NSW GOVERNMENT
Environment, Climate Change & Water
National Parks & Wildlife Service

Mooball National Park

Plan of Management

MOOBALL NATIONAL PARK

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

Part of the Department of Environment, Climate Change and Water

September 2010

This plan of management was adopted by the Minister for Climate Change and the Environment on 17th September 2010.

Acknowledgments

The NPWS acknowledges that this park is within the traditional country of the Bundjalung Aboriginal people.

This plan was prepared by John Hausia of the Northern Rivers Region of the NSW National Parks and Wildlife Service (NPWS), part of the Department of Environment, Climate Change.

Valuable assistance was also provided by the Northern Rivers Regional Advisory Committee, Tweed/Byron Local Aboriginal Lands Council, Tweed Shire Council Aboriginal Advisory Committee, and Ian Fox and David Lloyd of Southern Cross University.

Cover photo by Emma Kirsner, NPWS.

For additional information or enquiries about this park or this plan, contact the NPWS Tweed Area Office at Level 1, 135 Main Street Murwillumbah (PO Box 5081) NSW 2484 or by phone (02) 6670 8600.

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FOREWORD

Mooball National Park has an area of 1,130 hectares, and is located 10 kilometres south-east of Murwillumbah in far north-eastern NSW.

Mooball National Park supports one of the largest lowland moist forest vegetation remnants between the predominantly cleared Tweed and Brunswick Valleys. Subtropical rainforest occupies approximately one third of the park. Seventeen threatened plant species and 17 species of threatened animals have been recorded in the park. The presence of shells and the suitable habitat in the park suggest a high probability that the endangered Mitchell's rainforest snail may also occur.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each national park. 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 Mooball National Park was placed on public exhibition from 13th February until 1st June 2009. The submissions received were carefully considered before adopting this plan.

This plan contains a number of actions to achieve the State Plan priority to "Protect our native vegetation, biodiversity, land, rivers and coastal waterways", including protection of rainforest from fire, weed control programs, identification of threatened plant species along roadsides, and surveys to determine whether the endangered Mitchell's rainforest snail is present in the park. The plan also contains a number of actions to help "Increase the number of visits to parks", including allowing walking and cycling on roads and management trails in the park, and allowing horse riding on designated roads and trails.

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

Frank Sartor MP
Minister for Climate Change and the Environment

1. MOOBALL NATIONAL PARK

Mooball National Park (hereafter referred to as "the park") is located approximately 125 kilometres south of Brisbane and 10 kilometres south-east of Murwillumbah in far north-eastern NSW. The park covers an area of 1130 hectares and lies within the Tweed Shire Council Local Government Area (see Map). The park was gazetted in 1999.

Prior to its reservation as national park, the park was managed by Forests NSW (formerly State Forests of NSW) as Mooball State Forest. The park's inclusion into the NPWS estate was as a result of the Regional Forest Agreement (RFA).

The park supports one of the largest lowland moist forest vegetation remnants between the predominantly cleared Tweed and Brunswick Valleys (NPWS, 1999). Subtropical rainforest occupies approximately one third of the park.

Areas of both the Condong Range and the Burringbar Range are conserved within the park. The average annual rainfall is 1631.9 millimetres with nearly 40% of the annual mean rainfall occurring during January, February and March (NPWS, 2007).

As well as Mooball National Park, the planning area includes 'Ministerial roads', which are roads that do not form part of the gazetted park and are vested in the Minister on behalf of the Crown for the purposes of Part 11 of the NPW Act. Ministerial roads were created under section 13 of the *Forestry and National Parks Estate Act 1998* to ensure the continuation of access arrangements that existed immediately before the park's creation. This primarily relates to use of these roads for timber hauling and private property access. Whilst Ministerial roads do not form part of the gazetted park area, the management of these roads is subject to the provisions of this plan, the National Parks and Wildlife Regulations and the requirements of the *Environmental Planning and Assessment Act 1979* (EPA Act).

Surrounding land uses in the area include grazing, private forestry and banana plantations.

The park is within the Tweed - Byron Local Aboriginal Land Council (LALC), and Tweed Shire Local Government Area.

2. MANAGEMENT CONTEXT

2.1 Legislative and Policy Framework

The management of national parks 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). The policies are based on the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

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

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

2.2 Management Purposes and Principles

National parks are reserved under the NPW Act to protect and conserve areas containing outstanding or representative ecosystems, natural or cultural features or landscapes or phenomena that provide opportunities for public appreciation and inspiration and sustainable visitor use.

