WINBURNDALE NATURE RESERVE

PLAN OF MANAGEMENT

National Parks and Wildlife Service

Part of the Department of Environment and Climate Change NSW

November 2007

This plan of management was adopted by the Minister for Climate Change, Environment and Water on 5th November 2007.

Acknowledgments

This plan of management was prepared by staff of the Western Rivers Region of the National Parks and Wildlife Service, with the assistance of members of the Western Rivers Region Advisory Committee.

Valuable information and comments that assisted the compilation of this draft were provided by NPWS specialists and park neighbours, in particular Colin Ferguson, Grahem Stark, Ray Williams, Peter Cornett and Ian McArtney.

Enquiries about **Winburndale Nature Reserve** should be directed to the Macquarie Area Office, Parks and Wildlife Division, Department of Environment and Climate Change, Level 2 203-209 Russell Street BATHURST NSW 2795 or by telephone on 02 6332 9488.

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FOREWORD

Winburndale Nature Reserve is located 30 kilometres north-east of Bathurst within the Central Tablelands of New South Wales.

In 1967 approximately 9,000 acres (3,642.25 hectares) of Crown land was reserved under the *Fauna Protection Act 1948* as Winburndale Nature Reserve. The land, which covered a large portion of the Winburndale Range and part of the Winburndale Rivulet, was dedicated as a Faunal Reserve for the purpose of the protection and care of fauna, the propagation of fauna and the promotion of the study of flora. Today the reserve covers 10,718 hectares.

The reserve contains 12 native vegetation communities and is significant because it is the only area within the Central West, apart from Mount Canobolas State Conservation Area, that contains sub alpine (montane) vegetation associations. The diverse range of vegetation communities in the reserve provides a wide variety of habitats for native animals. A total of 166 species of native animals have been recorded, 11 of which are listed as threatened species.

A species of special interest is the Purple (Bathurst) Copper Butterfly *Paralucia spinifera* which is one of the rarest butterflies in Australia. This species, which has been recorded from two locations within the nature reserve, is endemic to NSW and principally depends upon an intricate symbiotic relationship with the plant *Bursaria lasiophylla* and an ant *Anonchomyrma itinerans* for its survival.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve. A plan of management is a legal document that outlines how an area will be managed in the years ahead.

A draft plan of management for Winburndale Nature Reserve was placed on public exhibition from 7th October 2005 until 30th January 2006. The submissions received were carefully considered before adopting this plan.

This plan of management establishes the scheme of operations for Winburndale Nature Reserve. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

Phil Koperberg
Minister for Climate Change, Environment and Water

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1. MANAGEMENT CONTEXT

1.1 LEGISLATIVE AND POLICY FRAMEWORK

Winburndale Nature Reserve will be managed under a legislative and policy framework being the *National Parks and Wildlife Act 1974* (NPW Act), the National Parks and Wildlife Regulation, the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). Section 72AA of the NPW Act lists the matters to be considered in the preparation of a plan of management. The policies arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

Other legislation, international agreements and charters may also apply to management of the area. In particular, the *Environmental Planning and Assessment Act 1979* (EPA Act) requires the assessment and mitigation of the environmental impacts of any works proposed in this plan.

A plan of management is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within Winburndale Nature Reserve except in accordance with the plan. The plan will also apply to any future additions to Winburndale Nature Reserve. Where management strategies or works are proposed for Winburndale Nature Reserve or any additions that are not consistent with the plan, an amendment to the plan will be required.

1.2 MANAGEMENT PURPOSES AND PRINCIPLES

Nature reserves are reserved under the NPW Act to protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena (Section 30J NPW Act).

Winburndale Nature Reserve will be managed in accordance with the above purposes of reservation and the management principles identified in Section 30J of the Act, that is:

(a) the conservation of biodiversity, the maintenance of ecosystem function, the protection of geological and geomorphological features and natural phenomena;
(b) the conservation of places, objects, features and landscapes of cultural value;
(c) the promotion of public appreciation, enjoyment and understanding of the reserve's natural and cultural values and
(d) the provision for appropriate research and monitoring.

In terms of management principles, nature reserves differ from national parks in that they do not have to provide for visitor use.

1.3 MANAGEMENT DIRECTIONS

Management priorities will be in line with protecting and preserving the biodiversity (flora and fauna) and the natural and cultural heritage values within the reserve as well as encouraging compatible nature conservation activities as part of scientific and educational programs.

Specific management objectives for Winburndale Nature Reserve are to:

- Conserve remnant native vegetation communities including the regionally significant Brown Barrel *Eucalyptus fastigata* communities, the Sub Alpine (montane) vegetation that includes populations of Snow Gum *E. pauciflora* and Mountain Gum *E. dalrympleana* with an understorey of Snow Grass *Poa sieberiana,* and inadequately conserved Western Foothill (Slopes) Woodlands;

- Conserve all native plant species particularly those species listed as vulnerable including the Capertee Stringybark *Eucalyptus cannonii* and Derwentia *Derwentia blakelyi* and other species of high conservation significance;

- Conserve native animals particularly those species listed as threatened and that have been recorded in the reserve;

- Conserve the Purple (Bathurst) Copper Butterfly, an endangered invertebrate, and its associated habitat in accordance with the approved recovery plan for this species;

- Manage the Aboriginal heritage of the reserve in consultation with relevant Aboriginal stakeholders;

- Determine the status of historic heritage and manage these heritage values;

- Control and where possible eliminate noxious plants from the reserve in consultation with relevant organisation, authorities, stakeholders and neighbours;

