



Plan of Management



Gunning Reserves:

Incorporating Bango Nature Reserve,
Oakdale Nature Reserve,
Mcleods Creek Nature Reserve and
Belmont State Conservation Area

**Gunning Reserves Plan of
Management:
Incorporating Bango Nature Reserve,
Oakdale Nature Reserve, Mcleods
Creek Nature Reserve and Belmont
State Conservation Area**

NSW National Parks and Wildlife Service

May 2013

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This plan of management was adopted by the Minister for the Environment on the 5 May 2013.

Acknowledgements

The NSW National Parks and Wildlife Service (NPWS) acknowledges that the Gunning Reserves are in the traditional Country of the Pajong (Gundungurra speaking), Ngambri (Walgalu speaking) and Wailabalooa (Ngunnawal speaking) people.

This plan of management is based on a draft plan prepared by the staff of the Southern Ranges Region of NPWS, part of the Office of Environment and Heritage. NPWS would like to thank those people who took the time to make a submission on the draft version of this plan.

For additional information or any inquires about these reserves or this plan of management, contact the NPWS Queanbeyan Area Office at 11 Farrer St, Queanbeyan NSW 2620 or by telephone on (02) 6229 7166.

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Foreword

The four Gunning Reserves have a combined area of 885 hectares. They comprise Bango, Oakdale and Mcleods Creek nature reserves and Belmont State Conservation Area, and are located south and west of Gunning in the Southern Tablelands of NSW.

The Gunning Reserves contain a number of significant vegetation communities and species, including two endangered ecological communities, one threatened plant species and eight threatened animal species. Another threatened plant has been translocated into one of the reserves with the aim of establishing additional populations of this species, while there is potential for two additional threatened animals to be present. There are also two historic trig markers dating from the late 1880s within the Gunning Reserves as well as Aboriginal sites.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve and state conservation area. A draft plan of management for the Gunning Reserves was placed on public exhibition from 9 September until 12 December 2011. The submissions received were carefully considered before adopting this plan.

The plan contains a number of actions to achieve the *NSW 2021* goal to protect our natural environment, including strategies to assist the recovery of threatened species and ecological communities, monitoring of vegetation and control weeds and pest animals. The plan also allows for low-impact recreation, including walking, picnicking, cycling, bushwalking and bush camping.

This plan of management establishes the scheme of operations for Bango Nature Reserve, Oakdale Nature Reserve, Mcleods Creek Nature Reserve and Belmont State Conservation Area. In accordance with section 73B of the *National Parks and Wildlife Act* this plan of management is hereby adopted.

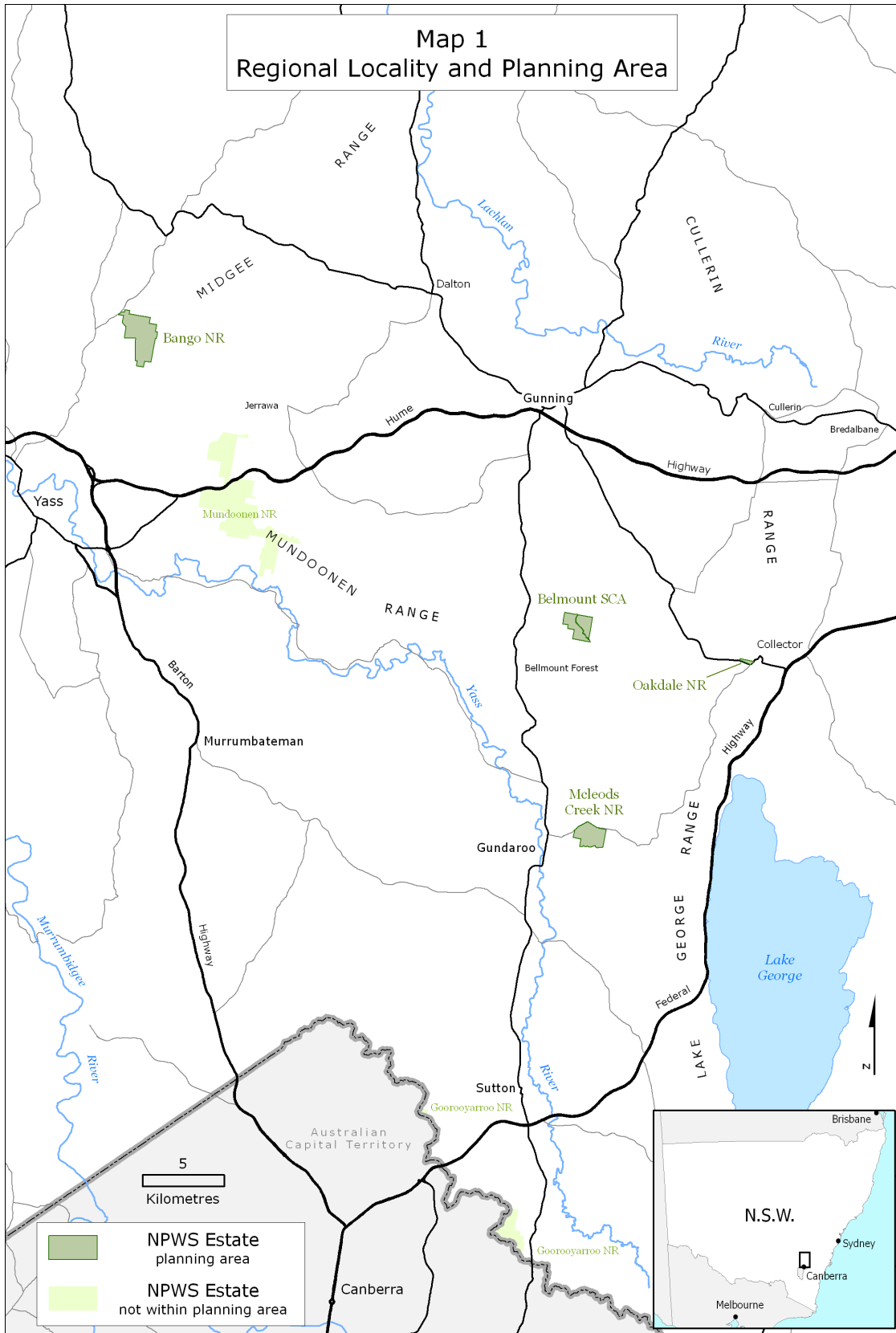


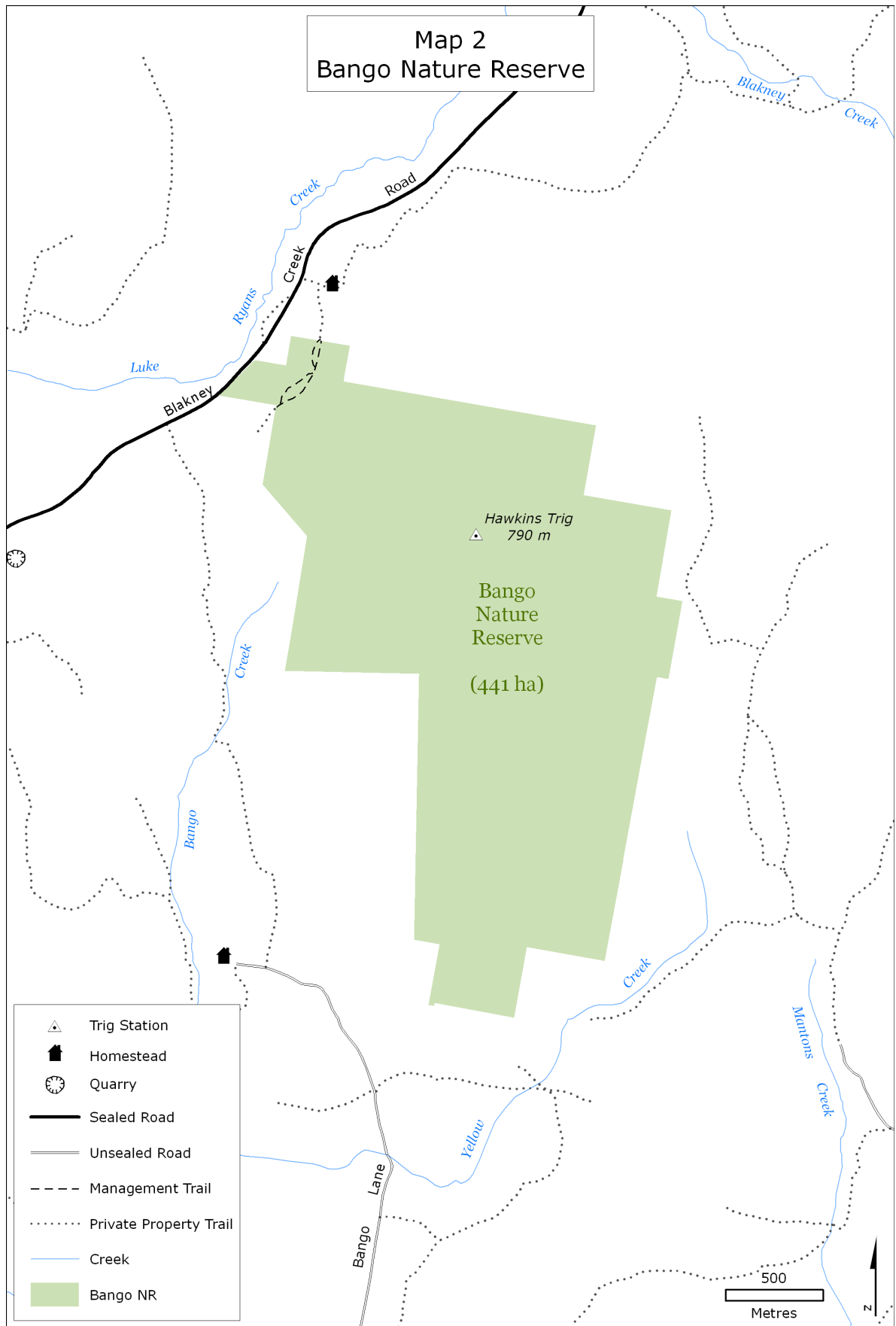
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Minister for the Environment