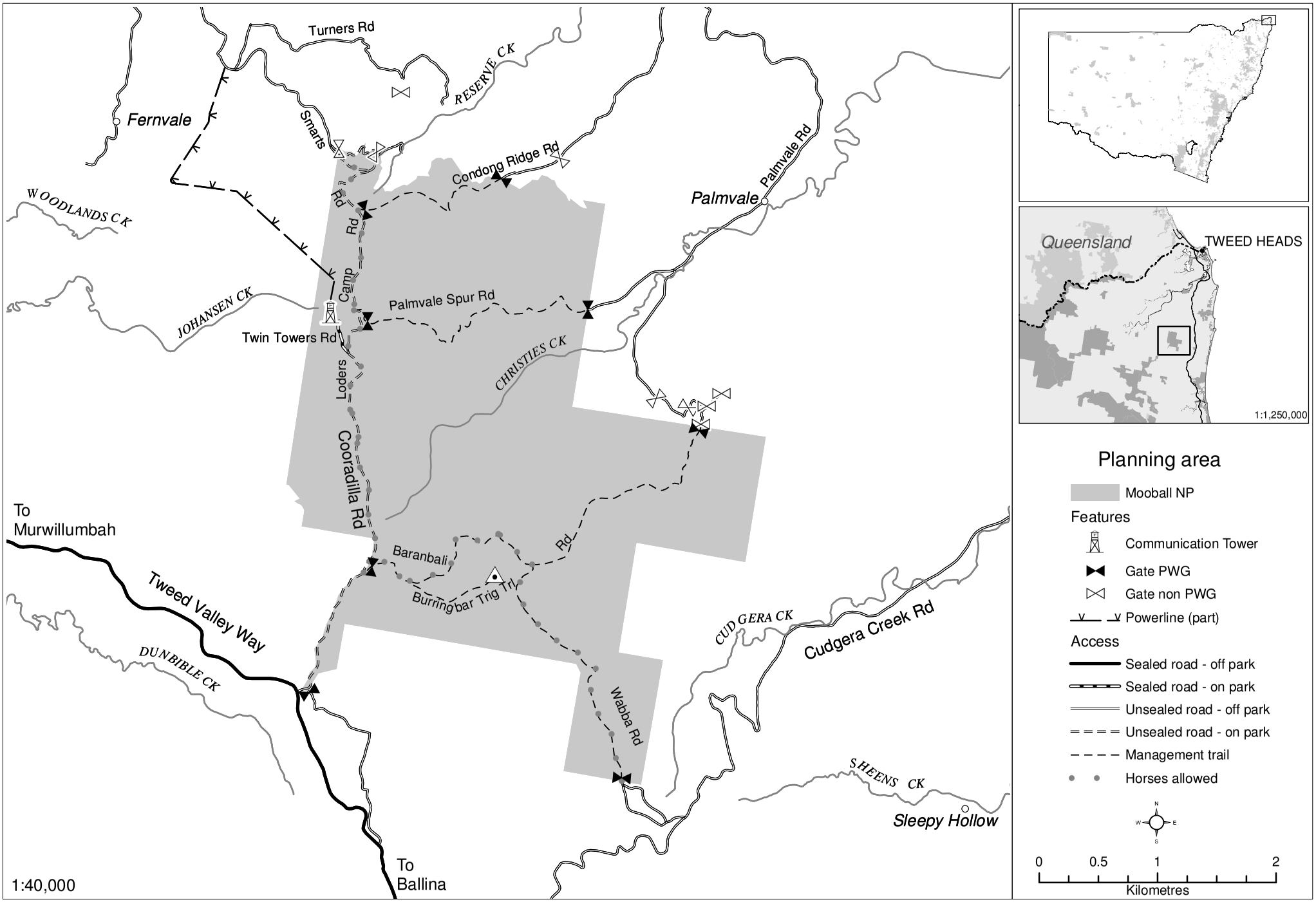
Under the Act (section 30E), national parks are managed to:

- conserve biodiversity, maintain ecosystem functions, protect geological and geomorphological features and natural phenomena and maintain natural landscapes;
- conserve places, objects, features and landscapes of cultural value;
- protect the ecological integrity of one or more ecosystems for present and future generations;
- promote public appreciation and understanding of the park's natural and cultural values;
- provide for sustainable visitor use and enjoyment that is compatible with conservation of natural and cultural values;
- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of natural and cultural values; and
- provide for appropriate research and monitoring.

