Office of Environment & Heritage
NSW National Parks & Wildlife Service

Plan of Management

Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve, and Doctors Nose Mountain Nature Reserve

CURRYS GAP STATE CONSERVATION AREA, MOUNT MACKENZIE NATURE RESERVE AND DOCTORS NOSE MOUNTAIN NATURE RESERVE

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

December, 2011

This plan of management was adopted by the Minister for the Environment on 8th December 2011.

Acknowledgements

This plan of management is based on a draft plan prepared by staff of the Northern Tablelands Region of the NSW National Parks and Wildlife Service (NPWS), part of the Office of Environment and Heritage, Department of Premier and Cabinet.

The NPWS acknowledges that Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve and Doctors Nose Mountain Nature Reserve are in the traditional country of the Jukembal Aboriginal people.

FRONT COVER: Currys Gap Creek by Pamela O'Neill, NPWS.

For additional information or any inquiries about Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve and Doctors Nose Mountain Nature Reserve or this plan of management, contact the NPWS Tenterfield Area Office, 10 Miles Street Tenterfield NSW 2372 or by telephone on 02 6736 4298.

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FOREWORD

Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve and Doctors Nose Mountain Nature Reserve are located on the Northern Tablelands of New South Wales, south west of Tenterfield. Currys Gap State Conservation Area covers an area of 227 hectares, Mount Mackenzie Nature Reserve is 141 hectares in size, and Doctors Nose Mountain Nature Reserve is 66 hectares.

The reserves contain relatively undisturbed high elevation old growth open forest. In addition to a number of regionally uncommon flora species, an endangered species of mintbush was recently rediscovered in Mount Mackenzie Nature Reserve after 100 years of being thought extinct. The reserves also contain two endangered ecological communities, New England Peppermint Woodland and White Box Yellow Box Blakely's Red Gum Woodland, and five threatened fauna species.

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 Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve and Doctors Nose Mountain Nature Reserve was placed on public exhibition from 3rd December 2010 until 14th March 2011. The submissions received were carefully considered before adopting this plan.

The plan contains a number of actions to protect the natural values of the reserve, including research into fire ecology, the implementation of actions to assist the recovery of threatened species and communities, and the control of introduced plants and animals. The plan also provides for low impact self-reliant recreation on management trails in Mount Mackenzie Nature Reserve and Currys Gap State Conservation Area.

This plan of management establishes the scheme of operations for Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve and Doctors Nose Mountain Nature Reserve. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

Robyn Parker
Minister for the Environment

MAP 1. MAP OF THE PLANNING AREA

1. LOCATION, GAZETTAL AND REGIONAL CONTEXT

This plan of management applies to lands reserved as Currys Gap State Conservation Area, Mount Mackenzie Nature Reserve and Doctors Nose Mountain Nature Reserve (referred to herein as 'the planning area') and any additions in the future. The planning area is located on the Northern Tablelands of New South Wales, south west of Tenterfield. Because of their proximity and similar management issues, Currys Gap State Conservation Area (SCA), Mount Mackenzie Nature Reserve (NR) and Doctors Nose Mountain Nature Reserve (NR) are considered together for planning purposes.

Currys Gap SCA is located one kilometre south west of Tenterfield at the base of Mount Mackenzie and covers an area of 227 hectares (refer to Map 1). Currys Gap SCA was gazetted in January 2003 and was formerly known as the Tenterfield Western Common and managed by a Common Trust. The eastern boundary of the conservation area is the railway line. The reserve is bounded by hobby farms to the north, and larger farms to the southwest.

Mount Mackenzie NR is located approximately five kilometres south west of Tenterfield, on the western edge of Mount Mackenzie. It covers an area of 141 hectares and was declared a nature reserve in 1999. The Mount Mackenzie Lookout Road, managed by Tenterfield Council, dissects the reserve.

Doctors Nose Mountain NR is located approximately 6 kilometres west of Tenterfield. It was gazetted in January 2008 and covers an area of 66 hectares. The reserve is bounded on all sides by grazing properties.

The planning area lies within the Inverell plateau granites (Mitchell Landscape) in the New England Tableland Bioregion between the woodland systems of the west and the taller forest communities in the east. Consequently there is a rich diversity of flora and fauna with many species at the limit of their distributions.

All of the planning area reserves were former vacant crown land covered by grazing leases.