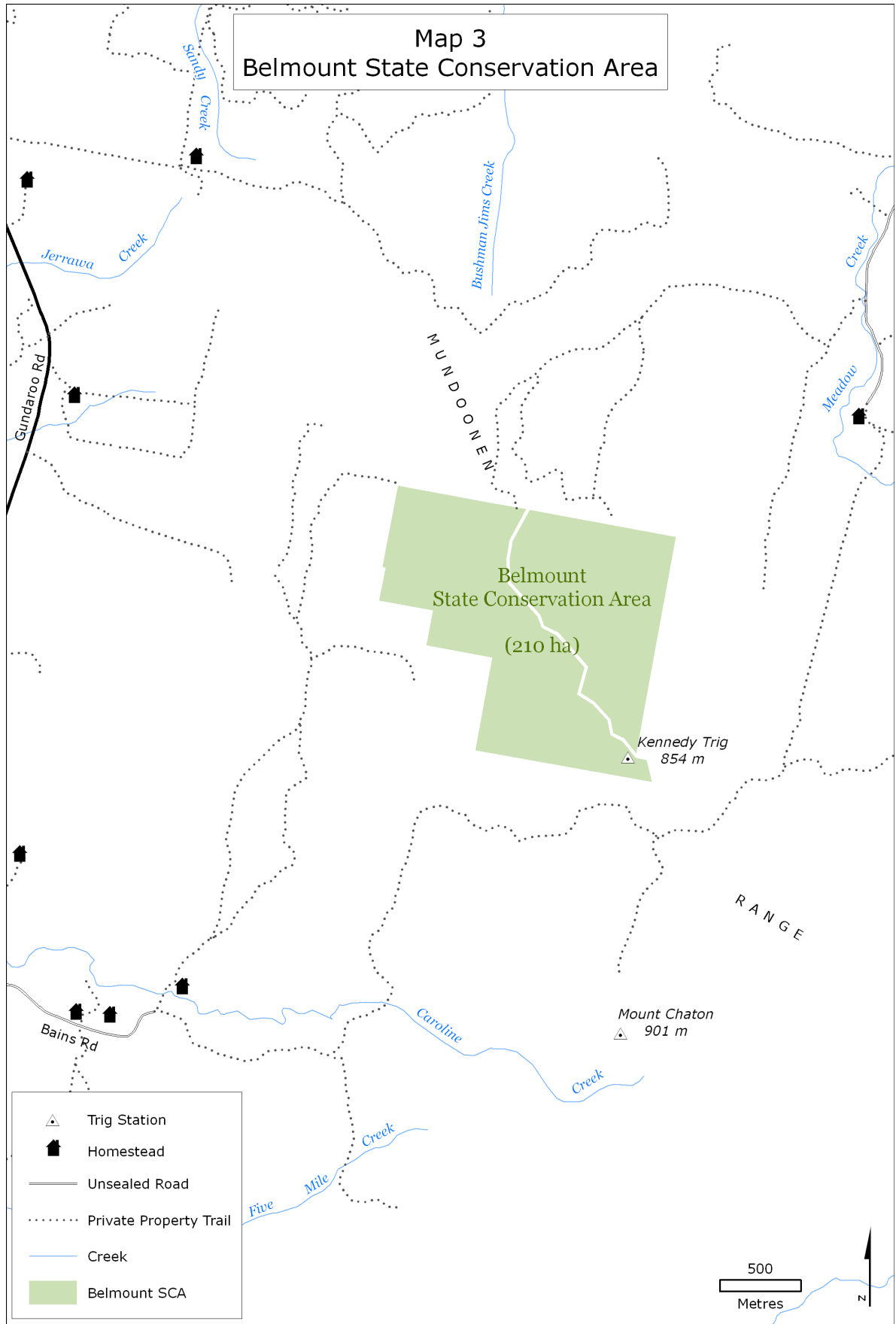
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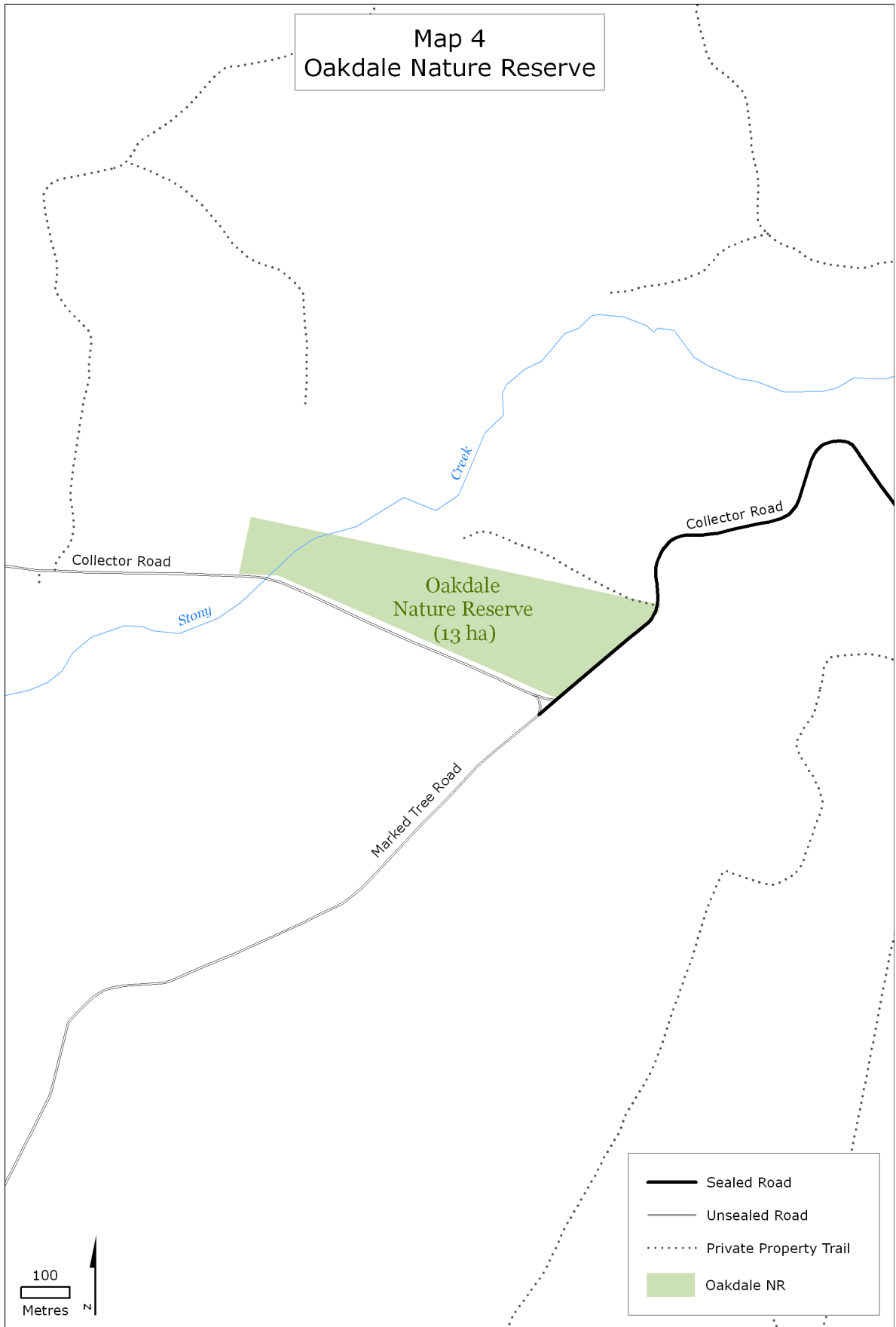
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Maps of Gunning Reserves