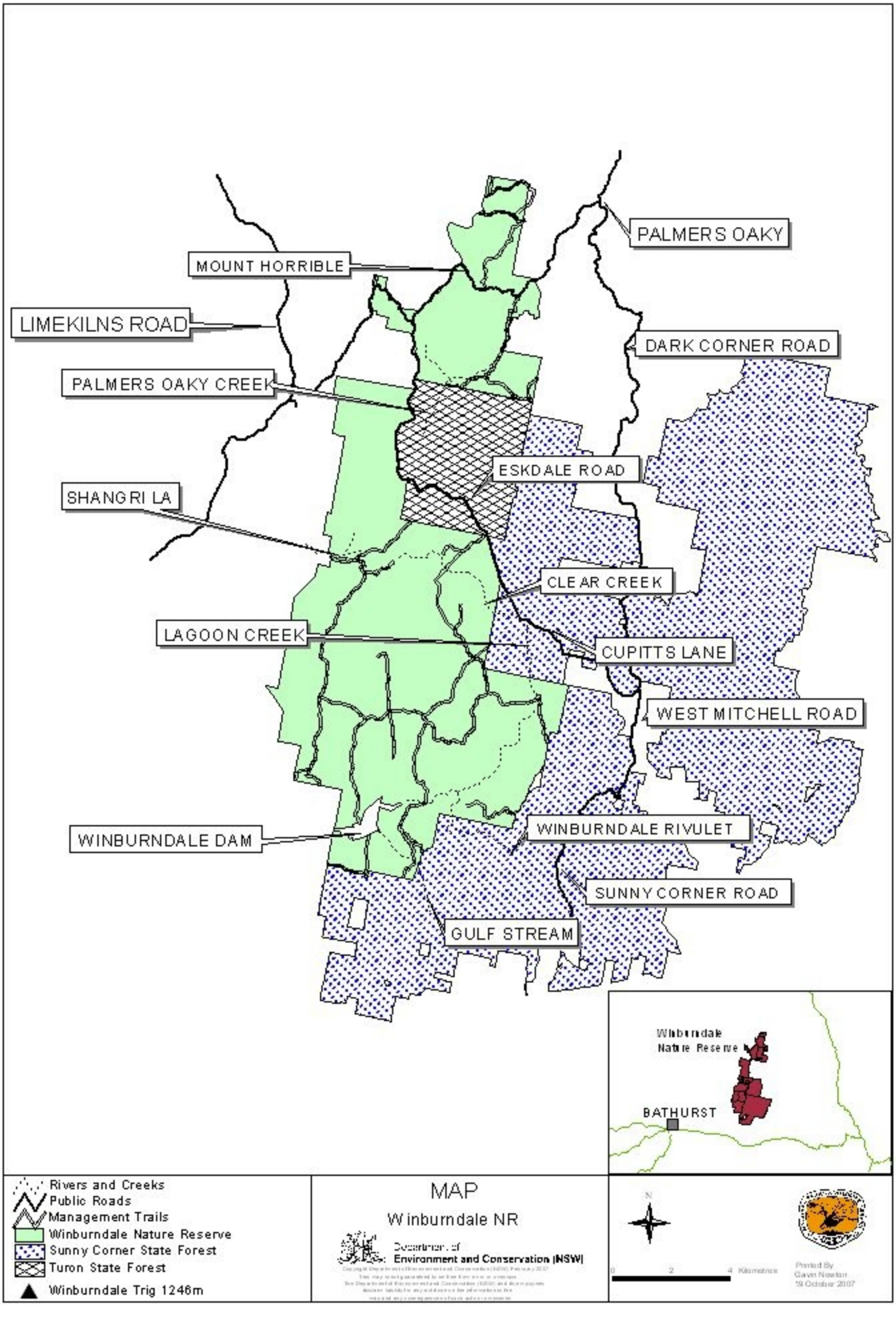
- Control pest animals in the reserve in consultation and cooperation with relevant organisations, authorities, stakeholders and neighbours;

- Maintain the existing closed access network of management trails;

- Encourage opportunities for scientific research and educational studies;

- Adopt appropriate fire management strategies and practices to protect the natural and cultural values of the reserve and prevent the detrimental impacts of large scale wildfires into and off the reserve; and

- Adopt appropriate strategies to allow for low impact uses such as bushwalking and cycling in such a way that these activities do not impact on the reserve's natural and cultural values.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CUPITTS LANE
WEST MITCHELL ROAD
WINBURNDALE DAM
WINBURNDALE RIVULET
SUNNY CORNER ROAD
GULF STREAM
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Gavin Newton
19 October 2007

2. WINBURNDALE NATURE RESERVE

2.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Winburndale Nature Reserve is located 30km north east of Bathurst within the Central Tablelands (Grid Reference 759000E 6308000N). The majority of the reserve occurs within the Bathurst Regional Council local government area with a small portion being located within the boundaries of Lithgow City Council. The reserve is within the State electorate of Bathurst.

The terms *"Winbourndale"* and *"Winbourn Brook"* were names respectively given to the range and an associated stream by Governor Lachlan Macquarie, however, the basis for the terms "Winbourn or Winburn" is not known. The Winbourndale Range and Winbourn Brook were later renamed the Winburndale Range and Winburndale Rivulet.

In 1967, approximately 9,000 acres (3,642.25 hectares) of Crown land was reserved under the Fauna Protection Act 1948 as Winburndale Nature Reserve. The land, which covered a large portion of the Winburndale Range and part of the Winburndale Rivulet was dedicated as a Faunal Reserve for the purpose of the protection and care of fauna, the propagation of fauna and the promotion of the study of flora.

A number of people were instrumental in having Winburndale Nature Reserve set permanently aside for nature conservation. These included local botantist Allan Cunningham, conservationist Keith Ingram and Oswald "Ossie" Stark, who helped establish and became the President of the now defunct Bathurst Conservation (Scientific) and Field Naturalist Society (Group) and was also the owner of the nearby Fernbrook Wildlife Refuge.

To date there have been nine additions to the reserve taking the total area covered by the nature reserve to 10,718ha. Addition 1 - 17 March 1972 – 1,045.73 ha (2,584ac) and 2,682.31ha (6,628ac), Addition 2 - 25 May 1973 – 42.49ha, Addition 3 - 17 May 1974 - 364ha, Addition 4 - 13 December 1974 – 732.6ha, Addition 5 - 25 January 1980 – 668ha, Addition 6 - 4 July 1980 – 82 ha, Addition 7 - 16 May 1986 – 137ha (gazettal inclusive of non public roads), Addition 8 - 20 August 1993 – 651.5ha) and Addition 9 – 2 July 2004 – 670ha (gazettal inclusive of Crown Public Roads).

The reserve occurs within the South Eastern Highlands Bioregion and comprises a ridge system, which is characterised by spectacular conglomerate cliff lines, that run north south through the reserve from Eskdale Gulf for fifteen kilometres. The reserve contains remnant natural vegetation and ranges in elevation from 790m along the reserve's western boundary to its highest point of 1266m which occurs in the south-western part of the reserve.

