

TUCKI TUCKI NATURE RESERVE

PLAN OF MANAGEMENT

National Parks and Wildlife Service

Part of the Department of Environment and Climate Change NSW

July 2008

This plan of management was adopted by the Minister for Climate Change and the Environment on 21st July 2008.

ACKNOWLEDGMENTS

This plan of management is based on draft plan prepared by staff of the Northern Rivers Region NPWS, based on a preliminary draft prepared by Sascha Cole, Kiersten Judd and Joanne Reardon as part of a Southern Cross University student project.

Valuable assistance including information and comments were also provided by Sharon McGrigor from the Northern Rivers Regional Advisory Committee, Friends of the Koala Inc. Northern Rivers, and local residents Jim Ormond and Ray Hunt.

For additional information or enquires about any aspect of the plan, contact the NPWS Richmond River Area Office at 75 Main Street, Alstonville (PO Box 856, Alstonville) NSW 2478 or by phone (02) 6627 0217.

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FOREWORD

Tucki Tucki Nature Reserve is located approximately 15 kilometres southeast of Lismore and 5.5 kilometres south of Wyrallah in northern New South Wales. The reserve comprises two separate portions totaling 4.47 hectares.

Tucki Tucki Nature Reserve was originally reserved as a fauna reserve in 1963 to protect habitat in the area. Prior to the reserve's gazettal, local residents planted over four hectares of land on and adjacent to the reserve with a variety of trees to provide food and shelter for the district's diminishing koala population.

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

A draft plan of management for Tucki Tucki Nature Reserve was placed on public exhibition from 10th November 2006 until 26th February 2007. The submissions received were carefully considered before adopting this plan.

This plan contains a number of actions to achieve "Better environmental outcomes for native vegetation, biodiversity, land, rivers, and coastal waterways" (Priority E4 in the State Plan) including strategies to increase the number of koala food trees in and around the reserve, and the provision of a small number of plant identification and koala identification signs at strategic sites along its route.

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

Verity Firth
Minister for Climate Change and the Environment

1. MANAGEMENT CONTEXT

1.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the NPW Regulation 2002, the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). Section 72AA of the NPW Act lists the matters to be considered in the preparation of a plan of management. The policies are compiled from the legislative background, the NPWS corporate goals and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

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

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

1.2 MANAGEMENT PURPOSES AND PRINCIPLES

1.2.1 General Objectives for 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, 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.

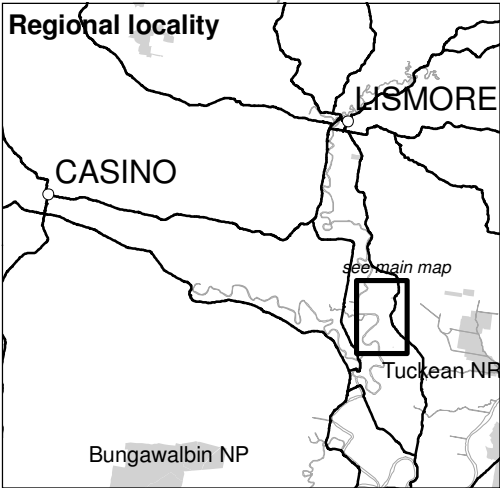
Nature reserves differ from national parks in that they do not have as a management principle to provide for visitor use.