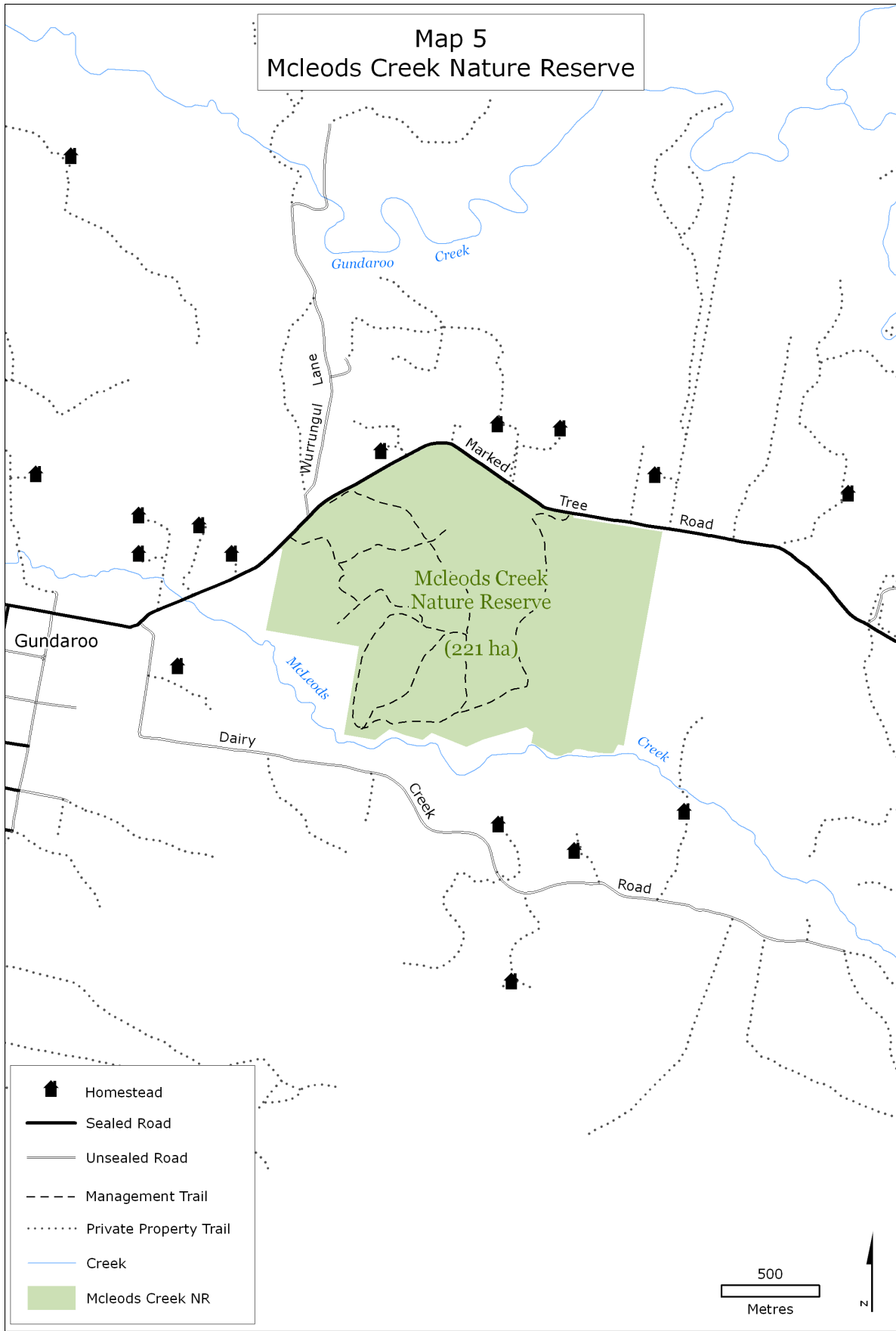








Map 5 McLeods Creek Nature Reserve



1. Location, gazettal and regional context

The Gunning Reserves are a complex of four reserves located south and west of Gunning in the Southern Tablelands of New South Wales (see Maps 1–5). They are, in a general progression from south to north: Mcleods Creek Nature Reserve, Oakdale Nature Reserve, Belmont State Conservation Area and Bango Nature Reserve. They cover a combined area of 885 hectares. They are collectively referred to as ‘the Reserves’ in this plan of management.

Mcleods Creek Nature Reserve (NR) (221 hectares), Oakdale NR (13 hectares), Belmont State Conservation Area (SCA) (210 hectares) and Bango NR (441 hectares) were reserved in August 2010. All were previously areas of Crown land recommended for addition to the protected area system as a result of the Goulburn Comprehensive Regional Assessment to enhance the protection of a number of significant vegetation communities in this poorly conserved region.

The Reserves lie within the South Eastern Highlands Bioregion, one of the 85 bioregions defined in Australia on the basis of common vegetation and land systems. Over 58 per cent of the South Eastern Highlands Bioregion has been cleared for agriculture and development, while less than 10 per cent lies within conservation reserves.

The Reserves are separated by up to 40 kilometres and generally lie to the south-east of the nearest existing reserve which is Mundoonen NR. The nearest large reserves are Tallaganda National Park (40 kilometres to the south-east) and Brindabella National Park (45 kilometres to the south-west).

Bango and Mcleods Creek NRs are within the Yass Valley Local Government Area. Oakdale NR and Belmont SCA are within the Upper Lachlan Local Government Area.

Bango NR and Belmont SCA lie within the boundaries of the Onerwal Local Aboriginal Land Council while Mcleods Creek NR is within boundaries of the Ngambri Local Aboriginal Land Council and Oakdale NR is within the boundaries of the Pejar Local Aboriginal Land Council. Bango NR is within the Lachlan Catchment Management Authority while the remaining reserves are within the area of the Murrumbidgee Catchment Management Authority.

The Reserves are within the geographical area of the Tablelands Livestock Health and Pest Authority, apart from Mcleods Creek NR which is in the South East Livestock Health and Pest Authority district.

2. Management context

2.1 Legislative and policy framework

The management of nature reserves and state conservation areas in New South Wales is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act) and Regulation, the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the NSW National Parks and Wildlife Service (NPWS).

Other legislation, international agreements and charters may also apply to management of the area. In particular, the *Environmental Planning and Assessment Act 1979* may require assessment and mitigation of the environmental impacts of any works proposed in this plan. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) also applies in relation to actions that may impact migratory and threatened species listed under that Act.

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 Mcleods Creek Nature Reserve, Oakdale Nature Reserve, Belmont State Conservation Area and Bango Nature Reserve except in accordance with the plan. This plan will also apply to any future additions to these reserves. Should management strategies or works be proposed for these reserves or any additions that are not consistent with the plan, an amendment to this plan or a new plan will be prepared and exhibited for public comment.

2.2 Management purposes and principles

2.2.1 Nature reserves

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

Under the Act (section 30J), nature reserves are managed to:

- conserve biodiversity, maintain ecosystem functions, and protect geological and geomorphological features and natural phenomena
- conserve places, objects, features and landscapes of cultural value
- promote public appreciation, enjoyment and understanding of the reserve's natural and cultural values
- provide for appropriate research and monitoring.

Nature reserves differ from national parks in that they do not have the provision of recreation as a management principle.

2.2.2 State conservation areas

State conservation areas are reserved under the NPW Act to protect and conserve areas that contain significant or representative ecosystems, landforms or natural phenomena or places of cultural significance; that are capable of providing opportunities for sustainable visitor or tourist use and enjoyment, the sustainable use of buildings and structures, or research; and that are capable of providing opportunities for uses permitted under other provisions of the Act.

Under the Act (section 30G), state conservation areas are managed to:

- conserve biodiversity, maintain ecosystem functions, protect natural phenomena and maintain natural landscapes

- conserve places, objects and features of cultural value
- provide for the undertaking of uses permitted under other provisions of the NPW Act (including uses permitted under section 47J such as mineral exploration and mining), having regard to the conservation of the natural and cultural values of the state conservation area
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of the area's natural and cultural values and with uses permitted in the area
- provide for sustainable use (including adaptive re-use) of any buildings or structures or modified natural areas having regard to conservation of the area's natural and cultural values and with other uses permitted in the area
- provide for appropriate research and monitoring.

The NPW Act requires a review of the classification of state conservation areas every five years in consultation with the Minister administering the *Mining Act 1992*. In the long term it is intended for Belmont SCA to become a nature reserve. Accordingly the management principles applying to nature reserves will be applied as far as possible to the state conservation area in the interim.

2.3 Statement of significance

The Gunning Reserves are considered to be of significance for:

Biological values

- The Reserves protect a number of significant vegetation communities in this poorly conserved region, the White Box – Yellow Box – Blakely's Red Gum (Box-Gum) Woodland Endangered Ecological Community (EEC) which is listed under both the TSC and EPBC Acts; the Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC, which is listed under the TSC Act; and the Natural Temperate Grassland of the Southern Tablelands of NSW and ACT EEC, which is listed under the EPBC Act. One plant and eight animal species listed under the TSC Act have been recorded in the Reserves.

Landscape/Catchment values

- The Reserves are important vegetated remnants within a landscape that has been extensively cleared for agriculture.

Aboriginal heritage values

- A scarred tree was located in Mcleods Creek NR and other sites are likely to occur within the Reserves.

Historic heritage values

- The Hawkins Trig in Bango NR (established by Department of Lands in 1887) and the Kennedy Trig in Belmont SCA (established in 1886) consist of substantial stone cairns with metal trig markers.

2.4 Specific management directions

In addition to the general principles for the management of nature reserves and state conservation areas, management of the Gunning Reserves will focus on the following:

- Protection of the range of plant and animal communities within the Reserves, with particular attention to minimising further fragmentation, and the maintenance of populations of threatened or regionally significant species and communities.
- Restoration of the composition and structural complexity of the vegetation communities in Mcleods Creek and Oakdale NRs.
- Protection of Aboriginal cultural values in consultation with the local Aboriginal community.

- Cooperation with the NSW Rural Fire Service and the local community regarding fire management activities and fire suppression in the Reserves.
- Control of introduced plant and animal species, including through cooperative programs with neighbours and the Livestock Health and Pest Authorities.
- Encouragement of appropriate use of the Reserves.

3. Values

The location, landforms and plant and animal communities of an area have determined how it has been used and valued. Both Aboriginal and non-Aboriginal people place values on natural areas, including aesthetic, social, spiritual and recreational values. These 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 values. For reasons of clarity and document usefulness, various aspects of natural heritage, cultural heritage, threats and ongoing use are dealt with individually, but their interrelationships are recognised.