The North East Regional Forest Agreement (RFA) covers Currys Gap SCA and Mount Mackenzie NR and provides for, amongst other things, ecological sustainable forest management. Regional Forest Agreements are one of the principal means of implementing the National Forest Policy Statement of 1992, under which the Commonwealth, States and Territory governments agreed to work towards a shared vision for Australia's forests. The North East RFA provided for major additions to the park system, including the establishment of Currys Gap SCA and Mount Mackenzie NR.

The planning area is within the geographical area of the Tenterfield Local Council, Border Rivers-Gwydir Catchment Management Authority, Moombahlene Local Aboriginal Land Council and the New England Livestock Health and Pest Authority (LHPA).

2. MANAGEMENT CONTEXT

2.1. LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves and state conservation areas in NSW is in the context of the legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPWS Act), and Regulation, the *Threatened Species Conservation Act 1995* (TSC Act), and the policies of the 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* (EPA Act) may require the assessment and mitigation of the environmental impacts of 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 on 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 the planning area except in accordance with this plan. This plan will also apply to any future additions to the planning area. Should operations be proposed for these reserves or any additions that are not in accordance with this plan and legislation, an amendment to this plan or a new plan will be prepared and exhibited for public comment.

2.2. 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.

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; and
- 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.

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 reuse) 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; and
- 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*. A review was undertaken in November 2008 in which the status of Currys Gap State Conservation Area remained unchanged.

2.3. STATEMENT OF SIGNIFICANCE

The planning area is considered to be of significance for the biological values it contains which include:

- relatively undisturbed high elevation old growth open forest, one endangered plant species, and a number of regionally uncommon flora species;
- the New England Peppermint (*Eucalyptus nova-anglica*) woodland on basalts and sediments in the New England Tableland Bioregion, and the White Box Yellow Box Blakely's Red Gum Woodland, both listed as endangered ecological communities under the TSC Act; and
- five species of fauna listed as threatened under the TSC Act.

2.4. SPECIFIC MANAGEMENT DIRECTIONS

In addition to the general principles for the management of nature reserves and state conservation areas (refer to Section 2.2), the following specific management directions apply to the management of the planning area:

- priority will be given to the protection of species or communities identified as threatened or endangered ecological communities;
- the control of introduced species and fire within the planning area; and
- passive recreation use, for example walking, will be provided for in Currys Gap SCA and Mount Mackenzie NR.

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 on-going use are dealt with individually, but their inter-relationships are recognised.

3.1. GEOLOGY, LANDSCAPE AND HYDROLOGY

The planning area lies within the New England Batholith (the Inverell plateau granites landscape (Mitchell, 2003) and is part of the eastern highlands of Australia (Great Dividing Range).

Currys Gap SCA is comprised of Late Permian granitoids, (80% of reserve), and Late Permian Volcanics. The terrain of Currys Gap SCA is undulating with elevations ranging from 850 to 980 metres above sea level along Currys Gap Creek. This creek dissects the reserve and drains to the east before flowing into the western flowing Tenterfield Creek part of the Dumaresq River catchment. The soils of Currys Gap SCA and Doctors Nose Mountain NR are infertile, poorly drained and susceptible to erosion, whilst in comparison the soils of Mount Mackenzie NR are rich and well drained.

Mount Mackenzie NR and Doctors Nose lie within the Mackenzie Monzogranite having numerous granitic outcrops. Mount Mackenzie NR is more rugged with elevations varying from 1160 to 1290 metres above sea level, whilst Doctors Nose Mountain NR contains steeply dissected terrain ranging in elevation from 1000 to 1175 metres above sea level.

Granitic outcrops usually occur as clusters with exposures separated by a few kilometres and are associated with thin soils that rapidly dry out after rain and have little or no moisture available for extended periods . In this region of the New England Batholith the relatively drier and colder environment of the granitic outcrops are associated with higher levels of flora insularity that is they are more likely to contain plant species that are restricted to the granitic outcrops (McGann, 2002).

3.2. NATIVE PLANTS AND ANIMALS

Currys Gap SCA is a former town common which was grazed intensively. As a result the reserve is characterised by open woodland with a grassy understorey and hollow bearing trees are absent. Despite this vegetation surveys of the reserve indicates a diverse range of flora (211 species) (Hunter, 2002).