2.3 Management Directions

The primary emphasis of this plan is the conservation of the natural and cultural values of the park. The plan also provides for sustainable recreational activities such as bush walking and bird watching. The key specific management objectives for the park are to:

- Conserve the vegetation communities in the park as representing one of the largest lowland moist forest vegetation remnants in the area and as a habitat corridor between the Condong and Burringbar Ranges;
- Protect all native flora and fauna species, populations and habitat, with special attention to those classified as Endangered under Schedule 1 of the TSC Act;
- Preserve the aesthetic qualities of the park as part of the Condong and Burringbar Range;
- Protect and preserve the Aboriginal values associated with the park;
- Reduce the distribution and spread of introduced pest species in the park;
- Ensure that recreation activities are undertaken in a sustainable way; and
- Encourage research into the natural and cultural heritage values of the park that will contribute to management and understanding of the parks values.


Turners Rd
RESERVE CK
Fernvale
Smarts Rd
Condong Ridge Rd
Palmvale
Palmvale Rd
WOODLANDS CK
Camp Rd
JOHANSEN CK
Palmvale Spur Rd
Twin Towers Rd
CHRISTIES CK
Loders
Cooradilla Rd
To Murwillumbah
Baranbali Rd
Tweed Valley Way
Burringbar Trig Trl
CUDGERA CK
Cudgera Creek Rd
DUNBIBLE CK
Wabba Rd
SHEENS CK
Sleepy Hollow
To Ballina
1:40,000
Queensland
TWEED HEADS
1:1,250,000
Planning area
Mooball NP
Features
Communication Tower
Gate PWG
Gate non PWG
Powerline (part)
Access
Sealed road - off park
Sealed road - on park
Unsealed road - off park
Unsealed road - on park
Management trail
Horses allowed
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3. VALUES OF THE PARK

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, natural heritage, cultural heritage, threats and on-going use are dealt with individually, but their inter-relationships are recognised.

3.1 Landform, Geology and Soils

Situated on the low eroded eastern sedimentary edge of the Mt Warning caldera that forms the watershed between the Tweed and Brunswick River catchment, the geomorphology of the area is consistent with the metamorphics of the Neranleigh-Fernvale Group. Previously known as the Brisbane Metamorphics, the Burringbar Ranges are predominantly phyllitic siltstone and shale (slaty in part). Quartzites and siliceous sandstones and siltstones are present with greywacke and argillite occurring in some areas (Morand 1996).

The park consists of a series of drier ridgelines intersected by moist gullies defined primarily by Christies Creek and associated tributaries to the north-east and by the small drainage lines of Cudgera Creek to the south-east.

Elevations within the park vary from below 40 metres to 391 metres above sea level. Located up slope from all neighbouring properties, the park ranges in slope from steep cliffs in the west to moderate slopes in the east. The majority of the slopes within the park range from 33 - 50% (Morand 1996).

3.2 Native Plants

The park encompasses one of the largest lowland moist forest vegetation remnants between the predominantly cleared Tweed and Brunswick Valleys. It supports ecosystems and species that have undergone considerable reductions in their range as a result of contraction of rainforest and tall wet forest along the east coast of NSW (NPWS unpub. 1999).

More than one third of the park is comprised of subtropical rainforest of very complex and mixed composition, but with Booyong (*Heritiera spp.*) often being the most plentiful species. In the gullies, dominant species include Bangalow palms (*Archontophoenix cunninghamiana*) and cabbage tree palms (*Livistonia australis*). Areas of northern moist blackbutt (*Eucalyptus pilularis*), wet bloodwood (*Corymbia intermedia, Corymbia gummifera*) and Tallowwood (*Eucalyptus microcorys*) forest is also present below the drier ridgelines. Grey gum (*Eucalyptus propinqua*)/grey ironbark (*Eucalyptus siderophloia*)/white mahogany (*Eucalyptus acmenoides*) associations dominate north-facing ridgelines and spurs. Scattered throughout the park are occurrences of open brushbox (*Lophostemon confertus)* and occasional flooded gum (*Eucalyptus grandis*)-tallowood associations.

The wet forests in the park support high levels of biodiversity and botanical values, including numerous threatened flora species of which several are regionally endemic or at their southern distributional limit in the Richmond /Tweed district. There are 17 threatened plant species listed under the TSC Act recorded within the park (refer Table 1) and one endangered ecological community; *Lowland Rainforest in the New South Wales North Coast and Sydney Basin Bioregions*.