To the west of the reserve lie predominantly cleared pastoral and agricultural land of the Bathurst Plains (used for grazing and cropping) and to the north lie both freehold and leasehold lands with a large amount still remaining as native vegetation. The reserve is bounded (to the east and south) by native vegetation that forms part of both Turon and Sunny Corner State Forests. These areas are then bounded by lands that consist of softwood (radiata pine) plantations and that also form part of Sunny Corner State Forest.

The reserve is located within the boundary of the Central West Catchment and the majority of streams within the central and southern part of the reserve drain to the west and eventually reach the Macquarie River. Streams in the northern section of the reserve drain to the north and eventually reach the Turon River.

The reserve is significant on both a Regional and State level because it is the only area within the Central West (apart from Mount Canobolas State Conservation Area) that contains sub alpine (montane) vegetation associations which are poorly represented in the Central Tablelands. The dominant montane association consists of a Sub Alpine Woodland and includes Snow Gum *Eucalyptus pauciflora* and Mountain Gum *E.dalrympleana* with an understorey of Snow Grass *Poa sieberana*, which occur on the high elevated plateaus. The majority of the reserve contains Dry Open Woodlands with one of these communities; the Western Foothills (Slopes) Woodland, being classified by Benson (1989) as inadequately conserved.

There are no visitor facilities and no public vehicle access within the reserve. All trails are gated to help conserve the natural and cultural heritage values of the reserve, for public safety (as trails are generally steep and unconsolidated) and to exclude activities within the reserve such as hunting, shooting, timber collection and the driving or riding of motor vehicles.

2.2 LANDSCAPE CONTEXT

Natural and cultural heritage and on-going use are strongly inter-related and together form the landscape of an area. Much of the Australian environment has been influenced by past Aboriginal and non-Aboriginal land use practices, and the activities of modern day Australians continue to influence and impact bushland through recreational use, cultural practices, the presence of introduced plants and animals and in some cases air and water pollution. Therefore the location, geology, landform, climate, plants and animals of reserves like Winburndale Nature Reserve have determined how they have been utilised in the past and will continue to be used by humans.

Both Aboriginal and non-Aboriginal people place cultural values on natural areas, including aesthetic, social, spiritual, recreational and other values. Cultural values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. This plan of management aims to conserve both natural and cultural heritage values within the reserve as well as recognise and document the inter-relationships of these values with non-human threats and on-going use.

2.3 NATURAL AND CULTURAL HERITAGE

2.3.1 Landform, Climate, Geology and Soils

The reserve is part of an uplifted plateau that has been heavily incised (eroded) by a number of streams. Apart from the Winburndale Rivulet, Clear Creek and the Gulf Stream, which are generally sources of permanent water, the remaining water courses and associated unnamed tributaries are considered as ephemeral. The larger of these watercourses include Lagoon Creek, Bald Hill Creek, Diamond Creek, Lickhole Gully, Middle Arm Creek, Dry Arm Creek and Harpers Gully, Larkins Gully and Palmers Oaky Creek.

The climate of the reserve is influenced by its position within the eastern part of the Central Tablelands and is characterised by typical warm temperate weather with warm summers and cool winters. Average temperatures for Bathurst/Sunny Corner range from 28 °C (39°C max) in summer to 1°C (-9°C min) during winter. Rainfall is generally distributed evenly throughout the year with slightly higher rainfall during spring and summer owing to thunderstorms. Rainfall over the reserve averages 780mm pa. Frosts occur from April to November with occasional snowfalls during winter. The most common wind direction is from the northwest and the windiest months occur between October and December.

Volcanics and sediments from the Devonian period dominate the nature reserve. Geology from the Lambie Group which is characterised by spectacular and continuous conglomerate escarpments that run north-south through the reserve dominate the central core and higher areas of the reserve. This group consist of the Slowmans Creek Conglomerates which are comprised of purple cobble conglomerates, mudstone and sandstone. These are combined with Gibbons Creek Sandstones which contains thickly to thinly bedded quartz sandstone, siltstone and mudstone, and are located at a lower elevation and often surround the conglomerate core. These purple coloured conglomerate outcrops and rocky cliff lines consist of large quartz pebbles and fine grained sandstone. A secondary layer of conglomerate composed of smaller pebbles are coloured red and purple as a result of the deposition of iron and manganese ash from volcanic activity (Killick, 1986).

The majority of the soils are derived from these parent conglomerates and are very shallow (thin) and often poorly (hardly) developed in places. The soil has limited topsoil ranging from 6cm – 20cm in depth and with a variable pH range between 4.5 and 6.5. Soils within the reserve have been classified into six broad groups with the lower slopes characterised as having yellow podzolic soils and yellow earths, the mid to upper slopes consisting of red earths, while on the upper slopes chocolate soils, skeletal soils and loams may occur.

The reserve is dominated by shallow soils from the Lambie soil landscape group and consist of sandstone, conglomerate and shale based soils. This group is characterised by rolling to steep hills and mountains with relief between 50m-150m and slopes between 6%-30%. The remainder of the reserve consists of a combination of soil groups the most prevalent being Red Earth soils from the Turonfels soil landscape group which consists of sandstones, shales and siltstones and are characterised by undulating to low rolling hills with relief between 50m-90m and slopes between 6%-20% and Terra Rossa Soils from the Limekilns soil landscape group which consist of limestone, shale and siltstone derived soils and are characterised by undulating low hills with relief between 40m – 120m and slopes of 5%-12%.

A number of areas in the reserve contain deposits of fossils known as Brachiopods. These ancient fossils are diagnostic features of rock dated from the Famennian/Frasnian divisions of the late Devonian period. To date two species have been identified: the abundant “spirifer” which is a bivalve shellfish and appear as butterfly wing shaped impressions and “strophomenid” which appear as a rounded shell fossil.

2.3.2 Native Plants

The nature reserve contains a broad representation of Central Tablelands flora, with an emphasis on sub alpine sclerophyll forest vegetation with open forest along ridgetops and heath along rocky outcrops. A total of 288 plants species have been recorded in the reserve (NPWS – Atlas of NSW).

Based on a report by ERM Mitchell McCotter (1996) and a vegetation map prepared by Lembit (1997), the reserve consists of twelve native vegetation communities which have been grouped into six broad vegetation complexes:

1. **Dry Open Woodlands (87%)**
   consisting of Red Stringybark Forest, Red Stringybark-Scribbly Gum Woodland, Ridgetop Woodland, Long Leaved Box-Red Stringybark Woodland and Western Foothills (Slopes) Woodland.

2. **Moist Forests (8%)**
   consisting of Brown Barrel - Ribbon Gum Forest and Ribbon Gum Forest.