Mount Mackenzie NR is a largely unmodified wet sclerophyll forest on top of the mountain. The steep terrain limited past grazing and clearing activities and the nature reserve comprises old growth forest with numerous hollows. Vegetation surveys (Hunter, 2002) have identified 170 species of plants within Mount Mackenzie NR.

Doctors Nose Mountain NR is a rocky outcrop with rare plants which have evolved in the absence of fire. Vegetation surveys have not been conducted within this reserve.

Five major vegetation communities have been recorded in the planning area (refer to Table 1), two of which are listed as endangered ecological communities under the TSC Act.

Table 1. Vegetation communities in Currys Gap SCA and Mount Mackenzie NR (Hunter, 2002)

Community Type	Dominant Plant Species
Kunzea outcrop heaths	*Eucalyptus banksii, Kunzea opposita, Leucopogon neoanglicus, Brachyscome stuartii.*
Messmate – manna gum tall open forest	*Eucalyptus obliqua, Acacia irrorata, Desmodium varians, Poa sieberiana.*
Apple – cabbage gum woodland	*Angophora floribunda, Leptospermum brevipes, Desmodium varians.*
New England Peppermint (*Eucalyptus nova-anglica*) woodland on basalts and sediments in the New England Tableland Bioregion*	*Eucalyptus nova-anglica, Acacia irrorata, Glycine clandestine, Microlaena stipoides.*
White Box Yellow Box Blakely's Red Gum Woodland *	*Eucalyptus banksii, Allocasuarina torulosa, Acacia fimbriata, Desmodium varians, Poa sieberiana.*

* An endangered ecological community under the TSC Act.

The planning area has 10 regionally uncommon species (Table 2). The mintbush species, *Prostanthera staurophylla*, was recently rediscovered in Mount Mackenzie Nature Reserve after 100 years of being thought extinct or confused with the Torrington Mintbush (*Prostanthera teretifolia*).

The restricted distribution and small population size of the mintbush makes it prone to local variations in demography and environment. Soil compaction and nutrient addition from grazing by feral goats could also pose a risk to the species as could wildflower collection. The most significant threats to vegetation structure and health are weed invasion, too frequent fire events and loss of connectivity with remaining habitat across the landscape as clearing of adjoining vegetation continues (refer to Section 4).

Table 2. Endangered and regionally uncommon species

Common Name	Scientific Name	Status
Shrubs		
	Acacia betchei	Regionally uncommon
Sticky cassinia	*Cassinia uncata*	Regionally uncommon
	Kunzea opposita	Regionally uncommon
Mintbush	*Prostanthera staurophylla*	Endangered*[#]
Herbs		
	Calandrinia eremaea	Regionally uncommon
	Callitriche muelleri	Regionally uncommon
Swamp lily	*Ottelia ovalifolia*	Regionally uncommon
Grasses		
Reedgrass	*Arundinella nepalensis*	Regionally uncommon
Corkscrew grass	*Austrostipa setacea*	Regionally uncommon
Slender bamboo grass	*Austrostipa verticillata*	Regionally uncommon
Cotton panic grass	*Digitaria brownii*	Regionally uncommon

* Status under TSC Act.
[#] Denotes species nationally threatened under the EPBC Act.

Vertebrate fauna surveys were conducted in Currys Gap SCA and Mount Mackenzie NR in 2003, but not in the nearby Doctors Nose Mountain NR. Six frog, 10 reptile, 40 bird and 12 mammal species were recorded in Currys Gap SCA, and 4 frog species, 39 bird, 18 mammal and 9 reptile species were recorded in Mount Mackenzie NR (Spark, 2003). Threatened species recorded in the planning area are listed in Table 3.

Table 3. Threatened fauna recorded in the planning area

Common Name	Scientific Name	Status
Powerful Owl	*Ninox strenua*	Vulnerable*
Glossy Black Cockatoo	*Calyptorhynchus lathami*	Vulnerable*
Border Thick – tailed Gecko	*Underwoodisaurus sphyrurus*	Vulnerable*[#]
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Vulnerable*
Squirrel Glider	*Petaurus norfolcensis*	Vulnerable*

* Status under TSC Act.
[#] Denotes species nationally threatened under the EPBC Act.

The NSW Threatened Species Priorities Action Statement (PAS) outlines the strategies for ameliorating threats listed under the TSC Act including the preparation of threat abatement plans. For each of these strategies the PAS lists one or more detailed actions which aim to protect threatened species by reducing the impact of listed threats.