1.2.2 Specific Management Objectives for Tucki Tucki Nature Reserve

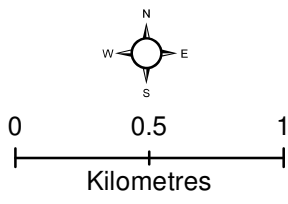
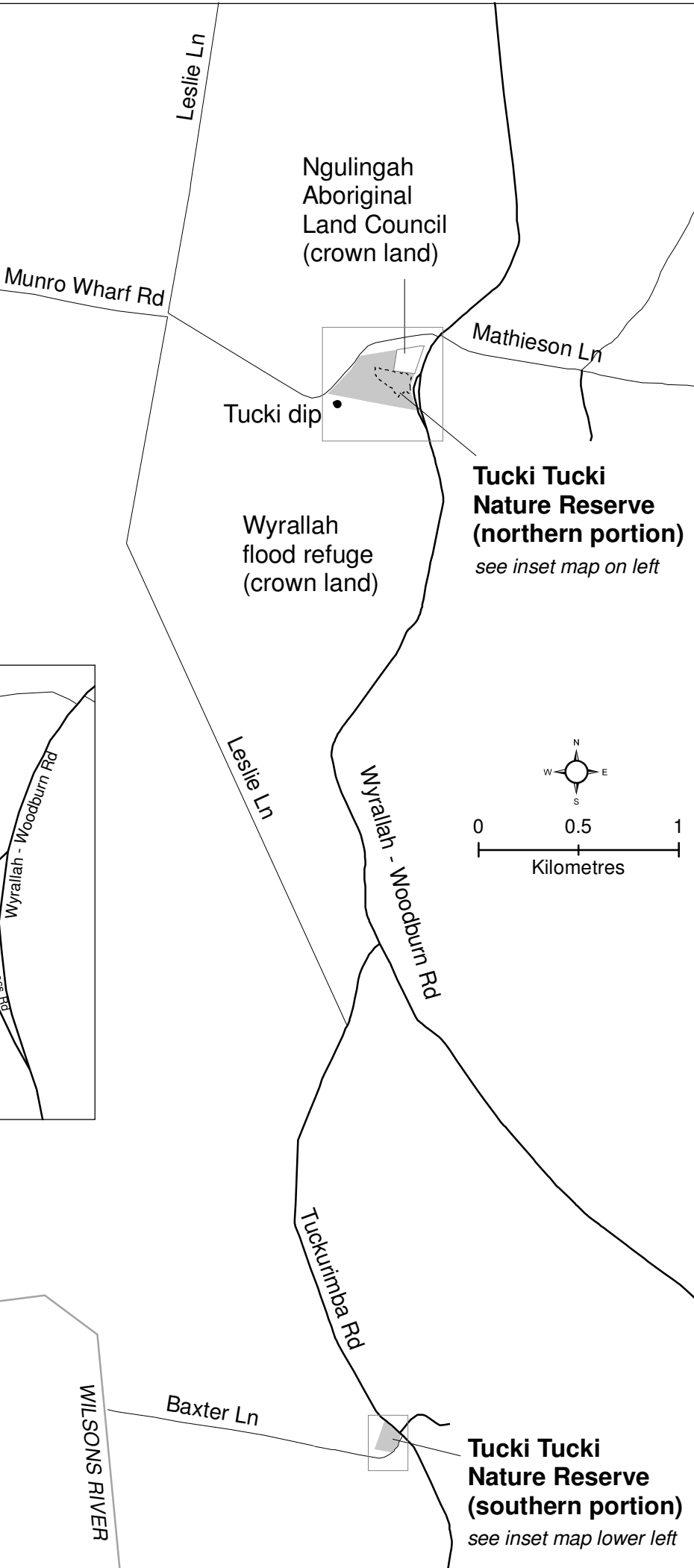
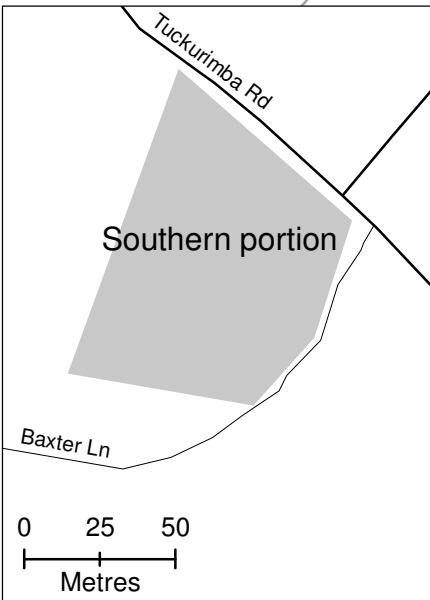
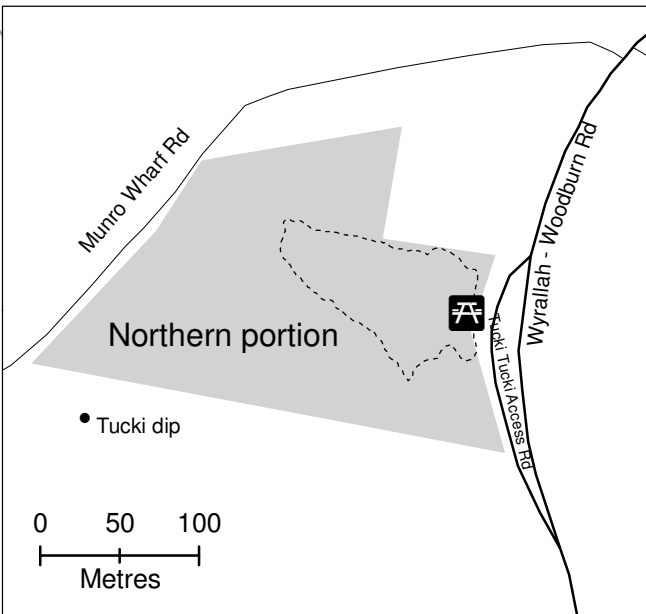
The primary emphasis of this plan is the conservation of the natural and cultural values of the reserve, and in particular the koala (*Phascolarctus cinereus*). Visitor opportunities

that are compatible with and promote the understanding of these values will also be provided. The specific management objectives for Tucki Tucki Nature Reserve are to:

- conserve, protect and monitor the reserve's koala population;
- manage vegetation in the reserve, including fire regimes suitable for koala habitat;
- ensure that the use of the reserve is principally for scientific and educational purposes compatible with koala conservation and other values of the reserve;
- encourage regeneration and protection of koala habitat on adjoining lands;
- recognise the long standing contribution of the community in the conservation of koala habitat in the area and continue to involve the community in the management and protection of the reserve's values;
- protect the traditional and contemporary Aboriginal cultural heritage values associated with the reserve in partnership with the local Aboriginal community; and
- encourage appropriate research into the values of the reserve, and in particular, the koala and its habitat.