3. **Sub Alpine Woodlands (3%)**
   consisting of Mountain Gum – Broad Leaved Peppermint Forest and Snow Gum Woodland.

4. **Cliff Top Heaths and shrubland (1%)**

5. **Black Cypress Pine Woodlands (0.3%)**

6. **River Oak Forests (0.1%)**

   Plus cleared or exotic pines or unclassified or other (0.6%)

The majority of the reserve contains Dry Open Woodland Communities, which are dominated by Red Stringybark *Eucalyptus macrorhyncha* and Western Scribbly Gum *E. rossii*. This community tends to occur on exposed slopes with shallow soils.

According to Benson (1989) the Western Foothills (Slopes) Woodland is classified as "vulnerable to extinction" and "inadequately conserved". This association is located on slopes and gullies below 900m along the western edge of the reserve and includes Red Box *E. polyanthemos*, Long Leaved Box *E. goniocalyx* and Western Scribbly Gum *E. rossii* in association with Red Stringybark *E. macrorhyncha.*

The Moist Forest Communities are located in sheltered valleys with south facing slopes and are dominated by Ribbon Gum *E. viminalis* and Mountain Gum *E. dalrympleana* and often are associated with a variety of shrubs including the Broad Leaved Hickory *Acacia falciformis* and ground plants. These areas are found in association with sub alpine woodlands that include Snow Gum *E. pauciflora* and Broad-leaved Peppermint *E. dives*, and support a diverse understorey with a range of shrubs, grasses and herbs.

Cliff line and ridges support Black Cypress Pine *Callitris endlicheri* woodlands and heath communities dominated by Fringe Myrtle *Calytrix tetragona* with a sparse understorey, while alluvial flats adjacent to creeklines support River Oak *Casuarina cunninghamiana* forests often with large stands of Native Blackthorn *Bursaria spinosa*.

Other prominent understorey species throughout the reserve include: Ploughshare Wattle *Acacia gunnii*, Blackwood *A. melanoxylon, A. falciformis, A. penninervis, A. buxifolia,* Narrow Leaved Geebung *Persoonia linearis, Leucopogon ericoides, Dillwynia phylcioides, Coprosma*

quadrifida, Tree Violet *Hymenanthera dentata, Lomatia myricoides,* Spiny Mat-rush *Lomandra longifolia, L. filiformis, Styphelia laeta, Styphelia triflora, Monotoca scoparia, Daviesia leptophylla, Leucopogon microphyllus, Pultanaea microphylla,* Redanther Wallaby Grass *Chionochloa pallida,* Poison Rock Fern *Cheilanthes sieberi,* Tussocky Poa *Poa labillardieri,* Snow Grass *Poa sieberana,* Bidgee Widgee *Acaena novae-zelandiae, Stellaria pungens, Dianella revoluta, Stypandra glauca,* Forest Hedge Grass *Echinopogon ovatus,* Weeping Meadow Grass *Microlaena stipoides,* Common Reed *Juncus usitatus, Aristida vagans, Melichrus urceolaris, Grevillea arenaria, Brachyloma daphnoides, Cassinia uncata* and *C. quinquefaria.*

Two plant species found in the reserve are listed under the *Threatened Species Conservation Act 1995* (TSC Act). They are the Capertee Stringybark *Eucalyptus cannonii* and Derwentia *Derwentia blakelyi*. Both are listed as Vulnerable under Schedule 2 of the Act. The Australian Anchor Plant *Discaria pubescens,* identified by Briggs and Leigh (1995) as a rare or threatened Australian plant (ROTAP) species, has also been recorded in the reserve.

Six species of plants that have been identified within the reserve are considered to be of conservation significance. These are three shrubs *Astrotricha ledifolia, Leptospermum multicaule* and *Bossiaea foliosa,* a daisy *Brachyscome ptychocarpa,* a tufted perennial grass *Glyceria latispicea* and a tufted perennial sedge *Schoenus turbinatus.*

2.3.3 Native Animals

The diverse range of vegetation communities in the reserve provides a wide variety of habitats for native animals. A total of 180 species of animals have been recorded (NPWS – Atlas of NSW), which includes 14 introduced species (5 birds and 9 mammals). Of the 166 native species there are 132 species of birds (7 of which are Vulnerable), 17 species of mammals (2 of which are Vulnerable), 13 species of reptiles, 4 species of amphibians (1 of which is Endangered) and 1 Endangered invertebrate (butterfly).

A species of special interest is the Purple (Bathurst) Copper Butterfly *Paralucia spinifera* (an invertebrate) which is listed as Endangered under the TSC Act and is one of the rarest butterflies in Australia. This species, which has been recorded from two locations within the nature reserve, is endemic to NSW and principally depends upon an intricate symbiotic relationship with the plant Native Blackthorn *Bursaria lasiophylla* and an ant *Anonchomyrma itinerans* for its survival.

A number of other species that occur within the reserve are listed as Vulnerable under the TSC Act. These include 7 species of birds (Glossy Black Cockatoo *Calyptorhynchus lathami,* Gang Gang Cockatoo *Callocephalon fimbriatum,* Barking Owl *Ninox connivens,* Powerful Owl *Ninox strenua,* Brown Treecreeper *Climacteris picumnus,* Speckled Warbler *Pyrrholaemus saggitata* and Diamond Firetail *Stagonopleura guttata*) and 2 species of mammals (Yellow Bellied Glider *Petaurus australis* and Squirrel Glider *Petaurus norfolcensis*). There is anecdotal evidence from neighbours to suggest that the Spotted tailed Quoll *Dasyurus maculatus* and Koala *Phascolarctus cinereus* were regularly seen in the Mount Horrible section of the reserve between the 1940's to the 1960's. To date there have been no recent records of the occurrence of these species from this area or in the remainder of the reserve.

2.3.4 Aboriginal Heritage

Aboriginal communities have an association and connection to the land. The land and water biodiversity values within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge and strengthening social bonds. Aboriginal heritage and nature are inseparable from each other and need to be managed in an integrated manner across the landscape.

Winburndale Nature Reserve is within Wiradjuri country, and it is highly likely that the reserve contributed to the social, economic and ceremonial life of the Wiradjuri people and may have economic and cultural significance to contemporary indigenous communities. An Aboriginal massacre occurred in the Clear Creek area (Bill Allen, pers com) which makes this area important to contemporary Aboriginal people.