3.1 Geology, landscape and hydrology

The Reserves lie in central eastern New South Wales in the eastern Lachlan Fold Belt. The area consists of Palaeozoic age sequences (Ordovician to Permian) overlain in part by Cainozoic age volcanic rocks (e.g. basalts) and sediments.

The Reserves are located within the Dalton Hills Landscape (NSW DECC 2008). This landscape is described as linear ranges and undulating hills on steep dipping, folded Ordovician quartzose, greywacke, slate, chert and phyllite. The soils derived from this landscape include red soils on the upper slopes, grading to harsh yellow clay subsoils with hard setting A horizons on the lower slopes.

Bango NR is an outlier on the Muddoonen Range. This range was formed by uplifting associated with the Lachlan Fold Belt. The Muddoonen Range contains large areas of undifferentiated Silurian aged volcanic rocks known as the Douro Group. These include fine to coarse rhyolitic to dacitic tuffs (rocks derived from the compacted ash of a volcano) and some sandstones, shales and interbedded limestones.

Belmont SCA and Muddoods Creek NR consist of undifferentiated sediments within the Adaminaby Group. These sediments formed in the Ordovician period and comprise sandstones, mudstones, shales, chert and quartzite.

Oakdale NR sits at the top of the east-facing Lake George fault scarp and consists of granitic soils from late Silurian period.

The Dalton–Gunning area is one of the more seismically active areas in Australia. Since 1886, over 20 earthquake epicentres have been recorded within the Dalton–Gunning area (McCue et al. 1989).

The Reserves vary from rolling hills (Muddoods Creek NR) to undulating ridges falling to drainage lines (Belmont SCA and Bango NR). The lowest elevation is 600 metres above sea level in Muddoods Creek NR and the highest elevation is 854 metres above sea level at Kennedy Trig in Belmont SCA. Bango NR and Belmont SCA contain steep and highly erodible land (vulnerable land) as designated under the *Native Vegetation Act 2003*.

Tributaries in Bango NR, Belmont SCA and Muddoods Creek NR drain into the Yass River, which forms part of the Murrumbidgee catchment. Oakdale NR contains Stony Creek which flows to Collector Creek. Gundaroo and Muddoods creeks have been designated as vulnerable land under the Native Vegetation Act. The upper tributaries of these creeks are contained within the Muddoods Creek NR.

3.2 Native plants

The region is characterised by a pattern of extensively cleared forest and woodland. Much of the remaining vegetation occurs in very small patches or as scattered trees. This fragmentation is largely the result of past clearing for agricultural purposes (Resource and Conservation Assessment Council 2002).

The Reserves contain some of the only substantial vegetated areas remaining in the region, protecting a number of key vegetation communities that are underrepresented within the reserve system.

The vegetation communities within the Reserves were mapped and described in 'Native Vegetation of the Southern Forests' (Gellie 2005). More recently, the vegetation mapping was validated by a consultant botanist (Miles 2010).

Table 1: Summary of vegetation communities within the Gunning Reserves

Reserve	Community	Dominant species	Structure	Geomorphology
Bango Nature Reserve	Tablelands Acacia/Grass/Herb Dry Forest	Canopy: <i>Eucalyptus bridgesiana</i> (apple box), <i>E. melliodora</i> (yellow box) Associated canopy: <i>E. cinerea</i> (Argyle apple) Understorey: <i>Acacia mearnsii</i> , <i>Microleana stipoides</i> var. <i>stipoides</i> , <i>Poa sieberiana</i> , <i>Lomandra</i> sp.	Open forest with grass/shrub understorey	Footslopes, creek gullies, lowland and flats
	Tablelands Dry Shrub/Tussock Grass Forest	Canopy: <i>E. macrorrhyncha</i> (red stringybark), <i>E. rossii</i> (scribbly gum) Understorey: <i>Daviesia leptophylla</i> , <i>Acacia gunnii</i> , <i>Brachyloma daphnoides</i> , <i>Joycea pallida</i> , <i>Poa sieberiana</i> , <i>Lomandra</i> sp.	Moderately tall forest with shrub/tussock grass understorey	Mid level to high rocky hills, slopes, footslopes, ridges and broad crests
Belmont State Conservation Area	Eastern Tablelands Dry Shrub Forest	Canopy: <i>E. sieberi</i> (silvertop ash), <i>E. dives</i> (broad leaf peppermint) Understorey: <i>Brachyloma daphnoides</i> , <i>Acacia gunnii</i> , <i>A. terminalis</i> , <i>Monotoca scoparia</i> , <i>Poa sieberiana</i>	Moderately tall forest with sparse understorey	Exposed slopes and ridges
	Tablelands Dry Shrub/Tussock Grass Forest	As per description for Bango NR; <i>E. mannifera</i> (brittle gum) is dominant in this location		Sheltered slopes
	Tablelands Acacia/Grass/Herb Dry Forest	As per description for Bango NR; <i>E. cinerea</i> is dominant in this location		

Reserve	Community	Dominant species	Structure	Geomorphology
Oakdale Nature Reserve	Tablelands Slopes Herb/Grassland/Woodland (includes Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC)	Canopy: <i>E. bridgesiana</i> , <i>E. pauciflora</i> (snow gum), <i>E. viminalis</i> (ribbon gum), <i>E. rubida</i> (candlebark), <i>E. dives</i> (broad leaf peppermint) Associated canopy: <i>Acacia melanoxylon</i> (blackwood) Understorey: <i>Themeda australis</i> (kangaroo grass), <i>Dichelachne micrantha</i> , <i>Lomandra filiformis</i> , <i>Schoenus apogon</i>	Woodland with tussock grasses	Upper ridge tops
Mcleods Creek Nature Reserve	Tablelands Dry Shrub/Tussock Grass Forest	As per description for Bango NR; <i>E. mannifera</i> is dominant in this location		Rolling hills
	Western Slopes Herb/Grass Woodland	Canopy: <i>E. macrorrhyncha</i> , <i>E. mannifera</i> , <i>E. melliodora</i> , <i>E. blakelyi</i> (Blakely's red gum) Understorey: <i>Microlaena stipoides</i> , <i>Austrodanthonia pilosa</i> , <i>Elymus scaber</i> , <i>Poa sieberiana</i>	Grassy woodland	Rolling hills
	Tableland Dry Grassy Woodland (includes White Box – Yellow Box – Blakely's Red Gum Woodland EEC)	Canopy: <i>E. melliodora</i> , <i>E. bridgesiana</i> Understorey: <i>Themeda australis</i> , <i>Austrodanthonia racemosa</i> var. <i>racemosa</i> , <i>Microlaena stipoides</i> , <i>Panicum effusum</i> , <i>Poa sieberiana</i>	Grassy Woodland	Rolling hills

Mcleods Creek NR contains White Box – Yellow Box – Blakely's Red Gum Woodland which is listed as an endangered ecological community (EEC) under both the TSC Act and the Commonwealth EPBC Act. This community is listed as White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland under the EPBC Act. Flora species located in these areas may meet the definition of the EEC, however, it is uncertain whether the areas containing these suite of species would be recognised as a distinct vegetation community or whether they are an ecotonal part of the broader vegetation mosaic, which would not be recognised as the EEC. Although locations are not currently known, there is the potential for this EEC to also occur in Bango NR, particularly on the lower slopes or in drainage lines. The *Threatened Species Priorities Action Statement* contains strategies for the recovery of EECs and threatened species. Actions to recover this community include pest and weed control using methods that do not disturb native species within the remnant, and the retention of fallen timber. There is a draft national recovery plan available for this community (NSW DECCW 2010b).

There is a small patch of Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory, listed under the EPBC Act, at Mcleods Creek NR. This occurs in a frost hollow within a drainage line in the westernmost section of the reserve. Threats to this community include deliberate plant introductions that are not found within this community, weed invasion, clearing and development, fertiliser application, trampling and grazing by domestic stock, inappropriate fire regimes, salinity and altered soil moisture. There is a national recovery plan available for this community (Environment ACT 2005).

Oakdale NR contains Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC. Threats to this community include climate change, clearing, fragmentation, fertiliser application, tree dieback, trampling and grazing by domestic stock, weed invasion and altered fire regimes.

The Yass daisy (*Ammobium craspedioides*) has been found in Bango NR. This species is listed as vulnerable under the TSC Act. Conservation strategies for the Yass daisy include no changes in land use that may affect populations, and weed control in and adjacent to populations.

The basalt peppercress (*Lepidium hyssopifolium*) is listed as endangered under the TSC Act. Three hundred and sixty plants have been translocated into Mcleods Creek NR, with the aim of establishing additional populations of this species that are self-sustaining with minimum management intervention. This activity is in accordance with the *Priority Action Statement* for this species.

Mcleods Creek and Oakdale NRs contain a diversity of flora species that are either intrinsically rare or declining in abundance in grassy ecosystem sites across the broader landscape in response to agricultural practices such as overgrazing, fertilisation and cultivation. The only known location of the large-fruit fireweed (*Senecio macrocarpus*) in New South Wales occurs on a property adjacent to Mcleods Creek NR.

The most significant threat to ecological condition in Oakdale and Mcleods Creek NRs is lack of regeneration of grassy woodland communities. Significant threats across all of the Reserves include burning of drought-stressed vegetation, competition from weeds, and impacts from feral animals.