Table 1: Threatened plant species within Mooball National Park

Botanical Name	Common Name	Status TSC Act
Acacia bakeri	Marblewood	Vulnerable
Acalypha eremorum	Acalypha	Vulnerable
Cassia brewsteri var. *marksiana*	Brush cassia	Endangered
Cryptocarya foetida	Stinking cryptocarya	Vulnerable
Dendrocnide moroides	Gympie stinger	Endangered
Drynaria rigidula	Basket fern	Endangered
Elaeocarpus williamsianus	Hairy quandong	Endangered
Endiandra floydii	Crystal Creek walnut	Endangered
Endiandra hayesii	Rusty rose walnut	Vulnerable
Endiandra muelleri subsp. *bracteata*	Green-leaved rose walnut	Endangered
Fontainea australis	Southern fontainea	Vulnerable
Hicksbeachia pinnatifolia	Red bopple nut	Vulnerable
Macadamia tetraphylla	Rough-shelled bush nut	Vulnerable
Rhynchosia acuminatissima	Pointed trefoil	Vulnerable
Syzygium hodgkinsoniae	Red lilly pilly	Vulnerable
Syzygium moorei	Durobby	Vulnerable
Tarenna cameronii	Cameron's Tarenna	Endangered

The park also contains predicted habitat for the endangered species: spiny gardenia *(Randia moorei);* southern ochrosia *(Ochrosia moorei);* Davidson's plum (*Davidsonia jerseyana)* and the vulnerable species: onion cedar *(Owenia cepiodora);* ball nut *(Floydia praealta);* yellow satinheart *(Bosistoa transversa);* corokia *(Corokia whiteana)* and arrow-head vine (*Tinospora tinosporoides*) (NPWS unpub. 1999).

A roadside survey in 2004 of threatened plant species in the park informs NPWS prior to undertaking road works to ensure maintenance does not impact on species. Roadsides are also assessed prior to commencement of works.

Under the TSC Act recovery plans may be prepared to identify actions and priorities for threatened species, populations or ecological communities. Additionally, a threatened species Priorities Action Statement (PAS) must be prepared which outlines the broad strategies and detailed priority action in NSW to promote the recovery of threatened species, populations and endangered ecological communities and to manage Key Threatening Processes. The PAS and recovery plans will be used to guide management of threatened species in the park.

Approved recovery plans have been prepared for *Endiandra floydii, Endiandra hayesii, Endiandra muelleri* spp*. bracteata, Davidonia jerseyana* and *Randia moorei* and a draft recovery plan has been exhibited for *Elaeocarpus williamsianus*. Management actions are included in the PAS for all of the above threatened flora except *Dendrocnide moroides, Syzygium hodgkinsoniae* and *Tarenna cameronii.*

The DECC is currently involved in the preparation of a cross-border biodiversity management plan for the north-east NSW and south east Queensland. The Border Ranges Rainforest Biodiversity Management Plan (DECC, in prep.) will provide landscape-based management for the threatened and significant rainforest flora for an area of NSW that includes the park.

3.3 Native Animals

The park supports a range of native animals including 17 threatened species listed under the TSC Act (refer Table 2) and is an important habitat for rainforest specialists. It provides high quality sub-coastal habitat for vulnerable mammals including: yellow-bellied glider; koala; red-legged pademelon; common blossom-bat; eastern long-eared bat; eastern tube-nosed bat; little bent-wing bat and common bent-wing bat (see Table 2). The park also provides habitat for the spotted-tailed quoll which has been recorded three times within 5 kilometres of the park (DECC, 2008).

The park also provides important lowland habitat for threatened bird species such as: the white-eared monarch; rose-crowned fruit-dove; superb fruit-dove; wompoo fruit-dove; glossy black-cockatoo; masked owl; sooty owl; the regionally endemic marbled frogmouth; and the red goshawk which has been recorded twice within 700 metres of the park (DECC, 2008).

Table 2: Threatened animals in Mooball National Park

Scientific Name	Common Name	Status TSC Act
Assa darlingtoni	Pouched frog	Vulnerable
Calyptorhynchus lathami	Glossy black cockatoo	Vulnerable
Miniopterus australis	Little bent-wing bat	Vulnerable
Monarcha leucotis	White-eared monarch	Vulnerable
Nyctimene robinsoni	Eastern tube-nosed bat	Vulnerable
Nyctophilus bifax	Eastern long-eared bat	Vulnerable
Podargus ocellatus	Marbled frogmouth	Vulnerable
Petaurus australis	Yellow-bellied glider	Vulnerable
Phascolarctos cinereus	Koala	Vulnerable
Ptilinopus magnificus	Wompoo fruit-dove	Vulnerable
Ptilinopus regina	Rose-crowned fruit-dove	Vulnerable
Petaurus australis	Yellow-bellied glider	Vulnerable
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable
Syconycteris australis	Common blossom - bat	Vulnerable
Thylogale stigmatica	Red-legged pademelon	Vulnerable
Tyto novaehollandiae	Masked owl	Vulnerable
Tyto tenebricosa	Sooty owl	Vulnerable

Shells of the endangered Mitchells rainforest snail *(Thersites mitchellae)* have been located in the park. Although no records of the species are listed for the park in the Atlas of NSW Wildlife, the presence of shells and the suitable habitat in the park suggest a high probability that Mitchells rainforest snail may occur. Targeted surveys in the park are desirable to determine the presence of Mitchell's rainforest snail.