-  Day use area (with Asset Protection Zone)
-  Main road
-  Minor road or lane
-  Walking track
-  Major river
-  NPWS estate (Land Management Zone)



2 TUCKI TUCKI NATURE RESERVE

2.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Tucki Tucki Nature Reserve (referred to as ‘the reserve’ in this plan) is located approximately 15 kilometres southeast of Lismore and 5.5 kilometres south of Wyrallah in northern New South Wales. The reserve comprises two separate portions totalling 4.47 hectares (see map). The northern portion is 3.86 hectares and bounded by Wyrallah Road to the east and Munroe Wharf Road to the north. The southern portion is 0.61 hectares and is located approximately 2.5 kilometres south of the northern portion, at the junction of Tuckurimba Road and Baxter Lane.

The area was gazetted as a Fauna Reserve in 1963 following community concerns raised by the Tucki-Tuckurimba Koala Preservation Committee about declining koala numbers and loss of habitat in the area (refer 2.3.5). In 1967 it became a nature reserve under the NPW Act.

Tucki Tucki is thought to come from an Aboriginal name ‘Tooki Tooki’ which is reputed to be the name for a bird that lived in the area that made a sound like ‘Tookie Tookie’.

The Wilsons River floodplain lies to the west and south of the northern portion of the reserve. Approximately 100 hectares of Crown land adjoining the reserve is designated as a “Refuge in time of flood under the care control and management of the Wyrallah Flood Refuge Reserve Trust”. To the north, land use is predominantly open farmland and to the east is an area of *Melaleuca* swamp forest. Land to the north-east is owned by the Ngulingah Local Aboriginal Land Council (LALC).

The southern portion of the reserve is bounded by public road to the north, east and south, and freehold land to the west. The reserve falls within the Lismore City Council Local Government Area (LGA) and the Ngulingah LALC

2.2 LANDSCAPE

Natural and cultural heritage and their on-going use are strongly inter-related and together form the landscape of an area. Much of the Australian environment has been influenced by past Aboriginal and non-Aboriginal land use practices, and the activities of modern day Australians continue to influence bushland through recreational use, cultural practices and the presence of introduced plants and animals.

The geology, landform, climate and plant and animal communities of the area, plus its location, have determined how humans have used it. Post European settlement the native vegetation was largely cleared for timber and grazing. There has been a long history of community interest in the conservation of koala habitat in the area, which has influenced the values and use of the reserve by the local community and visitors.

Both Aboriginal and non-Aboriginal people place cultural values on natural areas, which may include aesthetic, social, spiritual, recreational and other values. Cultural values may be attached to the landscape either as a whole or to individual components, for example: to plant and animal species. 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.

2.3 NATURAL AND CULTURAL HERITAGE

2.3.1 Landform, Geology and Soils

The reserve has a generally north-west aspect with a gentle slope and no distinct drainage lines. Surface runoff drains westward towards the Wilsons River floodplain. Elevation of the reserve is between 10-40m above sea level.

The geology of the northern portion of the reserve consists of Lismore Basalt, derived from the Lamington Volcanics from the Tertiary period.

Kangaroo Creek Sandstone occurs on the footslopes and low hills of the reserve's southern portion, consisting of a quartz arenite, minor quartz and lithic conglomerate.

Soils of the reserve are generally red, yellow and brownish red podsol on slopes or sandy loam, hardsetting and moderately to highly erodible, with low to moderate fertility (Morand 1994; RVNC & LGMS 1975). An area of erosion exists in the north-eastern corner of the southern portion of the reserve originating from a stormwater drain outside the reserve.

2.3.2 Native Animals

The reserve has long been recognised in the Lismore area for its values as koala habitat. In 1958 residents of the Tucki District formed a committee to preserve the local koala population and its habitat (refer 2.3.5 Historic Heritage). Prior to the reserve's gazettal, local residents planted over four hectares of land on and adjacent to the reserve with a variety of trees to provide food and shelter for the district's diminishing koala population.

Following a 1976 survey, all koalas in the reserve were translocated to the Richmond Range 100km away. Relocation of the koalas aimed to avert the possibility of a future crash in koala numbers due to overgrazing and to provide a vacant area of suitable food trees for immigrant yearlings and possibly nomadic adult koalas (Gall, 1980). The NPWS Atlas for Wildlife currently lists 18 koalas in the reserve however surveys in February and September 2005 were only able to locate 8 individuals (McGrigor 2005).

Koalas have suffered dramatic declines in numbers and distribution since the arrival of Europeans and are listed as a vulnerable species on Schedule 2 of the TSC Act. Koalas are highly susceptible to stress caused by loss of habitat, harassment by domestic pets and overcrowding in small forest remnants (refer 2.6 Threats to Reserve Values).

Threatened species require special management consideration to promote their recovery under the TSC Act. Under the TSC Act and *Threatened Species Legislation Amendment Act 2004* recovery plans may be prepared to identify actions and priorities for threatened species, populations and ecological communities. Also under these Acts, a threatened species Priorities Action Statement (PAS) must be prepared. The PAS outlines the broad strategies and detailed priority action in NSW to promote the recovery of threatened species, populations and ecological communities and to manage key threatening processes. The PAS and Recovery Plans will be used to guide management of threatened species in the area.