A number of State identified key threatening processes (KTPs) are relevant to the management of flora and fauna in these reserves, particularly in relation to their small size and isolation in the landscape. A summary of these includes:

- invasion of native plant communities by exotic perennial grasses
- competition and habitat degradation by feral goats (*Capra hircus*)
- predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)
- predation by the feral cat (*Felis catus*), European red fox (*Vulpes vulpes)* and feral dogs (*Canis lupus familiaris*)
- human-caused climate change
- high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition
- loss of hollow-bearing trees
- bushrock removal and removal of dead wood and dead trees
- anthropogenic climate change.

3.3. CULTURAL 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.

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 values. For reasons of clarity and document usefulness natural and cultural heritage, non-human threats and on-going use are dealt with individually, but their inter-relationships are recognised.

The geology, landform, climate and plant and animal communities of the planning area, plus its location, have determined how humans have used it. While Aboriginal use of the area is believed to have been widespread, the rugged terrain of Mount Mackenzie NR and Doctors Nose Mountain NR has limited the non-Aboriginal use of these reserves. This has in turn restricted disturbance in these reserves. Currys Gap SCA was more favourable for agricultural activity. This led to increased use and disturbance, and physical evidence of historic use remains in the reserve.

The reserves lie within the Moombahlene Aboriginal Land Council area and the Jukembal language group. The Jukembal people were the first people to inhabit the Tenterfield district, with their territory straddling the Great Dividing Range from near Glen Innes to Stanthorpe (Halliday, 1988). The name Jukembal means “the people who say ‘jogom’” (the word for ‘no’).

Limited information is available about the culture of the Jukembal people although numerous artefacts found in the region such as stone axes, spear points and wedges suggest they may have bartered and traded with other groups. Evidence of Jukembal use of the Tenterfield area can be seen in unusual blazes on old trees and the discovery of bora rings in the region.

Comprehensive cultural heritage (Aboriginal or historic) surveys have not been conducted within the planning area.

The first Europeans are thought to have visited the Tenterfield area in the late 1820s and early 1830s. Among the earliest arrivals were Charles Tuckwood and James and Joseph Cowell, who apparently came in the interests of Sir Stuart Alexander Donaldson and Sir Robert Mackenzie (Halliday, 1988).

Records suggest that Donaldson and Mackenzie were partners in Tenterfield Station where together they ran more than 18,000 sheep by 1840 (Halliday, 1988). Robert Mackenzie was the first occupier of Tenterfield with a legal title. Mount Mackenzie, the highest mountain bordering Tenterfield on the south-west, bears his name.

Prior to becoming National Park estate, Currys Gap SCA, Mount Mackenzie NR and Doctors Nose Mountain NR were vacant crown land with grazing leases. Prior to its gazettal Currys Gap SCA served as the western town common. During its use as a common, the reserve was subject to a number of activities, including a training ground for the army, and in recent years a motorbike circuit. The reserve was also subject to grazing, clearing and rubbish dumping including the disposal of old car bodies (since removed).

In 2005, a stone arrangement site was located in Currys Gap SCA. The arrangement closely resembles other stone arrangements found in Currys Gap Travelling Stock Route, adjacent to the reserve and to those found at nearby Boonoo Boonoo National Park. A cultural heritage assessment of the stone arrangements in the area concluded that the stone circles are most likely of military origin, dating back to a time when the area hosted a number of military camps during World War II. Long time local residents of the Tenterfield area concur with the identification of the stone circles as having a military origin, a fact supported by the presence of many other similar constructions in and around Tenterfield, having been definitively identified as military ‘sangers’ (Major, 2005). The historic significance of these ‘sangers’ was unable to be determined by this assessment. The ‘sangers’ are rock structures which are unlikely to be damaged in the future. They are accessed only by walking in the reserve and management trail maintenance and pest control activities will not disturb the sites.

3.4. VISITOR USE

The reserves currently receive low level visitor use. Use is usually limited to low-impact, self-sufficient, nature-based recreation, such as picnicking, bird watching and bushwalking.

There are no visitor facilities or public vehicle trails in Currys Gap SCA. Public pedestrian access to Currys Gap SCA is via a gate on the Mount Mackenzie Road, three kilometres from Tenterfield. No public vehicle access is allowed due to the highly erodible soils as well as the potential to spread weeds and harm threatened flora.

