Protect young plants against browsing by kangaroos, wallabies and wallaroos
- Investigate possibility of land purchase by BRC in strategic areas

Strategy (S12) Improve the proportion of indigenous species, health of the native species and the condition of the native riparian vegetation

- Undertake the selective and staged removal of large exotic tree species using best management practices (see Appendix D)
- Revegetate the riparian zone with indigenous trees, shrubs and groundcover species
- Remove weeds that significantly degrade the vegetation communities and stage weed removal with replantings of native species if plants provide valuable habitat for wildlife
- Exclude stock where necessary to encourage natural regeneration
- Control dominance of exotic grasses (avoid fertiliser run-on, crash graze if appropriate, overtop and shade using native tree/shrub species)
- Protect young plantings using tree guards, stock exclusion, rabbit and hare control
- Protect good quality or recovering native vegetation from development, grazing stock, browsing animals, vehicular access, inappropriate slashing, fires, weed invasion or dumping of litter and garden refuse
- In new development areas front houses to the waterways and/or increase distance of setback to allow for drainage corridor maintenance, minimise dumping of garden and household refuse and improve the area for conservation
- Minimise nutrient run-on from fertilisers, septic tanks and stock camps
- Prevent vehicular access and the dumping of rubbish and garden refuse

Strategy (S14) Protect threatened flora species, populations and ecological communities that occur or are likely to occur in the riparian zone

White Box-Yellow Box-Blakely's Red Gum-Woodland Endangered Ecological Community (TSC Act); and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Endangered Ecological Community (EPBC Act)

- Protect and enhance the EEC existing along waterways and create linkages between fragmented communities
- Adopt recommendations as per **Strategy S11, S12**

Objective 8

Enhance the visual, recreational and cultural amenity and linkages of the waterways

Strategy (S28) Create or improve conservation and environmental linkages along waterways

- Link woodland fragments and areas of high conservation value to waterways along planted conservation corridors
- Improve condition in stream sections that can bridge links between sections in good condition
- Improve waterways linkages that network terrestrial and aquatic natural landscapes

Strategy (S30) Undertake public awareness and education campaigns to encourage participation, ownership and responsible actions and to promote waterways values

- Provide educational material to the community
- Continue engagement of community officer to encourage participation and to disseminate information
- Undertake publicity through the local media
- Maintain education programs to minimise litter entering the waterways such as "Keep the Streets Clean" and the "Drains are Just for Rain" campaigns
- Report fish kills, aquatic animal diseases or alien fish species to the NSW Industry and Investment Aquatic Biosecurity via weblink
- Community awareness programs directed to educate public on:
 - the effects of excessive or poorly adopted fertiliser and pesticide use in the home garden
 - dog faeces, litter, garden refuse motor oil in the streets
 - the dumping of household and garden refuse
 - the values and benefits of natural waterways
 - potential for improved market value of properties fronting waterways
 - benefits to riparian zone with the exclusion of stock
 - problems with direct dumping of rubbish and garden refuse into waterways
 - don't release aquarium fish/water plants into the waterways