3.3 Native animals

Preliminary surveys (Mills & Robertson 2010) suggest that the Reserves support a large variety of native fauna including 16 mammal species, 52 species of birds, 6 species of frogs and 10 species of reptile. Mammals found on the Reserves include the eastern grey kangaroo (*Macropus giganteus*), red-necked wallaby (*Macropus rufogriseus*), swamp wallaby (*Wallabia bicolor*), brush-tail possum (*Trichosurus vulpecula*), ringtail possum (*Pseudocheirus peregrinus*), wombat (*Vombatus ursinus*), echidna (*Tachyglossus aculeatus*), and five species of bat.

Table 2 details the eight threatened fauna species that are known to occur within the Reserves. These species are all listed as vulnerable under the TSC Act. The presence of threatened species identified during the surveys indicates the Reserves are valuable as habitat.

Table 2: Threatened fauna species known to occur within the Reserves

(Mills & Robertson 2010)

Common name	Scientific name	Bango NR	Belmont SCA	Oakdale NR	Mcleods Ck NR
Brown treecreeper	<i>Climacteris picumnus victoriae</i>				X
Diamond firetail	<i>Stagonopleura guttata</i>				X
Gang-gang cockatoo	<i>Callocephalon fimbriatum</i>	X	X	X	X
Powerful owl	<i>Ninox strenua</i>		X		
Scarlet robin	<i>Petroica boodang</i>	X	X		X
Speckled warbler	<i>Pyrrholaemus sagittatus</i>				X
Superb parrot	<i>Polytelis swainsonii</i>				X
Varied sitella	<i>Daphoenositta chrysoptera</i>	X			

There is a high degree of probability that the golden sun moth (*Synemon plana*) occurs in Mcleods Creek NR, as it is known to occur in an adjacent property with similar habitat values. There is also potential for this species to be found in Oakdale NR. This species is listed as endangered under the TSC Act, and critically endangered under the EPBC Act. Threats to this species include loss of habitat and weed invasion.

There is also potential for the striped legless lizard (*Delma impar*) to occur in both Mcleods Creek and Oakdale NRs. This species is listed as vulnerable under both the TSC Act and the EPBC Act. Threats to this species include loss of habitat, feral animal predation, removal of bushrock, vehicle use within habitat, and weed invasion.

The *Priorities Action Statement* and recovery plans contain strategies for the recovery of threatened animal species. A recovery plan has been prepared for the large forest owls, which includes the powerful owl (NSW DEC 2006). Continued management of habitat values (such as hollow bearing trees, structural complexity of some habitats and open understorey vegetation of other habitats) and weed and feral animal control are required to limit further decline of threatened species, and of woodland birds towards threatened status.

3.4 Aboriginal heritage

Aboriginal communities have an association and connection to the land. The land and water 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, kinship systems and strengthening social bonds. Aboriginal heritage and connection to nature are inseparable from each other and need to be managed in an integrated manner across the landscape.

The Reserves lie within the traditional Country of the Pajong (Gundungurra speaking), Ngambri (Walgalu speaking) and Wailabalooa (Ngunnawal speaking) people (Jackson-Nakano 2001). Bango NR and Belmont SCA lie within the boundaries of the Onerwal Local Aboriginal Land Council while Mcleods Creek NR is within the boundaries of the Ngambri Local Aboriginal Land Council and Oakdale NR is within the boundaries of the Pejar Local Aboriginal Land Council.

The Onerwal and Pejar local Aboriginal land councils were consulted during the Goulburn Comprehensive Regional Assessment process, to explain the objectives and intended outcomes of the assessment and to seek the local Aboriginal land councils consideration and input (Resource and Conservation Assessment Council 2002).

An Aboriginal site survey of Bango, Oakdale and Mcleods Creek NRs was conducted by NPWS staff in September and October 2010. In Mcleods Creek and Bango NRs the surveys were conducted along the trail network and within the eroded gullies, as they provided disturbed areas with suitable visibility. Approximately 6 kilometres of trail were surveyed in Mcleods Creek NR, which was mainly along ridgelines but also crossed gullies and creek lines. Approximately 1 kilometre of trail was surveyed in Bango NR on the flat in the north-west of the reserve, in addition to 500 metres of rock-lined creek bed. In Oakdale NR eight east–west transects were surveyed. Only one site was found, a scarred tree in Mcleods Creek NR.

Sites recorded in the local region include open campsites, shelter with art/deposits, scarred trees and stone arrangements. Given this, it is likely that other sites exist on the Reserves.

The key threats to the known Aboriginal heritage values are fire and fire management operations (see Section 4.2).

3.5 Historic heritage

Prior to gazettal, the Reserves comprised Crown lands mostly held under lease or permissive occupancy. Evidence of past grazing use includes old fence lines and several accumulations of rubbish in Mcleods Creek NR. Bango NR and Belmont SCA are located in rugged country and were at best marginal areas for pastoral and agricultural activities.

The Hawkins Trig in Bango NR and the Kennedy Trig in Belmont SCA consist of substantial stone cairns with metal trig markers. Hawkins Trig is located at an elevation of 790 metres and was established by the Department of Lands in 1887. Kennedy Trig is located at an elevation of 854 metres and was established by the Department of Lands in 1886. Both Trig stations were repiled in 1892 (pers. comm. Land and Property Management Authority).

There is evidence (footings) of a brick kiln which was located just to the south-west of Bango NR. Operational details of this particular kiln are not known, however, in addition to commercial kilns in the Yass region, many small private kilns were built to make bricks for private houses (pers. comm. Yass and District Historical Society).

3.6 Recreation, education and research

The current level of use of the Reserves is low and there are no visitor facilities in the Reserves. The Reserves are not considered a priority for development for visitor use due to their management objectives as nature reserves, their small size, and lack of proximity to major travel routes. Bango, Mcleods Creek and Oakdale NRs each have at least one frontage to a minor public road. However, there is no public vehicular access due to locked gates and limited trails adjacent to public roads. Belmont SCA has no public access as it is surrounded by private properties.

The Bicentennial National Trail passes along the road adjacent to Oakdale and Mcleods Creek NRs, but does not actually traverse the Reserves. Neither reserve is identified for camping as part of the Bicentennial National Trail route. The trail is used by horse riders, mountain bike riders and walkers.

Some illegal use of the Reserves is likely, such as hunting and trail bike riding.

Research into the natural and cultural features of the Reserves and their maintenance requirements is important as it provides an effective framework for making informed management decisions. Research to date has included flora and fauna surveys, preliminary surveys for cultural heritage, and assessments of fire fuel levels in the Reserves.

4. Issues

4.1 Weeds and pest animals

A weed is defined in this plan as any plant species not native to these Reserves. Weeds can be listed as noxious weeds, Weeds of National Significance and environmental weeds. The *Noxious Weeds Act 1993* places an obligation upon public authorities to control noxious weeds on land that they occupy to the extent necessary to prevent such weeds spreading to adjoining lands. NPWS also has a priority to control environmental weeds which threaten natural habitats.

The NPWS *Draft Southern Ranges Regional Pest Management Strategy: 2012–2015* (OEH 2011) identifies priority pest species and programs for the Region. This strategic approach will consider such issues as the control of weeds in endangered ecological communities and threatened species habitat, and cooperative programs.

Consistent with the *Draft Southern Ranges Regional Pest Management Strategy: 2012–2015* (OEH 2011), control programs in the Reserves will target:

- serrated tussock (*Nassella trichotoma*)
- blackberry (*Rubus fruticosus*)
- thistles such as *Cirsium vulgare*
- sweet briar (*Rosa rubiginosa*)
- St Johns wort (*Hypericum perforatum*)
- non-endemic trees and shrubs, such as hawthorn (*Crataegus monogyna*) and fruit trees
- introduced grasses, such as *Phalaris aquatica* and *Paspalum dilatatum*
- herbaceous weeds, such as Bathurst burr (*Xanthium spinosum*)
- pine (*Pinus radiata*).

These species exist in low to medium numbers in the Reserves. Serrated tussock and blackberry are declared noxious weeds under the Noxious Weeds Act and are also declared Weeds of National Significance. The invasion of native plant communities by exotic perennial grasses has been declared a key threatening process under the TSC Act.

Weed species, such as sweet briar, blackberry and hawthorn, may provide resources to threatened and declining woodland birds in Mcleods Creek NR. Anecdotal evidence suggests that hawthorn fruit in the Yass–Gunning area (ripening late summer or early autumn) can fill a gap in winter feed requirements for gang-gang cockatoos. Weed control in these Reserves will have to account for these values whilst the native shrub and mid-layer species are regenerating.

A pest animal is defined in this plan as any animal species not native to these Reserves. Pest animals within the Reserves and on adjoining land are of concern because they have the potential to have detrimental effects on native animal communities through competition for resources, predation, disturbance and transmission of diseases. Pest animals can also impact on native vegetation and have the potential to have an adverse economic impact on neighbouring properties.

Pest animals recorded in the Reserves include foxes (*Vulpes vulpes*), cats (*Felis catus*) and rabbits (*Oryctolagus cuniculus*). Foxes and rabbits have been listed as a key threatening process under the TSC Act and the Commonwealth EPBC Act. Rabbits are also a declared pest under the *Rural Lands Protection Act 1989*. Other species predicted to occur include pigs (*Sus scrofa*) and goats (*Capra hircus*).

Control programs for these species are implemented as needed in line with the *Draft Southern Ranges Regional Pest Management Strategy: 2012–2015* (OEH 2011). The presence and density of pest animal species in the Reserves is currently unknown.