Doctors Nose Mountain NR is not accessible to the public as it is surrounded by private property as such there are no visitor facilities or public vehicle trails provided in the nature reserve.

Mount Mackenzie lookout is accessed through the reserve via Mount Mackenzie Lookout Road nine kilometres from Tenterfield. This is the only public road in the reserve. The lookout at Mount Mackenzie is located on Tenterfield Shire Council land just outside of the reserve.

Visitor facilities at the Council-owned lookout include fireplaces, picnic tables, a toilet, garbage bin and a sheltered cooking galley with a gas BBQ. Approximately 3,500 vehicles (or approximately 8,750 visitors) visit the lookout each year.

Bird watching, photography, sightseeing and picnicking are the most common activities undertaken in these reserves. Recreational activities not consistent with the study of nature and natural environments are generally considered inappropriate uses of a nature reserve. Activities such as horse riding, recreational trail bike riding or four-wheel driving and camping are generally considered inconsistent with the purposes of a nature reserve under the NPW Act and are therefore not permitted within these reserves.

4. ISSUES

4.1. WEEDS AND PEST ANIMALS

The control of all pest species within the planning area is undertaken in accordance with the Northern Tablelands Regional Pest Management Strategy (NPWS, 2007). This strategy identifies appropriate control mechanisms and management strategies for all pest species throughout the Region.

Introduced species within the reserves are of concern because they have detrimental effects on ecological values and can spread throughout the landscape. The Strategy identifies feral goats (*Capra hircus*), European red foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), feral pigs (*Sus scrofa*), feral cats (*Felis catus*) and feral dogs (*Canis lupus familiaris*) as priority pest animal species for the planning area (NPWS, 2007). Impacts from competition, habitat destruction and or predation by these species are all listed as key threatening processes under the TSC Act and the Commonwealth's EPBC Act. Predation by these species and wild dogs may impact on the population sizes of a range of native wildlife, including mammals, ground nesting birds and reptiles.

Historically, wild dog and fox mound-baiting in the reserves has been undertaken by NPWS on an informal basis. A significant management issue is encountered in these reserves in relation to the use of poison baits with neighbouring dwellings and domestic dogs in close proximity. Cooperative baiting strategies have been ongoing in Mount Mackenzie NR since December 2003 and an aerial baiting run was conducted near Mount Mackenzie NR for the first time in 2004. In the event of a wild dog sighting in Currys Gap SCA, trapping is undertaken.

An annual cooperative wild dog and fox mound-baiting program is undertaken by NPWS, the New England Livestock Health and Pest Authority and neighbours adjoining the reserves.

Introduced plants occur in their highest densities and diversity on disturbed ground such as along fire trails, creek lines and on old agricultural lands (Hunter, 2002). Most of the weeds present in the reserves are environmental weeds and would be difficult to eradicate as they are very widespread, such as flatweed (*Hypochaeris sp.)*. It is currently not economically feasible to attempt eradication, but it is believed that these weeds will be out-competed in the future as native species in these cleared areas begin to regenerate.

There is however a need for a pest species program to control introduced species on a prioritised basis to ensure the integrity of the endangered ecological communities within these reserves. Species of most concern in Currys Gap SCA are the tree of heaven (*Ailanthus altissima*), the tiger pear (*Opuntia aurantiaca*) and blackberry (*Rubus fruticosus spp. fruticosus*) (Hunter, 2002). A program to manage and treat tree of heaven, tiger pear and blackberry has taken place on an annual basis and will continue. By comparison, Mount Mackenzie NR has relatively few introduced species of major concern.

An emerging weed control issue for Mount Mackenzie NR is the encroachment of *Berberis floribunda* (an evergreen shrub originating from Asia) into the reserve from adjacent properties. *Berberis* is an invasive species with the potential to produce a prolific number of seeds in palatable berries which are easily spread by birds.

Introduced species of concern in Doctors Nose Mountain NR include the tree of heaven, coolatai grass, *Berberis floribunda* and prickly pear.

Livestock

Livestock straying from neighbouring properties onto the planning area are an ongoing issue at Doctors Nose Nature Reserve. Stock-proof fencing of the boundary between neighbouring properties and the planning area is essential to prevent cattle from straying. Livestock can impact the soil causing erosion and damage native vegetation. They are also a major source of weed translocation from adjacent weedy areas.