Twenty-two Aboriginal sites have been recorded within Winburndale Nature Reserve, made up of ten modified (scarred) trees, seven isolated artefact finds, three stone arrangements, one artefact open scatter site and one re-burial. To date most Aboriginal sites found in the reserve have tended to be opportunistically located and there is a high potential for more sites to be discovered, especially along riparian zones or along scenic landscape and lookout areas of the reserve.

2.3.5 Historic (Non-Aboriginal) Heritage

Winburndale Nature Reserve is located near the major Bathurst goldfields (Sofala, Hill End and the Turon River), and was subject to intense gold mining activity, most likely during the 1880 – 1890 period. Evidence of this past use includes shafts, adits, excavated depressions and trenches, mullock heaps, stamper battery sites, stone embankments and associated roads. Most of these sites are associated with watercourses that run through the reserve including Palmers Oaky Creek, Clear Creek, Lagoon Creek and the foreshore areas of Winburndale Dam. There is also evidence of a Chinese water race adjacent to Winburndale Dam. In addition, a substantial mining complex known as McKinnons Reef is located near the western boundary within the reserve.

The most prominent agricultural occupation site in the reserve is a “ruins” site adjacent to Clear Creek, which is known as “Shangri La”. The complex has a number of buildings including a small cottage homestead, rubbish dumps, fence lines, holding yards, remnants of an orchard, sheep dip and associated sheds which were once used for shearing and storage but are now in a derelict condition. Other areas that have been subject to occupation include the area known as “Gang Gang”, adjacent to Palmers Oaky Creek. In the 1960’s this area was partially cleared and a small house (cabin), storage sheds and garages were constructed. Sheep were grazed in the area and holding yards were also erected. Only the holding yards and timber race remain along with the footings of various structures and tanks stands as well as discarded building materials. The cottage was occupied up until 1974 when it was destroyed by a fire.

There is evidence that other areas of the reserve were used for grazing and possibility limited agricultural/pastoral production. The reserve was used as a source of Black Wattle bark, used for tanning leather, up until the 1930’s and for the harvesting of Eucalyptus leaves for the extraction of oils until the late 1950’s. In the northern end of the reserve (Mount Horrible area) it was an annual practice up until the 1960’s to regularly burn the vegetation in winter to provide “green pick” for stock during spring. The creek flats around Shangri La homestead may have also been used for cropping as well as grazing. Evidence of grazing and ringbarking can be found in the

south-western corner of the reserve. Fencelines and holdings yards were established along ridges near the western boundary.

Fifty-four historic sites have been recorded within Winburndale Nature Reserve made up of four mining complexes, forty mining elements, one building complex, eight buildings elements (includes fences/yards) and two survey trees.

2.4 PUBLIC USE

From Bathurst access to the northern section of the reserve can be gained via Limekilns and Mount Horrible Road's and then along either Eskdale Road or Palmers Oaky Trail. The eastern section of the reserve can be reached from the Great Western Highway along the Sunny Corner Road and then along a number of public roads (West Mitchell Road, Cupitts Lane, Eskdale Road and Dark Corner Road) through Sunny Corner and Turon State Forests. Access to the southern section of the reserve can also be gained from the Great Western Highway along Yetholme Drive via a number of public roads through Sunny Corner State Forest. Most of the western boundary of the reserve and areas adjacent to Winburndale Dam can only be accessed through gated trails within the reserve or through private property or land owned by Bathurst Regional Council, which is often gated and locked. The trails within the reserve are for management purposes and not available for public vehicle access.

Since gazettal in 1967, Winburndale Nature Reserve has been used occasionally by tertiary and secondary educational institutions. Students from various universities have used the reserve to study geology, geography, lithology and soils while local high schools have been known to occasionally use the park for camping or navigation (orienteering/map reading skills) exercises.

Winburndale Nature Reserve is also used infrequently for walking by both small groups (1–5 individuals) and larger groups from established walking clubs such as the Central West Bushwalking Club. Generally, walkers use the management trails, and they occasionally camp in the reserve although no fires are permitted.

Given the low use of the reserve for walking it is neither practical nor desirable to construct and maintain walking tracks within the reserve. However, it is intended to develop a guide (in consultation with walking clubs) that will outline a number of suggested walking routes through the reserve including a north-south walking route. It is envisaged that these routes will use a combination of management trails and natural features of the reserve's landscape. The routes will incorporate prominent features (ie lookouts, rock formations or vegetation communities) along the way.

Cycling (mountain bike riding) occasionally occurs on management trails but this activity appears to be even less frequent than walking. There is no known demand for horse riding and this activity will not be permitted within the nature reserve in accordance with NPWS policy.

The low level of recreational use of the reserve can be attributed to not only the reserve's rugged and steep terrain but also its proximity to other parks with established visitor facilities such as the Blue Mountains and Kanangra Boyd National Parks. The nearby Turon National Park also provides opportunities for walking, camping (campfires), cycling, four-wheel driving and river access.

2.5 THREATS TO RESERVE VALUES

2.5.1 Introduced Plants

Although there are number of introduced plant species occurring within the reserve the species' of most concern are Blackberry *Rubus fruticosus*, Sweet Briar *Rosa rubiginosa*, Gorse *Ulex europaeus*, St Johns Wort *Hypericum perforatum*, Serrated Tussock *Nassella trichotoma* and Willow *Salix spp*. The invasive nature of these noxious plants and the fact that they compete with native species requires their continued management and suppression.

Until 1996 weed control programs were focused in the Clear Creek – Shangri La homestead area of the reserve and concentrated on the control and removal of blackberry and serrated tussock. After this period annual weed control programs have been implemented on the reserve with the main emphasis on the control of Blackberry, Serrated Tussock and St Johns Wort. Extensive programs for the control of Blackberry have occurred in the Palmers Oaky Creek, Lagoon Creek and Clear Creek areas of the reserve. A desired outcome is to restore riparian areas (in particular) along the Winburndale Rivulet to its natural condition by removing invasive species such as Blackberry, Gorse and Willows.

The cleared land at the southern end of Markwicks Trail will need continued assessment and introduction of control programs to address the expected increase of weeds likely to occur since grazing has been withdrawn from the area. In addition, the recent Mount Horrible additions will also require a substantial commitment of resources and extension of existing control programs (ie fox baiting and weed spraying).