Starlings (*Sturnus vulgaris*), have been recorded within Mcleods Creek NR. This species has the potential to compete for nest sites with the superb parrot (*Polytelis swainsonii*) (listed as vulnerable under the TSC Act). Superb parrots have been recently observed nesting in the reserve (Mills & Robertson 2010).

A large number of noisy miners (*Manorina melanocephala*) were recorded at Oakdale NR. Noisy minors are not an exotic species, however, they may have led to the exclusion of the range of bird species found in the other reserves.

Stock from an adjacent property can access Oakdale NR through damaged fences. A small number of sheep remain in Mcleods Creek NR.

4.2 Fire

The primary fire management objectives of NPWS are to protect life and property and community assets from the adverse impacts of fire, whilst managing fire regimes to maintain and protect biodiversity and cultural heritage.

Fire is a natural feature of many environments and is essential for the survival of some plant communities. However, inappropriate fire regimes can lead to loss of particular plant and animal species and communities, and high frequency fires have been listed as a key threatening process under the TSC Act.

Little information is available about the fire history of the Reserves. Anecdotal reports indicate the Reserves have been subject to some fires started by lightning, but these have been quickly extinguished and there is little evidence of recent fires in the Reserves.

The Reserves contain dry sclerophyll forest in undulating country. Mcleods Creek and Oakdale NRs also contain secondary grassland.

There are few assets that are vulnerable to fire within the Reserves but all reserves adjoin areas of private grazing land with associated houses and outbuildings. The closest township to a reserve is Gundaroo which is about 2 kilometres from Mcleods Creek NR.

The greatest fire threats are from lightning, arson, escaped hazard reduction burning and accidental ignitions on nearby properties or public roads.

Fire management strategies are being prepared for the Reserves. The strategies will outline the recent fire history of the Reserves, key assets within and adjoining the Reserves including sites of natural and cultural heritage value, fire management zones, and fire control advantages such as management trails and water supply points.

Fuel monitoring sites are being established in the Reserves to provide baseline information to monitor fire fuel levels.

NPWS maintains cooperative arrangements with surrounding landowners and Rural Fire Service brigades and is an active participant in the Southern Tablelands Bush Fire Management Committee. Cooperative arrangements include trail maintenance, asset protection, fuel management, support for neighbour fire management efforts and information sharing.

4.3 Isolation and fragmentation

The area surrounding each of the Reserves has been extensively cleared, which has resulted in a high loss of biodiversity and fragmentation of habitat in the region. Long-term conservation of biodiversity depends upon the protection, enhancement and connection of remaining habitat across the landscape, incorporating vegetation remnants on both public and private lands. Nearby woody vegetation contributes to the habitat values of the Reserves and provides ecological corridors to other vegetated areas. Maintaining the integrity of the remaining habitat within the Reserves and, where possible, linking this to adjacent woody vegetation to facilitate wildlife corridors is important in ensuring long-term viability of the Reserves' biological values.

4.4 Grassy woodland regeneration and restoration

Significant proportions of the tree component of the grassy woodland vegetation in Mcleods Creek and Oakdale NRs have been cleared, resulting in secondary grasslands. Prior to being gazetted, the Reserves had a history of year-round grazing, predominantly with sheep. The secondary grassland community has nevertheless persisted in a relatively good condition, with a moderate diversity of flora and fauna species persisting.

Grazing ceased in the Reserves in April 2011. Without grazing pressure, it is anticipated that natural recruitment will occur adjacent to isolated trees and clumps of trees within the secondary grassland areas when appropriate conditions — such as high seed set, a wet summer and absence of grazing — combine to assist successful establishment. Allowing the woodland component to regenerate will enhance the biodiversity and habitat values of these Reserves.

In areas where the woodland community has been retained, the shrub layer is also sparse. In regenerating areas, enhancement of the shrub layer is likely to increase the habitat values, particularly for woodland birds and some arboreal fauna, such as sugar gliders (*Petaurus breviceps*).

The woodland values of Mcleods Creek NR will be enhanced by additional plantings of the trees, shrubs and ground-layer species that form the natural community components. The main community is Box-Gum Woodland. Restoration will include the reintroduction of canopy species and patches of mid-layer and shrub-layer species (*Acacia* spp., *Bursaria spinosa*, various members of in the *Fabaceae* family [peas], and selected forb species) according to community present. It is anticipated that Oakdale NR has sufficient natural recruitment so as not to require active planting at this stage.

In June 2011, a group of interested parties came together to form what is now known as the Mcleods Creek Nature Reserve Box-Gum Woodland Restoration Committee. The committee consists of specialists from CSIRO, Australian National Botanic Gardens, Greening Australia and OEH, and volunteers from neighbouring properties and Friends of Grasslands. The committee resolved to undertake the restoration of partially cleared areas of the reserve and produce a set of guidelines to direct this process. The draft woodland restoration guidelines are currently in the final stages of development, and set out the following:

1. objectives and aims of the restoration project
2. methods to be employed
3. planting density guidelines and species used for identified vegetation zones within Mcleods Creek NR.

4.5 Neighbour relations

A landholder adjacent to Bango NR held a permissive occupancy which allowed the grazing of livestock in the north-west corner of Bango NR. Grazing ceased in April 2011. The permissive occupancy enabled him to have a contiguous link between both sections of his property. Historically the landholder has used this small section of the reserve to move stock (sheep)

between paddocks when required. NPWS has issued a licence to the landholder on an annual basis to allow the movement of stock through the reserve. Grazing is not permitted under this licence. The licence will not be renewed, as it is not appropriate for stock to be moved through the area now it is a nature reserve, especially given that there is alternative access around the nature reserve along a public road.

This thoroughfare is fenced off from the remainder of the reserve, and is identified on Map 2 as a management trail.

4.6 Soils

The drainage lines in Mcleods Creek NR are actively eroding. Erosion within the reserve is resulting in gullies that are several metres deep. Rubbish has also been dumped into several gullies within Mcleods Creek NR. The movement of soil in the eroded gullies is resulting in a decline in water quality due to sedimentation.

Information provided by Yass Valley Council identified traces of salinity in Mcleods Creek NR. Mcleods Creek drains into the Yass River, which is one of 12 subcatchments identified in the Murrumbidgee Catchment Action Plan as delivering high salt loads to the Murrumbidgee River (Murrumbidgee Catchment Management Authority 2008).

4.7 Climate change

Anthropogenic climate change has been listed as a key threatening process under the TSC Act. The *NSW Climate Impact Profile* (NSW DECCW 2010) for the Southern Tablelands outlines projected changes in climate and the physical responses expected to these changes. The projections for the Southern Tablelands are that temperatures are likely to rise, there is likely to be a substantial increase in summer rainfall but conversely, winter rainfall is projected to decrease by up to 50 per cent.

Many parts of the Southern Tablelands are likely to become significantly drier than in the past, especially during the winter. Water stress, particularly during drought years, is likely to kill many trees in woodlands, and stressed trees are also likely to die from additional pressure from insect attack and disease. Such impacts are likely to be most severe for resident species or those with low dispersal capacity, including many threatened woodland birds such as gang-gang cockatoos and diamond firetails, and small mammals. The seasonality of growth in the tablelands is likely to intensify. This change is likely to increase the browsing and grazing of herbivores on grasslands and grassy woodland during drier winter periods. Summer growing grasses such as kangaroo grass (*Themeda australis*), and weeds such as St John's wort, are likely to expand and displace other native species such as Poa tussocks (NSW DECCW 2010).

Programs to reduce the pressures arising from other threats, such as habitat fragmentation, weeds and pest animal species and fire, will help reduce the severity of the effects of climate change.

4.8 Biomass management

The component species of grassy ecosystems at Mcleods Creek and Oakdale NRs may lose vigour with a lack of biomass management, particularly in low-lying, more productive areas of the Reserves. Accumulating biomass can lead to the collapse of some native ground-layer species as above-ground material builds up (both dead and live). Potentially when such ground-layer species collapse, particularly kangaroo grass, stored nutrients can be released which can result in the establishment of colonising exotic species that take advantage of increased nutrients.

If accumulated biomass is removed from the system, the native grasses grow more vigorously and have a greater capacity to out-compete exotic species. Diversity of the ground layer is

maintained or even enhanced with the application of biomass control measures because inter-tussock species can compete for resources (particularly light and nutrients) that they require.

It is also recognised that the dead thatch of kangaroo grass could lead to the introduction of high levels of carbon. A higher carbon to nitrogen ratio may slow the metabolisation of the thatch by soil organisms, reducing the rate of decomposition, and nutrients can be immobilised. Therefore the management response to biomass accumulation will be site-specific and requires observation and monitoring prior to determining management actions. The resulting management actions may therefore differ due to these variable plant responses over time and site-specific characteristics, such as soil type, position in landscape or season.