4.2. FIREWOOD COLLECTION

Firewood collection is a potential management issue for Mount Mackenzie NR, due to the abundance of timber in the reserve and the close proximity of the reserve to the township of Tenterfield. Signs discouraging the collection of wood from this reserve have been erected at the park entrance on the Mount Mackenzie Lookout Road.

4.3. FIRE

The primary fire management objectives of the 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 and little is known about the response of the Torrington mint bush to wildfire.

The fire history of the reserves has not been formally recorded; however no fires have been recorded in Currys Gap SCA in the last 17 years (J Chapman (Reserve neighbour) 2004, pers. comm., 24 October). This appears to be similar to the fire history of Mount Mackenzie NR. Evidence within this reserve suggests that there have been no fires for more than 20 years.

Doctors Nose Mountain NR does show evidence of recent fire activity, through the prevalence of blady grass and introduced weed species.

Mount Mackenzie NR contains the only reserved occurrence of well developed tall open forest in the Tenterfield area. According to Hunter (2002), the presence of the tall open forest community indicates that it is likely that the reserve has had a regime of high frequency, low intensity fires that has allowed the vegetation to converge into its current form.

Fire in the planning area is most likely to start from burning off activities escaping from neighbouring properties into the reserves.

A separate (map-based) fire management strategy has been prepared for the planning area (NPWS, 2010). The fire management strategy outlines the recent fire history of the planning area, key assets within and adjoining the planning area including sites of natural and cultural heritage value, fire management zones including Strategic and Land management zones and fire control advantages such as management trails and water supply points. Any hazard reduction and ecological burning proposals and fire trail works are submitted annually to the Northern Tablelands Bush Fire Management Committee.

The fire management strategies identify the bushfire threat and requirements for the conservation of native plants and animals and provide a low frequency strategic pattern of burning, incorporating ecological burning principles. The management aim for the planning area is to maintain biodiversity by restricting fires to only part of the distribution of a vegetation community at any one time, ensuring that the fire thresholds are not exceeded, and by excluding fire from some communities such as messmate – manna gum tall open forests.

The NPWS recognises that fire is a natural feature of the landscape and is essential for maintaining species and habitat diversity. The frequency of fire and the season in which it occurs are some of the major factors influencing the abundance, distribution, composition and survival of many plant and animal communities.

Fire management however is complex and not fully understood, and inappropriate fire regimes and practices may cause localised extinction or population reduction of many plant and animal species.

Bushfires that are too frequent disrupt the lifecycles of plants and animals and can cause a loss of vegetation structure and composition. Frequent bushfires are recognised as a Key Threatening Process under the TSC Act. Consequently, the ecological requirements and tolerance of flora and fauna communities needs to be investigated and fire management practices refined over time to ensure the maintenance of flora and fauna communities within the reserves.

4.4. INFRASTRUCTURE AND MAINTENANCE

Only one major internal management trail occurs in Currys Gap SCA (see Map 1). This trail is maintained for fire and pest management to a four-wheel drive, dry weather standard. Some smaller tracks extend away from the main track and may be

formalised as walking tracks in the future. These smaller tracks represent an erosion risk and are not currently maintained.

Management access to Mount Mackenzie NR is via a council road, Mount Mackenzie Lookout Road.

There are no management trails in Doctors Nose Mountain NR.

There are no power lines or beekeeping sites within Currys Gap SCA, Mount Mackenzie NR or Doctors Nose Mountain NR.

A road reserve currently runs through Currys Gap SCA. The NPWS has consulted with Tenterfield Shire Council, the Department of Lands and the Roads and Traffic Authority and has applied for the road reserve to be closed and transferred to NPWS estate.

A road reserve also runs through Mount Mackenzie NR to the lookout on top of Mount Mackenzie. The Lookout Road is not aligned with the existing road reserve. NPWS will consult with Tenterfield Shire Council and Department of Lands to have the road reserve realigned with the formed Mount Mackenzie Lookout Road.

A radio tower facility is located on top of Mount Mackenzie which is used by a number of Government agencies including NPWS and is accessed via Mount Mackenzie Lookout Road (through the reserve).

4.5. ISOLATION AND FRAGMENTATION

The area surrounding all three 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 vegetated areas contribute to the habitat values of the reserve and provide ecological corridors to other vegetated areas. Maintaining the integrity of the remaining habitat within the reserve and, where possible, linking this to adjacent areas of vegetation to facilitate wildlife corridors is important in ensuring long term viability of the reserve's biological values.