Three areas of plantation pines, totalling 19.5ha, are within the boundaries of the reserve. These areas are in the Gulf Boundary Road area (0.9ha), Bicycle Track area (17.2ha) and Mount Schofield area (1.4ha) and were planted out to pine in 1966, 1969 and 1970 respectively. Wildlings from these plantations and from neighbouring plantations are also of concern, as is the spread of Gorse and Blackberry into the reserve from the adjoining Sunny Corner State Forest.

2.5.2 Introduced Animals

Seventeen species of introduced animals have been recorded in the reserve, consisting of nine mammals (Pig, Goat, Cat, Fox, Wild Dog, Rabbit, Brown Hare, Black Rat and House Mouse) and eight species of birds (Mallard, Rock Dove, House Sparrow, Common Starling, Eurasian Skylark, Eurasian Blackbird, Common Myna and European Goldfinch).

Since 1987 an aerial culling program has occurred within the reserve and to date more than 360 goats and a number of feral pigs have been culled from the reserve.

A pig control program has been established and can be activated on an as needs basis (for either live trapping/shooting or 1080 poisoning) if pig activity increases in a particular area.

The control of Blackberry throughout the reserve has had a substantial impact on the pig population as it has removed "harbours" used by pigs for shelter and breeding and has to date resulted in a dramatic decline of pig numbers.

A cooperative fox baiting program with adjoining neighbours was first conducted in 1994 and was further consolidated when the Palmers Oaky Pest Animal Group (POPAG) formerly the Palmers Oaky Feral Dog Association, was established in 1996.

A regular mound baiting program using pre-prepared 1080 baits is generally conducted twice annually in April/May and Sept/October. At present, 104 bait stations have been established along approximately 27kms of firetrails within the reserve. Determining the actual number of foxes/dogs killed is difficult however, based on the amount of poisoned 1080 baits taken between May 1994 and May 2004 up to 2,915 foxes have been removed from the reserve.

2.5.3 Fire Management

Although knowledge of wildfires within the reserve date back to 1909, and in particular the 1940's, it was not until the 1950's when fires were first mapped and even later still (1970's) when more detailed and accurate fire records started to be kept.

Since the reserve was gazetted in August 1967 only six wildfires are known to have occurred on the main part of the reserve. However, if lands that are now included within the current boundaries of the nature reserve are considered, then the reserve has been subject to at least twenty-one known fires between 1909 and July 2004. A large percentage of these fires were caused from lightning strikes, with many burning an area of less than 1 hectare.

Even though the reserve receives numerous lightning strikes during the fire season, the incidence of wildfire caused by lightning remains low. Lightning is the major cause of wildfires in the reserve and the most recently recorded wildfire occurred in the McCanns Gully area in September 2004 and burnt an area of less than 3 hectares within the nature reserve.

Prior to the 1940's it was common practice for landowners in the Mount Horrible section of the reserve to regularly burn this area. This practice provided a dual purpose of both mustering the wandering sheep as well as encouraging green pick for grazing later in the year. A large amount of mill quality timber was also taken from along Eskdale Road during this period. According to neighbours, in the early 1950's when logging finished and the regular grazing and burning practices ceased, there was a dramatic increase in the density of timber in this area.

A provisional Fire Management Plan for the reserve was developed during the 1970's and broadly outlined fire histories, fire policies existing at the time, a Fire Action Plan, works programs, fire suppression, training, communications, public relations and prescribed burning. Since this time a variety of fire plans have been developed by Whittingham (1981), and Gellie and DeGovrik (1987). The most recent plan, a draft Fire Management Plan for Winburndale Nature Reserve NPWS (2000), prepared by Amanda Bryant and Allan Goodwin, is currently being used as a reference source for fire management planning within the reserve.

The preparation of a new Fire Management Strategy, in line with current standards and legislation, commenced in December 2005 with a final plan (Type 2 Fire Management Strategy) for completion by the end of 2007. The plan will aim to achieve fire regimes that maximise biodiversity and provide asset protection for the adjoining Forests NSW pine plantations. Between April 1971 and May 2004, twenty fuel reduction burns have occurred within the nature reserve, the most recent being a 1000ha ecological burn along the western boundary of the reserve.

It is believed that the first trails in the reserve were constructed in January 1959 and there are currently 30 designated management trails within the reserve. This equates to approximately 77 kms of management trails that require regular maintenance to ensure that access trails are maintained to a suitable standard for management and fire fighting purposes. Generally the majority of the management trail network remains in a reasonable condition, however, there are

a number trails throughout the reserve that require more regular and often annual maintenance due to their steep grades.

Although a small northern section of the reserve is located within the local government area of Lithgow City, the reserve is generally within the area administered by the Bathurst Regional Council area (which now incorporates the previous Evans Shire) and as such falls under the jurisdiction of the Chifley Zone Bush Fire Management Committee (CZBFMC). A NPWS representative attends the CZBFMC and is also an Executive member of this committee. Where and when possible staff attend local RFS brigade annual general meetings and may attend regular brigade meetings if invited.

2.5.4 Inappropriate Uses

In 1980 Telecom (now Telstra) installed an underground cable along the Mount Horrible Road from Limekilns to Palmers Oakey. With the recent addition of land to the northern end of the reserve, a large portion of this cable route now occurs within the nature reserve. In many locations the rehabilitation of the trench line has been ineffective and the majority of the route still remains denuded of vegetation. In some instances the route has been used by unauthorised vehicles and is now subject to erosion. The route needs to be formally closed and gated in order to help restrict access and eliminate activities such as the collection of firewood, the abandonment of cars and the dumping of rubbish. Telstra will be approached regarding a suitable licence agreement for the cable route.

Vehicular use of the reserve's management trails is only permitted for authorised reserve management activities. However, the proximity of the reserve to lands owned by Forests NSW where there is unrestricted and unregulated access has led to a number of inappropriate activities occurring on the reserve including motor bike riding, pig dogging/hunting and four-wheel driving.

Illegal firewood collection continues within the reserve, especially where boundary delineation between Forests NSW lands and NPWS lands are indistinct or where "common and unfenced" boundaries occur (ie Turon and Sunny Corner SF). This is particularly the case along Eskdale Road and Boundary Trail. Forests NSW currently issue a licence for timber collection on their lands, however, the licensing and collection system is not regularly policed or enforced. Developing a joint management agreement with Forests NSW for Turon and Sunny Corner State Forests along with increased patrols and signposting may help to control this and other undesirable activities.