A Draft Recovery Plan for the Koala (NPWS 2003) has been prepared which considers the conservation requirements of the species across its known range in NSW. It

identifies actions to be taken to ensure the long-term viability of the koala in nature and provides a framework for localised koala recovery efforts. Among other things, the recovery plan actions are aimed at identifying koala habitat and prioritising on-ground management actions, identifying research priorities and increasing awareness regarding the management and conservation of koalas.

Although most research in the reserve has focused on koalas, the NPWS Wildlife Atlas records indicate 44 bird, 3 mammal and 1 frog species in the northern portion of the reserve. As well as the koala, the wompoo fruit-dove (*Ptilinopus magnificus*) is also listed as vulnerable under schedule 2 of the TSC Act. There is no species list for the southern portion of the reserve.

2.3.3 Native Plants

The reserve is unusual in that the both portions have been specifically planted and managed to provide habitat and food trees for koalas. There has been a long history of community involvement in the planting of vegetation which predates gazettal of the reserve (refer 2.3.5 Historic Heritage). Apart from the swamp forests to the east, which are dominated by melaleucas, no extensive tracts of original vegetation remain in the area. The original native vegetation was cleared from the reserve in the 1800s for agriculture but it is likely that it would have been dry rainforest.

Vegetation in the reserve is now dominated by planted eucalypt species, including tallwood (*Eucalyptus microcorys*), blackbutt (*E. pilularis*), flooded gum (*E. grandis*), swamp mahogany (*E. robusta*), forest red gum (*E. tereticornis*) and mountain blue gum (*E. deanei*) (S. Phillips 2002, pers comm). These eucalypts are all local koala food tree species, except the mountain blue gum, which is indigenous to southern Australia. Some of the trees originally planted in the reserve by residents for koala conservation have suffered from overgrazing which has necessitated further planting. Green Corps and local community groups have undertaken supplementary planting of eucalyptus seedlings.

Natural eucalypt regeneration does not appear to be occurring within the reserve. Some rainforest species are present, such as sweet pittosporum (*Pittosporum undulatum*), as well as various native vines, ferns and ground cover species. There is a concern that rainforest trees may establish in the reserve, forming a mixed forest that may ultimately result in a rainforest community at the expense of the eucalypt forest (R. Joseph 1995, S. Phillips 2002 pers comm). If this was to occur it may threaten existing koala habitat. It has been observed, however, that weed species in the reserve are hindering regeneration of rainforest species and also restricting koala access between food trees (R. Joseph 1995). These interactions between desirable native plant species, undesirable native plants, weeds and fauna illustrate the complex dynamics of this ecosystem. Monitoring is therefore required to determine appropriate revegetation works.

A comprehensive flora survey has not been undertaken for either portion of the reserve but a preliminary flora list is provided in NPWS Wildlife ATLAS. There is currently no information on threatened plant species in the reserve.

2.3.4 Aboriginal Heritage

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

The reserve falls within the area of the Bundjalung nation. The northern portion of the reserve falls within the Widjabul tribal area and the southern portion is in the Bandjalang tribal area. Crown Land to the north-east of the reserve is managed by the Ngulingah Local Aboriginal Land Council. There is currently a Native Title application (Register number NC01/7) that includes the reserve.

Although no Aboriginal heritage sites have been recorded in the reserve, it forms part of a landscape important to the local Aboriginal people. A number of Aboriginal sites have been recorded in the nearby area. A ceremonial ring is located 2km north of the reserve, within what is now the Tucki Cemetery, where ceremonies were held up until the early 1800s when a second ring existed to the south west of the reserve.

2.3.5 Historic Heritage

European settlement of the Lismore district commenced in 1843 with the arrival of sheep and cattle graziers followed by the cedar cutters. Between the 1840s and 1860s much of the area including the reserve was cleared of native vegetation.

While there are no recorded historic heritage sites in the reserve there has been a long history of local community interest in the conservation values of the area dating back to the early 1900s.

In the 1930s concerns were raised about the removal of koalas from the area for relocation to Sydney and it was proposed that the Gundurimba Shire Council allocate land for an official koala park (Northern Star, 1957; NPWS files, archival letters). Land adjacent to the northern portion of the reserve was handed over by the Council to the Department of Education in 1937 for a school and later reverted to the management of the Department Land and Water Conservation).

During the 1950s continued public concern about declining koalas numbers led to the establishment of the Tucki-Tuckurimba Koala Preservation Committee. The Committee organised the planting of eucalypts as koala food trees and conducted regular surveys of koala numbers in the area now reserved. In 1963 that the conservation status of the reserve was formally recognised with its gazettal as a Fauna Reserve.

The reserve is identified on the State Heritage inventory as a “landscape item”. The inventory identifies the significance of the reserve as a notable local initiative for the conservation of koala habitat going back to the 1950’s and of natural and scientific significance (Register of National Estate, 1978 NSW Heritage Office 2006). The reserve is also listed in the Lismore Local Environmental Plan 2000 as a Heritage Item.

A visitor shelter near the entrance predates the reserve’s gazettal and requires assessment to determine if it has any heritage value.

2.4 VISITOR USE

The northern portion of the reserve has long been a destination for locals and visitors to the area wishing to view koalas. Friends of the Koala Inc promote a self-drive “Koala Tour” as part of their education and public information program, which includes visits to the reserve. Vehicle access to this portion of the reserve is off the Wyrallah-Woodburn Road.