The reserves form part of the east-west corridor on the Northern Tablelands. Currys Gap SCA has been extensively cleared in the past for grazing and lacks hollow bearing trees. By comparison Mount Mackenzie NR has had minor disturbance through grazing and tree poisoning. Doctors Nose Mountain NR has previously been used for grazing and subsequently been infested in some areas by weeds and subject to frequent fire regimes and some tree poisoning.

Forested properties adjacent to the reserves (particularly Mount Mackenzie NR) are of high conservation value for their connectivity to other reserved land, enabling them to function as wildlife corridors.

4.6. CLIMATE CHANGE

Climate change has been listed as a key threatening process under the TSC Act. The 2007 CSIRO report on climate change in the Border Rivers-Gwydir Catchment notes that since 1950 the region has experienced warming of around 0.8–1.3ºC, partially attributable to human activities. In this period there has been little change in rainfall, with data indicating trends in the order of ±5 mm per decade, however the contribution of human activities to rainfall changes is hard to distinguish from natural variability. The report notes that the future climate of the Border Rivers-Gwydir Catchment is likely to be warmer and drier leading to increases in evaporation, heat waves, extreme winds and fire risk. Nevertheless, despite this trend toward drier conditions, there is also potential for increases in extreme rainfall events.

Climate change may significantly affect biodiversity by changing population size and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration and pressure from feral animals. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates. Climate change is likely to be a concern to peppermint woodlands whilst little is known about its impact on species such as the border thick tailed gecko (CSIRO, 2007).

Programs to reduce the pressures arising from other threats, such as habitat fragmentation, invasive species, bushfires, pollution and urban expansion, will help reduce the severity of the effects of climate change.

5. REFERENCES

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6. IMPLEMENTATION

Current Situation	Desired Outcomes	Management Response	Priority
6.1. On-Park Ecological Conservation A comprehensive flora and fauna survey has been conducted for Currys Gap SCA and Mount Mackenzie NR. No surveys have been completed for Doctors Nose Mountain NR. The surveyed reserves support 10 regionally uncommon flora species and the mintbush, *Prostanthera staurophylla*, which is endemic to Mount Mackenzie NR and is considered endangered. There are five threatened fauna species recorded in the reserves (refer to Section 3.2). The reserves contain the New England Peppermint – Yellow Box Woodland and White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Communities. A significant area of Currys Gap SCA is in a degraded state from previous agricultural enterprises.	Native plant and animal species and communities are conserved. Landscape and catchment values are protected. The effects of climate change on natural systems are reduced.	6.1.1. Implement relevant actions in the Threatened Species Priorities Action Statement and recovery plans for threatened species and communities in the planning area. 6.1.2. Continue existing fire, pest and weed management programs to protect biodiversity values and increase the planning area's ability to cope with future disturbances, including climate change, and encourage research into appropriate indicators to monitor the effects of climate change. 6.1.3. Encourage surveys to improve knowledge of the plants and animals in the planning area. Priority for surveys will be given to Doctors Nose Mountain NR. 6.1.4. Encourage research into the fire ecology of threatened plants, endangered ecological communities and animals. 6.1.5. Monitor *Prostanthera staurophylla* (endangered species) in Mount Mackenzie NR. 6.1.6. Allow natural revegetation of old agricultural lands.	High Ongoing High Ongoing Medium Ongoing Medium Ongoing Medium Ongoing Low Ongoing