Approved recovery plans have been prepared for the yellow-bellied glider, large forests owls (which includes the masked owl and sooty owl), Mitchells rainforest snail and koala. Management actions are included in the PAS for all of the threatened fauna identified above.

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 sites and places are recognised by an area's traditional owner descendants as tangible evidence of their ancestor's cultural practice and traditions; as such they maintain a very real and meaningful value through to the present day. Aboriginal heritage and nature are inseparable from each other and need to be considered in an integrated manner across the landscape.

Scientific assessment of cultural evidence from selected sites indicates Aboriginal people were living in the Tweed from 10,000 years ago, and at least 20,000 years ago regionally (Neal & Stock, 1986). Aboriginal oral tradition tells a story of 'Three Brothers' who first came to this land in the 'Dreamtime' and formed the nucleus of tribes with whom today's traditional owner descendants identify (Vesper, undated). A common feature of their identity is language, acknowledged as the Bundjalung Yugumbeh language chain. The language dialect for the Tweed is known as Ngandowal, a name referring to the people who say 'Ngando' (meaning 'who' or 'somebody') (Livingstone, 1892).

There are more than 50 names used to describe the Tweed area's traditional Aboriginal people in the written record of the early European settlers (Fox, 2003b). However, there is general acceptance for the presence of three main groups in the Tweed River Valley. These were the Cooginburra people for the Tweed Coastal area, the Tul-gi-gin people for the North Arm, and the Moorang-Moobar people for the Southern and Central Arms around Wollumbin (Mt Warning) (Harper, 1894; Keats, 1988). The population of these three groups are known to have fallen dramatically, before and after the permanent European presence, mainly through the unchecked spread of European sourced illness and disease. Research suggests that prior to any European contact each of the three groups may have contained from 500 to 700 members distributed across their area of 'country' (Fox, in prep, 2006). High altitude topographical features were often the focus of social and spiritual custom and the location of many Aboriginal sites directly reflects the connection and significance value of these places. Wollumbin (Mt Warning) retains a high cultural and spiritual status within and beyond the Tweed valley and this is reinforced by knowledge of regional group gatherings and cultural expression at certain sites across the valley. Traditional owner descendants maintain that connection and support initiatives to protect and preserve their heritage sites and places.

There are levels of cultural confidentiality within the Aboriginal community and traditional owner descendants may prefer that certain site details and exact locations are not disclosed. To date, there is one site of cultural significance documented within the park. There may be others within the boundary of the park, but that is currently unknown. This not only identifies a limited documented knowledge of cultural sites within the park, but also signifies that the spiritual connection between the traditional owners, the park and the surrounding landscapes is also unknown.

3.5 Historic Heritage

Logging in the area dates back to the 1930s and predates the gazettal of the park. Remnants of past logging activities include logging roads and trails that were primarily constructed up until the 1960s. Historical evidence suggests that the site of the Trig Station at the summit of Mt Burringbar, known locally as "Cooradilla Lookout" may have also been used as a military lookout during World War II.

An isolated grove of hoop pines and a small number of stone fruit and citrus trees are located at an old logging camp near a small dam off Cooradilla Road. The historic significance of these sites and plantings has not been assessed.

Numerous reminders of the park's logging past still exist. Small dams and log loaders are still present along some fire trails. The historical significance of these structures is not known.

3.6 Recreation Values

Public vehicle access to the park is along Cooradilla Road from the south and from Smarts Road in the north. Recreational use of the park is low and there are no visitor facilities within the park. There is no demonstrated demand for camping in the park and the lack of water, steep topography and lack of suitable camp sites limits opportunities for this activity.

Although there are currently no formal walking tracks in the park, the existing roads and management trails may be used for walking as well as mountain bike riding.

During the development of this plan recreational horse riders requested that the following roads and trails in the park be made available for horse riding: Wabba Road (fire management trail), Baranbali Road (fire management trail) and Cooradilla Road (part 11 road) through Loders Camp Road (continuation of Cooradilla Rd). Use of the these roads and trails for horse riding is unlikely to conflict with other park visitors and provided horses remain on the designated roads and trails it is unlikely there would be any impact on threatened species or communities, water quality or cultural values. The Regional Manager may temporarily close roads and trails to horse riding in the event of extreme weather conditions or other circumstances as provided in the NPWS Recreational Horse Riding Policy.