Current day-use facilities in the northern portion of the reserve include a small gravel parking area, paved pathway, shelter, wood-fired BBQ, picnic tables, interpretive signs and a log seat. A concrete slab, pipe, tap and trough is located north of the day visitor area. Most facilities are more than 20 years old and in a deteriorated condition. Some of the information panels on the interpretation sign are missing and others require updating. Fencing and the turnstile at the entrance to the reserve are in a poor condition and outdated. There have been incidences of unauthorised camping which conflicts with day use of the reserve and may adversely impact on the small koala population and other values of the reserve.

Recreational use of the smaller southern portion of the reserve is low and no visitor facilities will be provided within this area.

Visitor use must not compromise reserve values and should be consistent with the purposes of nature reserves. Appropriate uses are those orientated towards education, appreciation, enjoyment and understanding of the reserves natural and heritage values and that are ecologically sustainable.

A number of other areas nearby provide for a diverse range of recreation opportunities and facilities, these include Victoria Park Nature Reserve; Lumley Park in Alstonville; and various council parks in Lismore.

2.5 RESEARCH

A large volume of research has been and is being conducted on koalas in NSW. This extensive research forms the basis of our knowledge about koalas and the platform on which the draft Recovery Plan for the Koala has been developed (NPWS 2003). A range of guidelines for the survey of koalas and koala habitat have also been prepared.

To date the major focus for research in the reserve has been on koalas and koala habitat. A study between 1972-1976 reported on the ecology of koalas in the reserve and identified a resident population of 11 or 12 koalas and a mean total population of 26.5 (Gall, 1980). The study identified 11 or 12 resident adults, comprising 3 males and 8 or 9 females as the optimum social structure for the reserve. In 1985 the National Koala Survey recorded 25 koalas in the reserve. A number of incidental surveys have also recorded koala numbers in the reserve.

Friends of the Koala Inc also provide an important role in the monitoring of koalas in the reserve and surrounding area. Their records of animals brought in for care, their injuries and their fate can be used to identify patterns at the local scale and contribute to future monitoring programs in the reserve.

2.6 THREATS TO RESERVE VALUES

2.6.1 Fire

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

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

The NPWS uses a zoning system for bushfire management in its reserves. NPWS zones are compatible with the system adopted by the Bushfire Coordinating Committee for use in District Bushfire Management Committee (DBFMC) bushfire risk management plans.

The NPWS approach to fire management planning is based on the level of complexity and risk to the reserve. In regard to Tucki Tucki Nature Reserve, a fire management strategy has been prepared for the reserve and are summarised in this plan of management.

The most recent fires in the reserve were in 1991, 2000 and 2004. In 1991 part of the northern portion of the reserve was burnt to suppress rainforest seedlings, while encouraging eucalypt regeneration and growth. A small-unauthorised fire, believed to be deliberately lit, occurred just outside the reserve's northern portion in 2000 and burnt the north-eastern portion of the reserve. In 2004 an unplanned fire burnt most of the northern portion of the reserve causing significant damage to native vegetation and several koala mortalities.

NPWS has assessed the reserve for fire management planning purposes and has identified the Tucki Day Use Asset Protection Zone (APZ) around the day use area, with the balance of both portions of the reserve zoned as a Land Management Zone (LMZ). The primary fire management objectives for the LMZ are to protect culturally significant sites and prevent the extinction of all species that are known to occur naturally within the reserve. Specifically for this reserve, the LMZ for the northern portion will be managed to protect koala populations and their habitat.

Fire management of the northern and southern portions of the reserve focuses on maintaining appropriate fire regimes on elevated and exposed slopes and ridges for the successful germination of eucalypt species suitable for local koala populations. Wildfires will be excluded from entering the reserve where possible.

NPWS maintains cooperative arrangements with surrounding landowners and the Rural Fire Service (RFS) brigades and is actively involved with the Northern Rivers Bush Fire Management Committee. Cooperative arrangements include fire planning, fuel management and information sharing.

2.6.2 Introduced plants

The northern portion of the reserve contains dense infestations of pest plant species occurring under a disturbed eucalypt canopy. These weed infestations inhibit germination of native seed vegetation.

Climbing weeds such as cats claw creeper (*Macfadyena unguis-cati*), white passionfruit (*Passiflora subpeltata*), corky passionfruit (*P. suberosa*) and asparagus fern (*Protasparagus africanus*) completely smother native vegetation and threaten the development of understorey species (Ford 2005; Joseph 1995). Lantana (*Lantana camara*) has formed a dense understorey throughout the reserve, and tradescantia (*Tradescantia fluminensis*) is fairly widespread on the south-east corner of the southern portion of the reserve.

A number of introduced species are present in surrounding lands and pose a threat to the reserve including winter senna (*Senna x floribunda*), Madeira vine (*Anreadeira cordifoli*) and ink weed (*Phytolacca octandra*). Weeds such as camphour laurel (*Cinnamomum camphora*), privet (*Ligustrum spp*) and wild tobacco (*Solanum mauritianum*) are also commonly dispersed by birds, and so may be brought to the reserve from greater distances.