Where approval was previously granted for use of management tracks to gain access to neighbouring freehold lands there is a need to determine if formal access is still necessary and update these consents with licence agreements under the *National Parks and Wildlife Act 1974*.

A number of other boundary issues need to be addressed along the Mount Horrible Road where previous road construction has isolated small portions of lands, generally owned by private individuals. It may be advantageous for the NPWS to acquire these parcels of land or to negotiate strategic land swaps in the same area, however this issue will require further investigation to determine its conservation and operational merits.

3. MANAGEMENT ISSUES AND STRATEGIES

Current Situation	Desired Outcomes	Strategies	Priority
Geology, Soil and water conservation			
Apart from the Telstra cable route and two gravel (borrow) pits that directly adjoin the Mount Horrible section of the reserve (and are respectively owned by Bathurst Regional Council and Lithgow City Council), there are no known soil erosion or water quality problems that need to be specifically addressed at this time.	Soil erosion is minimised and the quality of water within Clear Creek, Gulf Stream and Winburndale Rivulet remains healthy.	All works and activities will be undertaken in a manner that minimises erosion and water pollution and reduces any further impact on fossils bed locations.	High
		Liaise with local authorities and neighbours to maintain and improve water quality in the reserve's catchments.	Low
A number of existing firetrails have been constructed within areas that contain fossilised rock deposits. These trails are essential for fire and park management purposes and have been strategically constructed along ridgelines which, tend to coincide with the occurrence of fossils. No alternatives are available for relocating these trails. Although fuel management activities will also occur in areas known to have fossilised rock deposits they will have a negligible impact on these sites.	The Telstra cable line and two gravel pits to be sympathetically rehabilitated.	Test and monitor water quality on an annual basis and establish permanent sampling sites.	Low
		Liaise with Telstra and the local government areas of Bathurst and Lithgow to implement a rehabilitation program for areas under their administration.	Low
	Areas with known fossil beds will be protected from new developments or activities.		

Current Situation	Desired Outcomes	Strategies	Priority
Native plant and animal conservation A number of threatened flora and fauna species have been recorded in the reserve. Limited data is available on these populations and future surveys may find other threatened species. Prior to gazettal, the northern end of the reserve (Mount Horrible, Palmers Oaky and Gang Gang) had been subject to regular grazing and burning practices. Likewise land in the Goulds Creek area that had been subject to ringbarking activity was added to the reserve in 1993 and was subject to grazing up until 2003. Although habitat for the Endangered Purple (Bathurst) Copper Butterfly has been recorded from two locations in the reserve, limited knowledge exists as to the extent (distribution and abundance) of these populations. Conservation of vegetation on neighbouring lands that surround the reserve would increase the value of the reserve and provide wildlife corridors	All existing native plant and animal species and communities are recorded and conserved. Biodiversity and habitat values are restored in areas subject to past land management practices.	Undertake a flora survey (including GIS mapping) for the Mount Horrible additions Undertake a survey for threatened plant species Undertake a fauna survey (including threatened fauna) Implement measures included in approved recovery plans, especially for the Purple (Bathurst) Copper Butterfly Monitor vegetation recovery near Goulds Creek and implement a restoration or rehabilitation program if required. Work with neighbours and vegetation management committees to encourage conservation of remnant native vegetation in the vicinity of the reserve	High Medium Medium High Low Low

Current Situation	Desired Outcomes	Strategies	Priority
Introduced species			
Programs to control introduced plants and animals occur on an annual basis throughout the reserve.	That the impact of introduced species on native species and neighbouring lands is minimised.	Control and where possible eradicate introduced plant species. Priority will be given to the control of Blackberry, Serrated Tussock, Gorse, Willows and St Johns Wort, especially within riparian zones and in particular along Winburndale Rivulet.	High
	Ensure the restoration of riparian areas through the development of partnerships and programs with relevant land management agencies and stakeholders.	Control introduced animal species. Priority will be given to the control of foxes, pigs and goats. Continue to undertake baiting programs for foxes and aerial culling of goats.	High
		Seek the cooperation of other authorities and neighbours in implementing weed and pest animal control programs for biodiversity outcomes.	High
		Prepare a pest management plan for the reserve by end 2007.	High
		Monitor noxious and significant environmental weeds and feral animal activity (pigs) and manage any new outbreaks.	Medium
		Remove exotic species (pines and fruit trees) from the north-eastern portion of the Mount Horrible additions.	Low
		Implement weed control programs in the Goulds Creek area	Low

Current Situation	Desired Outcomes	Strategies	Priority
Fire management Fire is a natural feature of the environment of the reserve and is essential to the survival of some plant communities. Frequent or regular fire can cause loss of particular plant and animal species and communities, as can too infrequent fires. Fire can also damage cultural heritage features and fences and threaten neighbouring land. Since 1967 there have only been six "on park" wildfires recorded on the reserve. However, since 1909 the total number of "known" wildfires that that have occurred on the area that now forms part of the nature reserve is 21, the majority starting from lightning strikes. Twenty fuel reductions burns have occurred on the reserve, the majority being conducted to protect the Forests NSW assets (Softwood Pine Plantations) adjoining the eastern and southern parts of the reserve. A large percentage of the reserve is classified as long unburnt (an adverse fire regime) and exceeds the "recommended" fire frequency thresholds for these vegetation communities, apart from subalpine communities where fire should be excluded. If this situation is not addressed there is expected to be a decline in biodiversity and conservation values within the reserve.	Life, property and natural and cultural features and values are protected from bushfire. Fire regimes are appropriate for conservation of plant and animal communities and enhance biodiversity in accordance with fire interval guidelines for broad vegetation types.	Continue to participate in Chifley Zone Bush Fire Management Committee. Maintain coordination and cooperation with Rural Fire Service brigades, State Forests and neighbours with regard to fuel management and fire suppression. Suppress all unplanned fires in the reserve ASAP. Use prescribed fire to protect assets and enhance/promote biodiversity values. All fuel reduction burning will be preceded by an assessment of environmental impacts. Prepare a fire management strategy for the reserve by end 2007. Encourage further research into the ecological effects of fire in the reserve.	High High High High High Low