5. Implementation

Current situation	Desired outcomes	Management response	Priority
<p>1 On-park ecological conservation</p> <p>The Gunning Reserves will enhance the protection of a number of significant vegetation communities.</p> <p>The Reserves contain one plant (the Yass daisy in Bango NR) and seven animal species listed as vulnerable under the TSC Act. There is a high probability that the endangered golden sun moth occurs in Mcleods Creek NR.</p> <p>White Box – Yellow Box – Blakely’s Red Gum Woodland EEC (listed under the TSC and EPBC Act) and Natural Temperate Grassland of the Southern Tablelands of NSW and ACT EEC (listed under the EPBC Act) are located in Mcleods Creek NR. The Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC, which is listed under the TSC Act, is located in Oakdale NR.</p> <p>Significant proportions of the tree component of the grassy woodland vegetation in Mcleods Creek and Oakdale NRs have been cleared, resulting in secondary grasslands. Without grazing pressure, it is anticipated that natural recruitment will occur adjacent to isolated trees and clumps of trees within the secondary grassland areas, under appropriate conditions. This will enhance the biodiversity and habitat values of these Reserves. Additional plantings of tree, shrub and ground-layer species that form the natural community components, will also enhance the woodland values at Mcleods Creek NR. Woodland</p>	<p>Landscape and catchment values are protected.</p> <p>Native plant and animal species and communities are conserved.</p> <p>Negative impacts on threatened taxa are stable or diminishing.</p> <p>Research outcomes will enable improved management decisions to be made.</p> <p>Vigour of the native ground layer is maintained.</p> <p>Structural diversity and habitat values are restored in areas previously subject to clearing.</p>	<p>1.1 Undertake fire, pest and weed management programs to maintain and enhance the natural biodiversity values, reduce threats to existing threatened species populations and to increase the Reserves’ ability to cope with future disturbances, including climate change.</p> <p>1.2 Protect endangered ecological communities and threatened species through implementing relevant strategies in the <i>Priorities Action Statement</i> and recovery plans.</p> <p>1.3 Place fallen logs along trails near known locations of Yass daisy to ensure vehicles do not access, do not mow or slash understorey near known Yass daisy locations, and undertake weed control in and adjacent to populations of Yass daisy (taking care to spray or dig out only target weeds), and monitor known Yass Daisy locations every two to three years to determine extent and to identify population changes.</p> <p>1.4 Protect Box-Gum Woodland community by avoidance of widening during road maintenance activities.</p> <p>1.5 Monitor natural regeneration in Mcleods Creek and Oakdale NRs.</p> <p>1.6 Promote re-establishment of native tree, shrub and ground-layer species in accordance with woodland restoration guidelines for Mcleods Creek NR.</p> <p>1.7 Monitor diversity and vigour of native grasses within Mcleods Creek and Oakdale NRs. If decline is occurring due to</p>	<p>Ongoing</p> <p>Ongoing</p> <p>High</p> <p>High</p> <p>High</p> <p>High</p> <p>Low</p>

Current situation	Desired outcomes	Management response	Priority
<p>restoration guidelines for Mcleods Creek NR are currently being developed in consultation with stakeholders.</p> <p>Biomass accumulation may lead to a loss of vigour of native grasses and the release of nutrients which can result in the establishment of colonising exotic species.</p> <p>The drainage lines in Mcleods Creek NR are actively eroding, resulting in gullies that are several metres deep.</p> <p>Research to date provides a good basis for management, however further research will expand the knowledge base.</p>		<p>biomass accumulation, assess options for reduction, such as ecological burning, slashing or strategic grazing, subject to environmental impact assessment. If biomass control measures are undertaken, apply to no more than 10 per cent of the site at any one event. Monitor impacts of control on ground layer vigour, structure, species diversity and abundance.</p> <p>1.8 Increase coarse woody debris within Mcleods Creek and Oakdale NRs to provide habitat and structural complexity. Coarse woody debris can be collected from nearby clearing or roadwork projects and placed within the reserves.</p> <p>1.9 Assess stability of erosion gullies. Obtain specialist advice and undertake remedial actions if necessary.</p> <p>1.10 Encourage further survey work of plant and animal species, targeting threatened species.</p> <p>1.11 Monitor the presence and distribution of the golden sun moth in Mcleods Creek NR.</p> <p>1.12 Monitor natural recruitment of canopy and shrub-layer species in known golden sun moth habitat. Assess the requirement for managing natural recruitment to maintain suitable habitat for threatened fauna and the conservation values of the Box-Gum Woodland EEC.</p>	<p>Low</p> <p>Medium</p> <p>Low</p> <p>High</p> <p>High</p>

Current situation	Desired outcomes	Management response	Priority
<p>2 Cultural Heritage</p> <p>The Reserves are located within the area of the Onerwal, Ngambri and Pejar local Aboriginal land councils.</p> <p>Preliminary survey work for Aboriginal sites has been conducted on the trail network and targeted landform features. The only site identified was a scarred tree.</p> <p>Hawkins Trig in Bango NR and Kennedy Trig in Belmont SCA were established in the 1880s by the Department of Lands.</p>	<p>Aboriginal and historic places and values are identified and protected.</p> <p>Aboriginal people are involved in management of the Aboriginal cultural values of the Reserves.</p> <p>Negative impacts on Aboriginal and historic heritage values are stable or diminishing.</p> <p>Understanding of the cultural values of the Reserves is improved.</p>	<p>2.1 Consult and involve relevant Aboriginal community organisations in the management of Aboriginal sites, places and values, including interpretation of places or values.</p> <p>2.2 Assess potential impacts on Aboriginal or historic sites prior to all works.</p> <p>2.3 Encourage further research into the Aboriginal heritage values of the Reserves with relevant Aboriginal community members and organisations.</p> <p>2.4 Protect the scarred tree and retain in situ.</p> <p>2.5 Assess the condition of Hawkins and Kennedy trigs in consultation with Surveyor General of NSW and implement required ameliorative measures.</p>	<p>Ongoing</p> <p>Ongoing</p> <p>Low</p> <p>High</p> <p>Medium</p>

Current situation	Desired outcomes	Management response	Priority
<p>3 Visitor use and services</p> <p>The Reserves have little public use, and ease of access varies depending on the proximity of public roads. There is no public vehicular access within the Reserves.</p> <p>Belmont SCA has no public access as it is surrounded by private properties. Access to the reserve through private property would require approval from the landholder.</p> <p>There are no facilities for public use in the Reserves.</p> <p>Promotion of visitor understanding and appreciation of the values of the Reserves is important for minimising damaging activities and maximising visitor enjoyment.</p> <p>Some illegal use of the Reserves is evident such as hunting, trail bike riding, timber-getting and dumping of rubbish.</p>	<p>Visitor use is appropriate and ecologically sustainable.</p> <p>Visitor use and services encourage appreciation of the Reserves' values.</p> <p>The local community is aware of the significance of the Reserves and of management programs.</p>	<p>3.1 Install Reserve identification signage within the Reserves, in accordance with the Signage Policy and Park Signage Manual.</p> <p>3.2 Allow day walks, picnics (no facilities will be provided and no fires permitted) and educational visits, subject to limits on numbers and other conditions as necessary to minimise impacts.</p> <p>3.3 Allow bush camping in Bango and Mcleods Creek NRs and Belmont SCA. Camping will not be promoted, no facilities will be provided and no fires permitted. Limits and other conditions may be instituted as necessary to minimise impacts. Camping will not be permitted in Oakdale NR to protect the endangered ecological community.</p> <p>3.4 There will be no public vehicular access within the Reserves due to the limited number of formed trails, their limited size, and their status as nature reserves.</p> <p>3.5 Assess whether parking facilities are required at Bango, Mcleods Creek and Oakdale NRs, and if required liaise with local councils to determine whether parking can be provided on the road reserve or just inside the reserve boundary.</p>	<p>High</p> <p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p> <p>Low</p>

Current situation	Desired outcomes	Management response	Priority
		<p>3.6 Allow cycling in Mcleods Creek NR on signposted management trails. Cycling will not be permitted in Bango and Oakdale NRs due to the limited number of formed trails, and their limited size. Cycling is not permitted in Belmont SCA due to the lack of formed trails and as access to the reserve is through private property.</p> <p>3.7 Horse riding will not be permitted in Bango, Oakdale or Mcleods Creek NRs, due to the limited number of formed trails, their limited size, and their status as nature reserves. Horse riding will not be permitted in Belmont SCA unless otherwise signposted due to the lack of formed trails, limited size and because access to the reserve is through private property.</p> <p>3.8 Monitor levels and impacts of use.</p> <p>3.10 Continue to undertake law enforcement patrols and to work with neighbours and law enforcement agencies to control illegal activities.</p> <p>3.11 Assess environmental and visual impact of rubbish located within the Mcleods Creek NR. If removal of rubbish is required this should be undertaken with minimal impact.</p> <p>3.12 Install interpretative signage at Mcleods Creek NR to raise community awareness of the reserve's significance and management programs, such as woodland restoration.</p> <p>3.13 Install interpretative signage (in priority order) at Oakdale NR and Bango NR to raise community awareness of these reserves' significance and management programs.</p>	<p>Ongoing</p> <p>Ongoing</p> <p>Low</p> <p>Ongoing</p> <p>High</p> <p>Medium</p> <p>Low</p>

Current situation	Desired outcomes	Management response	Priority
<p>4 Community programs and education</p> <p>The areas surrounding the Reserves have been extensively cleared, which has resulted in a high loss of biodiversity and fragmentation of habitat in the region. Maintaining the integrity of the remaining habitat within the Reserves and, where possible, linking this to adjacent areas of bushland to facilitate wildlife corridors is important in ensuring long-term viability of the Reserves' biological values.</p> <p>A committee of stakeholders and volunteers has been established who have resolved to undertake the restoration of partially cleared areas of Mcleods Creek NR and produce a set of guidelines to direct this process. The woodland restoration program at Mcleods Creek NR provides opportunities for volunteer community involvement, such as planting days and field visits.</p>	<p>Neighbours support conservation of native vegetation near the Reserves.</p> <p>The local community is aware of the significance of the Reserves and of management programs.</p>	<p>4.1 Liaise with neighbours to encourage the retention and appropriate management of key habitats and corridors adjacent to the Reserves.</p> <p>4.2 Foster community engagement to build community pride in the Reserves and provide information on the natural and cultural values (in consultation with the Aboriginal community) of the Reserves via the internet.</p> <p>4.3 Foster community engagement to build community pride in the Reserves.</p> <p>4.4 Identify key areas for connectivity into the Reserves and prioritise their importance to the Reserve.</p>	<p>Low</p> <p>Low</p> <p>Medium</p> <p>Medium</p>