A Restoration and Rehabilitation Plan was prepared for the reserve in 1995. The plan addresses the replacement of weed understorey and groundcovers and encouragement of natural regeneration of native species rather than the implementation of a planting program. Target species for control include cats claw, lantana, asparagus and passionfruit species (Joseph 1995).

Following a fire in the reserve in 2004 introduced weeds took advantage of the increased light conditions and quickly invaded and dominated. Since early 2005 a program of systematic weed control has focussed on target weeds, specifically cats claw creeper, asparagus fern, coral berry (*Rivina humilis*) and ink weed (Ford 2005).

Ongoing maintenance is required. A review of the Restoration and Rehabilitation Plan may identify further threats to the reserve from additional weed species and changes to priorities for weed control.

2.6.3 Introduced animals

Attacks by wild and domestic dogs are a significant cause of koala death and injury in NSW. Attack by dogs are expected to be more common during the breeding season when koalas are more active and moving through cleared areas (NPWS 2003). Records maintained by Friends of the Koala Inc indicate that since 1989 there have been 7 koala deaths that can be attributed directly to dog attacks in the Tucki Tucki/Wyrallah area (Vass, 2006) but none have been recorded in the reserve.

Occasional trampling and grazing of vegetation by cattle from neighbouring properties has occurred due to the deteriorated state of fencing along some areas of the reserves boundaries.

Pest animal species have not been identified as major problem in the reserve. Because of the small size of the reserve, any pest animal control should be carried out in conjunction with reserve neighbours.

2.6.4 Isolation and fragmentation of the reserve

Past clearing of vegetation in the surrounding area has resulted in loss of biodiversity and fragmentation of habitat. Loss, fragmentation and degradation of habitat are significant threats to koalas throughout their range. Due to habitat fragmentation, koalas, which can be highly nomadic, must travel through cleared areas where they are vulnerable to death on roads and predation by dogs. Where fragmentation reduces or prevents successful dispersal and recruitment between populations the number of animals may decrease over time due to threats such as predation, stress related disease and death on roads (NPWS 2003).

The reserve's small size and isolation of habitat threaten the long-term viability of resident populations of native fauna in the reserve, and in particular the local koala population. Information provided by Friends of the Koala Inc indicate that most koala deaths in the area can be attributed to disease, motor vehicles, fire and dogs (Vass, 2006). Friends of the Koala Inc play an important role in the rescue, rehabilitation and release of injured, orphaned and diseased koalas in the Lismore area.

Long term conservation of biodiversity both within the region and locally within the reserve depends upon protection, enhancement and connection of remaining habitat across the landscape, involving public and private land remnants. Revegetation and conservation of remaining areas of adjoining forested land, including the adjoining 100ha flood reserve, is important to maintaining biodiversity.

Tree corridors have also been planted by community groups to link the reserve with other nearby koala habitats. Other initiatives which may assist in the enhancement of koala habitat outside the reserve system include Voluntary Conservation Agreements (VCAs), Wildlife Refuges and Land for Wildlife.

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4 MANAGEMENT ISSUES AND STRATEGIES

Current Situation	Desired Outcomes	Strategies	Priority
<p>4.1 Soil and water conservation Surface runoff from the northern portion of the reserve drains westward towards the Wilsons River floodplain.</p> <p>Stormwater runoff from a drain under Tuckurimba Road has caused gully erosion in the southern portion of the reserve.</p>	<ul style="list-style-type: none"> • Soil profiles are undisturbed and soil erosion is minimised. • Areas of gully erosion in the southern portion of the reserve are rehabilitated. 	<p>4.1.1. Undertake all works in a manner to minimise erosion and soil disturbance in the reserve</p> <p>4.1.2. Liaise with council and RTA about works to prevent further gully erosion in the southern portion of the reserve from stormwater runoff and undertake appropriate rehabilitation works.</p>	<p>Medium</p> <p>Medium</p>
<p>4.2 Native plant and animal conservation The koala is listed as a vulnerable species under the TSC Act. A draft Recovery Plan has been prepared for the koala in NSW, which provides a framework for koala recovery efforts.</p> <p>The reserve provides important local habitat for koalas and has been specifically planted and managed for koala conservation.</p> <p>Limited eucalypt regrowth, rainforest/wet sclerophyll encroachment and inappropriate fire regimes are potential threats to koala habitat in the reserve.</p> <p>In 1976 koalas were relocated from the reserve to avert the possibility of overgrazing and to allow other koalas to re-establish in the reserve.</p> <p>Loss, fragmentation and degradation of habitat are the major threats to koalas in the area. Most koala deaths in the reserve and surrounding area can be attributed to disease, cars, fire and dogs.</p>	<ul style="list-style-type: none"> • The reserves koala population is maintained. • Vegetation in the reserve is managed to provide suitable food trees and habitat for koalas. • An expansion in the extent and connectivity of koala habitat in surrounding lands. • Knowledge of plant and animals in the reserve is improved. 	<p>4.2.1. Ensure that the management of the reserve is consistent with the approved Koala Recovery Plan and PAS.</p> <p>4.2.2. Review the Restoration and Rehabilitation Plan for the reserve and develop strategies for monitoring natural revegetation of koala food trees to determine future revegetation works and appropriate fire regimes. This may include planting of local eucalypt seedlings as koala food trees where natural regeneration is not sufficient and threatens the viability of koala habitat in the reserve (refer also 4.3.2 and 4.4 Fire Management).</p> <p>4.2.3. Translocation of koalas will only be considered where consistent with NPWS Policy for the Translocation of Threatened Fauna and the Koala Recovery Plan.</p> <p>4.2.4. Work with neighbours and community organisations such as Friends of the Koala to encourage conservation and planting of native vegetation, especially koala food trees, in the vicinity of the reserve and along local wildlife corridors.</p>	<p>High</p> <p>High</p> <p>High</p> <p>Medium</p>