4. THREATS TO PARK VALUES

4.1 Pest Species

A pest management plan, incorporating restoration and weed control has been prepared for the park (NPWS, 2003). The pest management plan identifies priorities for control taking into account factors such as legal status, threat to native communities, dispersal mechanisms, frequency and density of distribution, control techniques and resources available. A Pest Management Strategy was prepared for the Northern Rivers Region NPWS in 2007 (DECC 2007). This strategy identifies priorities, guidelines and actions to address the control of introduced animal species.

A total of 25 weed species have been identified in the park. Infestations of lantana (*Lantana camara*) and other weed species are not widespread throughout the park, but are mainly confined to the edges of the roads, trails and drainage gullies. Camphor laurel (*Cinnamomum camphora*) is widespread along many roadsides and although few mature, seed bearing specimens were identified, seedlings and large saplings are common.

There are numerous occurrences of serious environmental weeds on lands that surround the park. Several of these species, such as cocos palm *(Syagrus romanzoffiana*), guava (*Psidium sp*) and umbrella tree (*Schefflera actinophylla*) have the potential to establish within the park.

Introduced animal species recorded in the park include wild dogs, house mice, foxes, cats and cane toads. Although dogs have been recorded in the park, the Tweed-Lismore Rural Lands Protection Board (RLPB) does not believe that their numbers pose a significant problem. If wild dog numbers increase to an extent that it is considered to be causing a negative impact on biodiversity and surrounding agriculture, reactive ground baiting will be undertaken as necessary in accordance with the Tweed-Lismore RLPB Wild Dog Management Plan (RLPB, 2006).

Fox numbers and distribution in the park are unknown. Priorities for fox control are based on the impact of foxes on threatened species and are determined by the Fox Threat Abatement Plan (Fox TAP) (NPWS, 2001), although there are other species and sites of lesser priority that have also been identified for fox control under the PAS. The park has not been identified as a priority site for fox control and is not likely to be in the future.

Feral cats are known from the area. The impacts of cats have been identified as a Key Threatening Process under the NSW TSC Act. Future management of feral cats within the park will be in accordance with the Priority Action Statement (PAS).Cane toads have been recorded from five separate locations in the park since 1994 (DECC, 2008). This data however is not likely to reflect the true distribution and abundance of the species and it can be assumed occurrence exists across the entirety of the park. The Northern Branch Cane Toad Management Strategy guides management of cane toads in the park. Additionally, a Cane Toad Management Strategy has been prepared for the Northern Rivers Region to identify presence/absence and priority areas for control based on achievability/distribution.

According to the Atlas of NSW Wildlife, the indian myna (*Acridotheres tristis*) has not yet been recorded in any National Parks or Nature Reserves in the Tweed Area. However

due to the close proximity to cleared farmland and human habitation, certain hollow-bearing trees on the periphery of the park may be susceptible to invasion by this species which is increasing in population and distribution in the area (DECC, 2008; TSC 2008).

4.2 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 loss of particular plant and animal species and communities. The ecological consequences of 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 (NPWS, 2006).

Fire history within the park can be dated back to at least 1966 when NSW State Forests began recording fire events in the area. Between 1966 and 2009 there have been approximately 24 wildfires in the park. Limited information is available for the fire events leading up to the parks gazettal, however, it would appear some fires entered the area from neighbouring properties. Fires between 1999 and 2009 were the result of escaped legal and illegal burn-offs, suspected arson and powerlines. Most fires were clustered within the area between Wabba Road, Baranbali Road and Cooradilla Road, with an outlying cluster immediately north of Twin Towers Road.

A Type 2 Fire Management Strategy for the park was approved in 2005 which provides information including operational guidelines, for managing the risk to biodiversity, life and property (NPWS, 2005). The majority of the vegetation in the park consists of rainforest and wet sclerophyll communities which are sensitive to fire. The Fire Management Strategy identifies the recent fire history of the park, key assets within and adjoining the park including sites of natural and cultural heritage value, fire thresholds for the vegetation, fire management zones (which may include Asset Protection Zones), fire control advantages such as management trails and water supply points.

Roads and management trails provide access within the park for fire management and private properties. Built assets within the park include the two telecommunication towers on Twin Towers Road.

NPWS maintains cooperative arrangements with surrounding landowners and the Rural Fire Service (RFS) brigades and is actively involved with the Far North Coast Bush Fire Management Committee.

4.3 Visitor Impacts

There has been a history of unauthorised motor bike riding along the network of old logging trails in the park. This has included registered and unregistered motor bikes. Unauthorised motor bike riding also occurs along the park's management trails. These trails are not designated as park roads or public roads and access by public vehicles (including motor bikes) is not permitted.