Current Situation	Desired Outcomes	Strategies	Priority
Cultural heritage Limited knowledge is available regarding the traditional use of the reserve and the relative significance or value of existing Aboriginal sites. The majority of recorded sites include modified (scarred) trees and scattered artefact sites. The reserve was subject to mining during the late 1880's especially along Palmers Oaky Creek and Lagoon Creek, and a large number of mining related sites have been recorded in the reserve. Shangri La homestead (ruins) adjacent Clear Creek is the most extensive habitation site known to exist in the reserve. This property was most likely used for grazing and limited pastoral activity.	Aboriginal and historic features and values are identified and protected. Aboriginal people are involved in management of the Aboriginal cultural values in the reserve. Understanding of the cultural significance of the reserve is improved.	Continue to record new Aboriginal sites in the Aboriginal Heritage Information Management System (AHIMS). Consult and involve the Bathurst Local Aboriginal Land Council, the Wiradjuri Elders group and other relevant Aboriginal community organisations in the management of the reserve. Continue to record new historic sites in the Historic Heritage Information Management System (HHIMS). Undertake a targeted and stratified cultural heritage survey. Undertake a cultural heritage assessment of the Shangri La homestead area and associated buildings and structures with a view of managing the area as a ruin site. All known survey (portion marker/boundary) trees will be located and their condition assessed every three years. All other remaining historic sites related to gold mining, pastoral, grazing or agricultural activities, occupation sites and boundary fence lines, will be left in situ and no active management of these sites will occur. Encourage further research into the Aboriginal and historic heritage values of the reserve.	Medium Medium Medium High Medium Low Low Low

Current Situation	Desired Outcomes	Strategies	Priority
Visitor use			
There are no visitor facilities within the reserve. The reserve is used on a limited basis by walkers and to a lesser extent for camping and mountain biking. Most activities occur along the management trail network. Given the significant scenic and landscape value of the reserve it is important that these and other conservation values are not diminished through inappropriate recreational activities.	No designated or formalised walking tracks or other facilities to be constructed Define a number of acceptable walking routes through the reserve using reserve attributes and features Develop improved community awareness of the values the reserve contains	Bushwalking and remote bush camping will continue to be permitted within the reserve. Bush camping will only be permitted more than 200m away from any road or management trail. Wood (solid fuel) fires will be prohibited throughout the reserve. Mountain biking (cycling) will continue to be permitted but is restricted to roads and management trails only. Develop, in conjunction with walking clubs a brochure outlining a number of acceptable (low impact) walking routes through the reserve. Promote adjacent areas such as Turon River NP for recreational activities (camping and campfires) to reduce the impact on the nature reserve. Gain a better community understanding and appreciation of the reserve by promoting the conservation values of the reserve to help ameliorate damaging visitor use and activities.	Medium High Medium Medium Medium Low

Current Situation	Desired Outcomes	Strategies	Priority
Research Further research will improve understanding of the reserve's natural and cultural heritage, the processes that affect them and the requirements for management of particular species. Priority areas for research are the Purple (Bathurst) Copper Butterfly, other threatened plants and animals, pest and fire management (in particular post burn monitoring of communities following an ecological burn).	Research enhances the management information base and has minimal environmental impact.	Undertake and encourage research to improve knowledge and management of natural and cultural heritage.	Low
Neighbour relations There are 26 adjoining neighbours, with the largest landowner being Forests NSW that manage Sunny Corner and Turon State Forests that run north south along the eastern boundary of the reserve. Another major neighbour is Bathurst Regional Council who manages Winburndale Dam, which is surrounded by the reserve.	Develop and encourage (where possible) environmental and ecologically sustainable management practices with surrounding landholders.	Encourage adjoining landowners to manage lands for biodiversity outcomes and develop a Memorandum of Understanding (MOU's) with both Forests NSW and Bathurst Regional Council to achieve desired management and ecological outcomes.	Low

Current Situation	Desired Outcomes	Strategies	Priority
Management operations A number of management trails exist (see Reserve Map) which provide access for management purposes such as fire management, weed management and feral animal control. All trails have locked gates to prevent unauthorised access. All boundary fencing matters to be dealt with under DEC fencing replacement policies. Plain wire fencing is preferred over netting, ringlock and hingejoint fences. This style of fence does not accumulate litter or debris. Unlike other fence material, a plain wire design is not subject to frequent damage by native animals that create concentrated access points into the reserve that can be used by domestic stock. Signposting is located throughout the reserve generally along key boundaries location with neighbours or stakeholders, along sections of public roads and at all gates and track nodes. There are currently no signs identifying that the Mount Horrible area is now part of the reserve. A number of boundary alignment issues exist, including some areas on the reserve that have been planted to pine or in other areas where neighbours have approached the NPWS to resolve historic boundary management issues. Continue to update access consents to licence agreements in accordance with the Access to Inholdings Policy and formalise arrangements with Telstra for the Mt Horrible cable route.	To ensure that access trails are maintained in a trafficable condition for management purposes only. To restrict public vehicle access and inappropriate activities. To limit domestic stock entering the reserve. Ensure new areas have reserve boundary and trail signs installed. All areas planted to pine are removed from the reserve. All agreements are based on current policies and licence agreements. All boundary alignment issues are investigated and where possible area amicably resolved.	Continue to maintain the existing management access network (firetrails) in line with fire management policies and other works priorities across then reserve and Region (see Reserve Map). Continue to upgrade, install or replace gates and fences throughout the reserve and relocate a number of existing gates and fences to more strategic positions to avoid the need for elaborate and costly fencing along our boundary. Continue to process boundary fencing applications on a case by case basis in line with other Regional fencing priorities. Replacement boundary fencing will be constructed of plain wire only. Continue to upgrade and replace signposting throughout the reserve in accordance with NPWS standards with a priority being the Mount Horrible section. Resolve encroachment issues by transferring lands that have been planted with pine to Forests NSW. This will need to be instigated by revocation of lands through appropriate means such as a boundary readjustments (inclusion in the Adjustment of Areas Bill) and then either by sale of the land concerned or by a land swap with Forests NSW. The latter being compensatory habitat considered to be of high conservation value by the NPWS. Resolve boundary alignment issues with neighbours along Mount Horrible Road. Update the access consent for the Penrith Ridge Trail and develop a licence agreement (Telecommunications Facilities (Cables and Lines) Licence) with Telstra for section of the Mount Horrible cable route that occurs within the reserve.	High High Medium High High Low Medium

High priority activities are those imperative to achievement of the objectives and desired outcomes. They must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.

Medium priority activities are those that are necessary to achieve the objectives and desired outcomes but are not urgent.

Low priority activities are desirable to achieve management objectives and desired outcomes but can wait until resources become available.

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