Current situation	Desired outcomes	Management response	Priority
<p>5 Weeds and pest animals</p> <p>Weeds present in the Reserves include serrated tussock, St John's wort, blackberry, sweet briar rose, hawthorn and thistles and exotic grasses. Weeds have a high potential to invade grassy ecosystems, which have been identified as EECs, and reduce abundance of native grass and forb species.</p> <p>Feral fauna species recorded in the Reserves to date include foxes and rabbits. Other species predicted to occur include pigs, goats and cats. The presence and density of pest animal species in the Reserves is currently unknown.</p>	<p>Introduced plants and animals are controlled and where possible eliminated.</p> <p>Negative impacts of weeds and pest animals on reserve values and neighbouring lands are minimised.</p> <p>Weed and pest control programs are undertaken where appropriate in consultation with neighbours.</p>	<p>5.1 Manage introduced species in accordance with the regional pest management strategy. Priority will be given to control programs for serrated tussock, blackberry and St John's wort. All introduced species that have the potential to spread rapidly and threaten endangered ecological communities, threatened species habitat, diverse grassy ecosystems and the integrity of native communities will be targeted as a high priority.</p> <p>5.2 Prepare a weed map for each reserve to determine presence and extent of weeds, and to provide baseline comparative data for monitoring success of treatment programs.</p> <p>5.3 Survey the Reserves, e.g. establish sand plots, to determine the presence and extent of introduced animals in the Reserves. Implement appropriate control strategies.</p> <p>5.4 Treat new occurrences of highly invasive weed species with the potential for significant impacts on the Reserves.</p> <p>5.5 Continue to provide habitat for threatened woodland birds by retaining areas of hawthorn, briar and blackberry in Mcleods Creek NR at their current density until a native shrub layer establishes. Once the native shrub layer has been established these woody weeds will be removed.</p> <p>5.6 Trap starlings within Mcleods Creek NR to reduce competition with superb parrots for nesting sites. Establish a starling trapping program in coordination with landholders in Gundaroo.</p> <p>5.7 Seek the cooperation of neighbours and the local Livestock Health and Pest Authority in implementing weed and pest control programs.</p>	<p>Ongoing</p> <p>High</p> <p>Low</p> <p>Ongoing</p> <p>Ongoing</p> <p>Low</p> <p>Medium</p>

Current situation	Desired outcomes	Management response	Priority
		<p>5.8 Undertake planting of canopy species in previously disturbed areas, where serrated tussock is present, to assist with weed control in these areas.</p> <p>5.9 Investigate the impact of noisy minors on other native species in Oakdale NR and implement required ameliorative measures.</p> <p>5.10 Undertake construction and maintenance of boundary fences with neighbours to exclude stock from the Reserves. Fencing assistance may be provided in accordance with NPWS policy.</p> <p>5.11 Control sifton bush (<i>Cassinia arcuata</i>) in Mcleods Creek NR in accordance with the objectives of the woodland restoration program and potential impacts on the grassy woodland values of the reserve.</p> <p>5.12 Monitor infestations of exotic grasses and other species within grassy ecosystems in Mcleods Creek and Oakdale NRs. If infestation is occurring due to biomass accumulation, assess options for reduction.</p>	<p>Low</p> <p>Low</p> <p>Medium</p> <p>Low</p> <p>Medium</p>

Current situation	Desired outcomes	Management response	Priority
<p>6 Fire management</p> <p>Fire is a natural feature of many environments but inappropriate fire regimes can lead to loss of particular plant and animal communities. High frequency fires have been listed as a key threatening process under the TSC Act.</p> <p>Several private assets are located within close proximity of the Reserves' boundaries. On-reserve assets include cultural heritage sites, gates and fences.</p> <p>The fire history of the Reserves is unknown. However, it is presumed that the vegetation communities have not been affected by a significant fire for several decades. Ecological burns should only be introduced into the Reserves if there is a demonstrated biodiversity decline, however long-unburnt areas are ecologically significant as they are rare.</p> <p>Fire management strategies are currently being prepared for the Reserves.</p>	<p>Life, property and natural and cultural values are protected from fire.</p> <p>Fire regimes are appropriate for conservation of native plant and animal communities.</p> <p>Negative impacts of fire on natural and cultural heritage values are stable or diminishing.</p>	<p>6.1 Finalise and implement fire management strategies for the Reserves.</p> <p>6.2 Participate in the Southern Tablelands Zone Bushfire Management Committee. Maintain cooperative arrangements with local Rural Fire Service brigades and officers and surrounding landowners in regard to fuel management and fire suppression.</p> <p>6.3 Respond to all unplanned fires in the Reserves as quickly as possible.</p> <p>6.4 Install directional signage on the trail network within the Reserves to assist in fire incidents, in accordance with the Signage Policy and Park Signage Manual.</p> <p>6.5 Establish a monitoring program to identify areas where vegetation communities are senescing due to lack of fire.</p> <p>6.6 Encourage research into improving understanding of the influence of fires on the diversity of tableland dry sclerophyll forest.</p>	<p>High</p> <p>Ongoing</p> <p>Ongoing</p> <p>Medium</p> <p>Low</p> <p>Ongoing</p>

Current situation	Desired outcomes	Management response	Priority
<p>7 Infrastructure and maintenance</p> <p>Most trails are 4WD-only standard due to the terrain.</p> <p>The requirement for additional management trails within the Reserves needs to be determined.</p> <p>The south-east corner of Oakdale NR is not within the fenced section of the reserve, and is able to be accessed by public vehicles.</p>	<p>Management facilities and operations adequately serve management needs and have minimal impact.</p> <p>Infrastructure and assets are routinely maintained.</p>	<p>7.1 All existing trails within the Reserves are management trails. Rationalise existing trails. Additional management trails may be required. No trails will be constructed in Oakdale NR due to its limited size.</p> <p>7.2 Maintain all roads and management trails in a manner that minimises erosion and water pollution, in accordance with NPWS policy.</p> <p>7.3 Gate and signpost all management trails to restrict unauthorised access.</p> <p>7.4 Fence the outlying section of Oakdale NR into remainder of block.</p>	<p>High</p> <p>Ongoing</p> <p>High</p> <p>High</p>

High priority activities are those imperative to achieving the objectives and desired outcomes, and 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.

Ongoing is for activities that are undertaken on an annual basis or statements of management intent that will direct the management response if an issue that arises.

References

Environment ACT (2005) *National Recovery Plan for Natural Temperate Grassland of the Southern Tablelands (NSW and ACT): an endangered ecological community*, Environment ACT, Canberra.

Gellie N (2005) 'Native vegetation of the Southern Forests: South East Highlands, Australian Alps, South-west Slopes, and SE corner bioregions', *Cunninghamia* 9 (2): 219–253.

Jackson-Nakano, Ann (2001) *Weereewaa History Series Volume 1*, National Library of Australia, Canberra.

McCue, KF, Kennett, BLN, Gauli, BA, Micheal-Leiba, M, Weekes, J and Krayshek, C (1989) 'A century of earthquakes in the Dalton-Gunning region of New South Wales', *BMR Journal of Australian Geology and Geophysics* 11, 1–9.

Miles J (2010) 'Comments on Vegetation Mapping, Small Southern Tablelands Reserves', unpublished report to NPWS.

Mills, DJ and Robertson, G (2010) Flora and fauna of National Parks in the Crookwell, Yass, Goulburn and Gundaroo Regions of the Southern Tablelands of NSW (Draft), Department of Environment, Climate Change and Water, NSW, Queanbeyan.

Murrumbidgee Catchment Management Authority (2008) *Murrumbidgee Catchment Management Plan*,
www.murrumbidgee.cma.nsw.gov.au/about/mcma-cap/download-cap.aspx.

NSW DEC (2006) *NSW Recovery Plan for the Large Forest Owls: Powerful Owl (*Ninox strenua*), Sooty Owl (*Tyto tenebricosa*) and Masked Owl (*Tyto novaehollandiae*)*, Department of Environment and Conservation, Sydney,
www.environment.nsw.gov.au/resources/nature/TSRecoveryPlanForestOwls.pdf.

NSW DECC (2008) Description for NSW (Mitchell) Landscapes,
<http://maps.environment.nsw.gov.au/Metadata/NSW%20Landscapes%20descriptions.pdf>.

NSW DECCW (2010) *NSW Climate Impact Profile, The impacts of climate change on the biophysical environment of New South Wales*, Department of Environment, Climate Change and Water NSW, Sydney South.

NSW DECCW (2010b) *Draft National Recovery Plan for White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland*, Department of Environment, Climate Change and Water NSW, Sydney.

OEH (2011) *Draft Southern Ranges Regional Pest Management Strategy Part B: 2012–2015*, Office of Environment and Heritage, Sydney, NSW.

Resource and Conservation Assessment Council (2002) *Proposal for public land use in the Goulburn Region*. NSW Government, Sydney.