The use of management trails and closed logging tracks by motor bikes contributes significantly to environmental impacts on the park including: increased soil erosion; loss

of valuable soil nutrients; increased run-off and decreased infiltration during rain events; decreased water quality; and increased sediment loadings and turbidity down stream. Unauthorised vehicle access on these trails also aids in the spread of pest species throughout the park, as well increasing the possibility of introducing soil pathogens and disease. A level of bushfire risk is also associated with the hot exhausts of some motor bikes.

Associated noise impacts from unauthorised motor bike usage detracts from the park's amenity affecting both visitors and neighbours. Reports of trespass and vandalism to fencing associated with unauthorised motor bike use affects park neighbours and can result in stock losses. Instances of unauthorised motor bike activity within the park will be monitored and law enforcement action taken when required.

4.4 Climate Change

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 (Department of Environment and Conservation, 2006).

The relatively modest warming experienced so far has already had measurable impacts on a range of species across the globe. For example, the distributions of some species of birds, mammals and insects have apparently moved toward the poles or upwards in altitude, in response to shifting climatic zones. There is also increasing evidence of earlier flowering and fruiting in plants, and earlier reproduction in amphibian and birds in response to warmer temperatures (Department of Environment and Heritage, 2007).

Anthropogenic Climate Change is listed as a key threatening process under the TSC Act. Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases is listed as a key threatening process under the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999*. Some of the recovery plans for threatened plant species that occur in the park have also identified climate change as a threat.

There is evidence suggesting that the rate of climate change will be faster than the rate at which most species can adapt, either by migration or by changing their behaviour, physiology or form. Hence, one short term goal for management is to ensure the survival of species in spite of additional threats from climate change. Some existing programs designed to manage threatening processes may also enhance species adaptability or resilience to impacts from climate change, examples include management programs for pest animals and weeds (Department of Environment and Heritage, 2007).

5. MANAGEMENT OPERATIONS AND OTHER USES

5.1 Vehicle Access

Cooradilla is the only public vehicle access through the park and is used by local and neighbouring residents travelling from the Tweed Valley Way in the south and by Smarts Road from the north.

Twin Towers Road is a bitumen 2WD road accessible from Cooradilla Road. It provides access to two telecommunication towers within the park.

A network of management trails in the park are used by NPWS for fire management and other essential management operations such as pest control (see Map). Management trails in the park include Burringbar Trig Trail, Barranbali, Wabba, Palmvale Spur and Condong Ridge Roads. On occasion private property owners access their properties via Condong Ridge Road and Palmvale Spur Road management trails. The use of these management trails is on an irregular basis and normally only when it is not practicable for the landowner to use alternative access eg. during times of heavy rainfall or fire. All old logging trails not deemed to be strategic in terms of pest and fire management will be closed to vehicles.

5.2 Telecommunication Towers

There are two telecommunication towers located within the park at the end of Twin Towers Road within separately fenced perimeters (see Map). The towers provide several telecommunication services and connections to the Far North East Coast Region. Telstra Corporation Pty Ltd currently hold an Occupation Permit for one tower whilst the permit for the other is held by Australian Rail Track Corporation. These organisations provide and sub-lease specific telecommunication equipment and services to various companies such as Country Energy and local Emergency Services.

Telstra's Occupation Permit is due for review as the current permit was approved prior to the gazettal of the park into the NPWS estate. The Occupation Permit for Australian Rail Track Corporation (formally Argus Telecommunications) was revised in January 2001 and expired in December 2006. Renewal of Occupation Permits will be in accordance with the NPW Act.

5.3 Powerline Easements

A Country Energy power line traverses the park (see Map). The power line is included in Occupation Permit 2774 granted by State Forests NSW prior to reservation of the park. DECC now administers this permit as an existing interest. The 11KV transmission line requires vegetation management within a 10 metre wide corridor. A formal agreement with Country Energy is required to formalise maintenance arrangements relevant to the power line.

5.4 Trigonometrical Station

A trig station is located at the summit of Mt Burringbar. NPWS has an agreement with the Crown Lands Office and Central Mapping Authority (now Land and Property Information – part of the Department of Lands) regarding the management of trig stations. Rights of access to the trig station for survey purposes are guaranteed but site management and survey operations are subject to environmental impact assessment. Few issues arise in regard to the trig station at Mt Burringbar as it is accessed via the existing Burringbar Trig management trail and tree clearing is not envisaged.