Current Situation	Desired Outcomes	Management Response	Priority
6.2. Cultural Heritage No detailed surveys for cultural heritage areas have been conducted in the reserves. To date the only cultural heritage sites identified in the planning area are the military stone arrangements in Currys Gap SCA (refer to Section 3.3).	Aboriginal places and values are identified and protected. Historic features are appropriately conserved and managed. Understanding of the cultural values of the park is improved.	6.2.1. Encourage further research into the Aboriginal and European cultural significance of sites and values in the planning area. 6.2.2. Consult and involve the Moombahlene Local Aboriginal Land Council and other appropriate members of the Aboriginal community in the management of Aboriginal sites, places and values. 6.2.3. Record the cultural heritage of the reserves through historical records and oral history.	High Ongoing High Ongoing Medium Ongoing
6.3. Visitor Use The planning area currently receives low levels of visitor use. This use is generally low-impact, self-sufficient, nature based recreation, such as bird watching and bushwalking (refer to Section 3.4). Public access to Currys Gap SCA is via a gate on the Mount Mackenzie Road, three kilometres from Tenterfield. No public vehicle access is permitted in Currys Gap SCA Doctors Nose Mountain NR is surrounded by private property. Mount Mackenzie NR and lookout is accessed via the public Mount Mackenzie Lookout Road.	Visitor use is appropriate and ecologically sustainable. Negative impacts of visitors on park are stable or diminishing.	6.3.1. Permit low impact self-reliant recreation on management trails in Mount Mackenzie NR and Currys Gap SCA, such as bushwalking, bicycling, bird watching and nature observation. Recreation is not encouraged in Doctors Nose Mountain NR as it is surrounded by private property. 6.3.2. Upgrade interpretative material in Mount Mackenzie NR at the Lookout and in Currys Gap SCA near the main entrance to the reserve.	Medium Ongoing Low Ongoing

Current Situation	Desired Outcomes	Management Response	Priority
6.4. Weeds and Pest Animals The Northern Tablelands Region Pest Management Strategy (NPWS, 2007) has been developed for the region as a whole. This strategy identifies pest populations, priorities for control and suggested control methods. A number of pest plants occur in the planning area, predominantly around disturbed areas (refer to Section 4). Species of particular concern include tree of heaven, tiger pear, blackberry and *Berberis floribunda*. Pest animals include feral goats, European red foxes, rabbits, feral pigs, feral cats and feral dogs (refer to Section 4.1). These species have the potential to impact on threatened plants and prey on native wildlife. Stray stock from neighbouring pastoral properties occasionally enters the reserves and may also impact on natural values of the reserve. Appropriate fencing is important to minimise this.	Introduced plants and animals are controlled and where possible eliminated. Negative impacts of weeds and pest animals on park values are stable or diminishing. Pest control programs are undertaken where appropriate in consultation with neighbours.	6.4.1. Manage introduced species in accordance with the Regional Pest Management Strategy. Priority for ongoing control programs will be given to wild dogs, goats, pigs, foxes, African lovegrass, coolatai grass, tiger pear, tree of heaven, *Berberis* and blackberry. 6.4.2. Survey and monitor the planning area to determine the presence and extent of introduced species. 6.4.3. Seek the cooperation of neighbours in implementing weed and pest control programs. Undertake control in cooperation with the Tenterfield Livestock Health Pest Authority. 6.4.4. Encourage the construction and maintenance of boundary fences to exclude livestock from the planning area. Fencing assistance may be provided in accordance with NPWS policy.	High Ongoing Medium Ongoing High Ongoing Medium Ongoing

Current Situation	Desired Outcomes	Management Response	Priority
6.5. Fire Management 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. The Currys Gap SCA, Mount Mackenzie NR and Doctors Nose Mountain NR Fire Management Strategy was approved in 2010. The fire history of the planning area is largely unknown (refer to Section 4.3).	Life, property and natural and cultural values are protected from fire. Fire regimes are appropriate for conservation of native plant and animal communities.	6.5.1. Implement the Reserve Fire Management Strategy for the planning area. 6.5.2. Participate in the Bush Fire Management Committee. Maintain coordination and cooperation with Rural Fire Service, Forests NSW and neighbours regarding fuel management, fire suppression and notification procedures. 6.5.3. Manage the planning area to protect biodiversity in accordance with the identified fire regimes/thresholds in the fire management strategy.	High Ongoing High Ongoing High Ongoing
6.6. Infrastructure and Maintenance Currys Gap SCA has both an easement for a public road and a management trail running through the reserve. Mount Mackenzie has a public road and an easement, which are not aligned (refer to Section 4.3).	Management facilities and operations adequately serve management needs and have minimal impact. Infrastructure and assets are routinely maintained.	6.6.1. Acquire the road reserve through Currys Gap SCA. 6.6.2. Investigate adapting the disused trails in Currys Gap SCA to provide a series of walking trails and implement if appropriate. 6.6.3. Realign the easement in Mount Mackenzie NR to match the location of the public road. 6.6.4. Maintain trails for management purposes to 4WD dry weather standard (refer to Map1).	Low Low Low High Ongoing

*** 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.

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.