Current Situation	Desired Outcomes	Strategies	Priority
<p>NPWS records indicate a diversity of bird species in the northern and southern portions of the reserve but extensive flora and fauna survey work has not been undertaken.</p>		<p>4.2.5 Investigate Crown land adjacent to the reserve for inclusion as part of the reserve in future.</p> <p>4.2.6 Investigate appropriate traffic calming measures along Wyrallah Road (such as warning signs or speed restrictions) with RTA/Council to minimise koala road deaths adjacent to the reserve.</p>	<p>Medium</p> <p>High</p>
<p>4.3 Pest plant and animal species A Restoration and Rehabilitation Plan was prepared for the reserve in 1995. Following a fire in the northern portion of the reserve in 2004 weeds quickly invaded and dominated. Since early 2005 a program of systematic weed control has focussed on target weeds, specifically cats claw creeper, asparagus fern, coral berry and ink weed.</p> <p>Introduced species such as winter senna, Madeira vine and ink weed on surrounding lands may also threaten reserve values. Camphor laurel, privet and wild tobacco are commonly dispersed by birds from greater distances.</p> <p>On occasion there has been trampling and grazing of vegetation by cattle entering the reserve through incomplete fencing.</p> <p>Since 1989 there have been 7 koala deaths that can be attributed directly to dog attacks in the Tucki Tucki/ Wyrallah area.</p>	<ul style="list-style-type: none"> • The impact of introduced species on native species and neighbouring lands is minimised. • Pest control programs are undertaken in consultation with neighbours. 	<p>4.3.1 Continue current weed control programs targeting cats claw creeper, asparagus fern, coral berry and ink weed with the aim of replacement by existing native ground covers.</p> <p>4.3.2 Undertake a review of the Restoration and Rehabilitation Plan for the reserve (refer 4.2.2).</p> <p>4.3.3 In conjunction with neighbours, maintain boundary fences and determine strategies to exclude stock.</p> <p>4.3.4 Monitor the incidence of dog attack on koalas near the reserve and where necessary provide information to dog owners regarding the threat to koalas posed by dogs and how dog owners can reduce this threat.</p>	<p>High</p> <p>Medium</p> <p>Medium</p> <p>High</p>

Current Situation	Desired Outcomes	Strategies	Priority
<p>4.4 Fire management In 2004 a fire burnt most of the northern portion of the reserve causing significant damage to native vegetation, several koala mortalities and promoted the establishment of several weeds species.</p> <p>Two Fire Management Zones are identified. The Tucki Day Use Asset Protection Zone (APZ) is identified around the day use area. The balance of the reserve is zoned as a Land Management Zone (LMZ) to protect culturally significant sites and for the protection of koalas.</p> <p>NPWS is an active member of the Northern Rivers Bush Fire Management Committee.</p>	<ul style="list-style-type: none"> • Life and property are protected from fire. • Fire regimes are appropriate for conservation of plant and animal communities, in particular the koala. • Cultural values are protected from damage by fire. • A cooperative approach is developed for fire management with neighbours and other fire authorities. 	<p>4.4.1. Manage the area around the day use area as the Tucki Day Use Asset Protection Zone (APZ) by slashing the grass.</p> <p>4.4.2. Manage the balance of the reserve as a Land Management Zone (LMZ) to protect culturally significant sites and specifically for protection of koalas.</p> <p>4.4.3. Prescribed burning may be used to promote germination of eucalypt species suitable as koala food trees.</p>	<p>High</p> <p>High</p> <p>Medium</p>
<p>4.5 Cultural heritage The reserve is within the Widjabul and the Bandjalang tribal area, within the Bundjalung Nation. Land to the north-east of the reserve is managed by the Ngulingah Local Aboriginal Land Council.</p> <p>Although no Aboriginal heritage sites have been recorded in the reserve, it forms part of a landscape important to the local Aboriginal people. A Native Title claim includes the reserve.</p>	<ul style="list-style-type: none"> • Aboriginal heritage values are identified, protected and managed in partnership with the Aboriginal community. • Historic heritage values are identified and protected in accordance with their significance. 	<p>4.5.1. Consult with the Ngulingah LALC, Bandjalang and Widjabul Native Title Claimants and the Bundjalung Elders in the management of Aboriginal sites, places and values, including interpretation of places or values.</p> <p>4.5.2. Liaise with the Ngulingah Local Aboriginal Land Council about opportunities to undertake complementary management of adjacent lands (refer also 4.2 Native plant and animal conservation, 4.3 Pest plant and animals and 4.4 Fire management).</p>	<p>High</p> <p>Medium</p>

Current Situation	Desired Outcomes	Strategies	Priority
<p>The reserve is identified on the State Heritage inventory, in recognition of the local community's long history of involvement in the conservation of koala habitat. It is also listed in the <i>Lismore Local Environmental Plan</i> as a Heritage Item.</p> <p>A shelter located near the entrance to the reserve is more than 20 years old and requires assessment to determine its heritage significance.</p>		<p>4.5.3. Undertake an assessment of the shelter to determine any heritage significance and appropriate management. Subject to the outcomes of assessment the shelter may be removed (refer also 4.6 Visitor use).</p> <p>4.5.4. Ensure that interpretation of the reserve's values acknowledges the historical efforts of the local community in koala conservation (refer 4.6 Visitor use).</p>	<p>Medium</p> <p>Medium</p>
<p>4.6 Visitor use</p> <p>The northern portion of the reserve offers opportunities to view koalas in a relatively natural setting. A loop pathway provides walking access in the reserve.</p> <p>Facilities in the northern portion of the reserve, such as the shelter, barbecue, picnic table, old concrete slab, pipe, tap and trough, have encouraged unauthorised camping and other activities which may impact on the local koala population.</p> <p>Most facilities are in a deteriorated condition. Information panels and signs require updating. Fencing and the turnstile at the entrance to the reserve are also in a poor condition.</p> <p>Vehicle access off the Wyrallah-Woodburn Road is not clearly signposted.</p>	<ul style="list-style-type: none"> • Visitor use is nature based, ecologically sustainable and does not impact on the local koala population. • Unauthorised activities, including camping are excluded from the reserve. • The local community and visitors continue to support koala conservation in the reserve. 	<p>4.6.1. Allow nature-based activities, which are consistent with the purposes of a nature reserve, such as bird watching and nature study. Permit nature based commercial or educational visits to the northern portion of the reserve only and groups limited to no more than 15 people.</p> <p>4.6.2. Prohibit camping, open fires, vehicles (other than in the car park), horse riding and cycling.</p> <p>4.6.3. Visitation to the southern portion of the reserve will not be promoted and no visitor facilities will be provided.</p> <p>4.6.4. Redevelop the interpretation signage/panels in the northern portion of the reserve to highlight:</p> <ul style="list-style-type: none"> - the values of the reserve, in particular as a koala habitat; - the historic and ongoing contribution of the community to the protection of koala habitat; and - threats to koalas in the area. 	<p>High</p> <p>High</p> <p>High</p> <p>Medium</p>

Current Situation	Desired Outcomes	Strategies	Priority
		<p>4.6.5. Maintain the existing loop pathway and provide a small number of plant identification and koala identification (scratch marks & scats) signs at strategic sites along its route.</p> <p>4.6.6. Relocate the reserve identification sign to improve its visibility to visitors accessing the northern portion of the reserve off the Wyrallah-Woodburn Road.</p> <p>4.6.7. Replace the existing fencing and turnstile at the entrance to the reserve with a combination of bollards and fencing.</p> <p>4.6.8. Remove the barbecue, picnic table, concrete pipe, log seat, concrete slab, tap and trough.</p> <p>4.6.9. Update the reserve information brochure to promote koala conservation and reporting of koala sightings to NPWS.</p> <p>4.6.10. Promote and support appropriate volunteer activities in the reserve (refer 4.2 Native plants and animal conservation).</p>	<p>Medium</p> <p>Medium</p> <p>High</p> <p>High</p> <p>Low</p> <p>Medium</p>
<p>4.7 Research and monitoring There have been various studies undertaken in the reserve and surrounding area specific to koalas. Results from research and monitoring have sometimes proven difficult to access.</p> <p>Friends of the Koala Inc provide important information relevant to the ongoing monitoring of koalas in the reserve and surrounding area.</p>	<ul style="list-style-type: none"> • Research contributes to a better understanding of the reserves natural and cultural values and in particular the conservation biology of koalas. 	<p>4.7.1. Monitor natural revegetation of koala food trees (eg through photo monitoring points) to determine management strategies for future revegetation works.</p> <p>4.7.2. Continue to liaise with Friends of the Koala Inc and Wires Northern Rivers about animals brought in for care to contribute to future monitoring programs in the reserve.</p>	<p>High</p> <p>Medium</p>

Current Situation	Desired Outcomes	Strategies	Priority
<p>To date the major focus for research in the reserve has been on koalas and koala habitat. There has been little research on other values in the reserve.</p>	<ul style="list-style-type: none"> • Research programs are conducted in a coordinated and sustainable manner. 	<p>4.7.3. Ensure that proposals for koala research in the reserve (including community-based surveys) are consistent with the Koala Recovery Plan.</p>	High
		<p>4.7.4. Encourage research that improves knowledge and management of natural and cultural heritage values in the reserve. This may include:</p> <ul style="list-style-type: none"> - a compilation of past research on koala conservation in the reserve; - research into the history of the reserve as a community initiative; - identification of cultural heritage values in the reserve; - identification of threatened species in the reserve 	Medium
		<p>4.7.5. Encourage information sharing between relevant research agencies/individuals and NPWS.</p>	Medium

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

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

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