6. MANAGEMENT STRATEGIES AND ACTIONS

Current Situation	Desired Outcomes	Management Response	Priority
6.1 Soil and water conservation The park includes Christies Creek, associated tributaries and small drainage lines leading into Cudgera Creek. The park forms part of the watershed between the Tweed and Brunswick River catchments. Soils in the park are erodible if disturbed, particularly on the steep slopes, sites of old log dumps and along roads, management trails and unauthorised motorbike trails. Rationalisation of the road and trail network in the park will reduce the erosion hazard (refer 6.7 Vehicle access).	• Soil erosion is minimised. • Water quality of Christies Creek and other drainage lines are maintained.	6.1.1 Rationalise the road and trail network and control unauthorised vehicle access in the park (refer 6.4 Visitor use and 6.7 Vehicle access). 6.1.2 Close unauthorised trails and implement soil erosion control and mitigation measures where necessary.	High High
6.2 Native plant and animal conservation The park encompasses one of the largest lowland moist forest vegetation remnants in the predominantly cleared Tweed and Brunswick valleys. Seventeen threatened plant species and 17 threatened animal species have been recorded in the park. The endangered Mitchell's rainforest snail is also thought likely to occur in the park. Approved recovery plans have been prepared for the yellow-bellied glider, koala, masked owl, sooty owl, Mitchell's rainforest snail, Crystal Creek walnut, rusty rose walnut and the green-leaved rose walnut. Management actions are included in the PAS for most of the threatened plant species and all of the threatened animals species that are listed for the park (refer 3.2 Native Plants and 3.3 Native Animals).	• Biodiversity in the park is maintained and there is no further decline in threatened species or their habitat. • Natural processes, such as succession of regenerating forest communities, continue undisturbed. • Surrounding lands with conservation values provide vegetation and habitat corridors for wildlife.	6.2.1 Implement relevant strategies in Priorities Action Statement and recovery plans for threatened species as prepared. This will include protection of rainforest habitat from fire in accordance with the fire management strategy for the park, weed control programs focusing on lantana control and identification of threatened species along roadsides. 6.2.2 Undertake or encourage surveys to determine the occurrence of Mitchell's rainforest snail in the park	High High

Current Situation	Desired Outcomes	Management Response	Priority
A roadside survey of threatened plant species informs NPWS prior to undertaking roadworks to ensure maintenance does not impact on species Inappropriate fire regimes and pest plants and animals are the main threats to plant and animal communities and species in the park. Climate change is also recognised as a Key Threatening Process. Appropriate fire and pest management may improve the ecological resilience of species (refer 6.5 Introduced Species and 6.6 Fire Management). Further research may also contribute to management. VCAs or other appropriate strategies may encourage the retention and appropriate management of key habitat and corridors adjacent to the park.			
6.3 Cultural heritage The park is part of the landscape of the Moorang-Moobar, Tul-gi-gin and Coodjngburra people of the Bundjalung nation. There is very little documented about traditional Aboriginal use and values of the park, although there is one known cultural site of significance. An isolated grove of hoop pines and some fruit and citrus trees are located near a small dam near an old logging campsite. Historical evidence suggests that the site of the Trig Station at the summit of Mt Burringbar, known locally as "Cooradilla Lookout" may have also been used as a military lookout during World War II. The historic significance of these sites is unknown.	• 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.	6.3.1 Protect and manage Aboriginal cultural heritage in consultation with the Tweed/Byron LALC, Bundjalung Elders and other relevant community members. 6.3.2 Encourage research into the Aboriginal and non-Aboriginal heritage values of the park. 6.3.3 Record the location of relics from past logging activities and assess their conservation significance and appropriate management. 6.3.4 Assess the heritage value of introduced plants around the old logging campsite. If determined to be of historic value, retain existing plants but do not replace or allow introduced species to regenerate or become invasive.	High Medium Low Low

Current Situation	Desired Outcomes	Management Response	Priority
6.4 Visitor use Public vehicle access in the park is restricted to Cooradilla - Loders Camp Roads. There are currently no other visitor facilities in the park. Roads and management trails in the park offer opportunities for cycling, although current use is low. There is no demonstrated demand for camping in the park and opportunities are limited by the lack of water, steep topography and lack of suitable camp sites. There is a demonstrated demand by local riders for horse riding in the park on Wabba Road (fire management trail), Baranbali Road (fire management trail) and Cooradilla Road. Temporary closure of roads and trail to horse riding may be necessary in the event of extreme weather conditions or other circumstances as determined by the Regional Manager and in accordance with the Recreational Horse Riding Policy. Illegal motor bike riding, including along management trails and old logging trails, threaten park values and conflicts with other park users.	• Visitor use does not significantly impact on park values. • Unauthorised activities, including motor bike riding off road and on management trails, are excluded from the park.	6.4.1 Allow horse riding on designated roads and trails only (see Map). Limit horse riding to a group size of ten or less horses. Commercial horse riding, overnight camping and campfires will not be permitted. 6.4.2 Erect appropriate regulatory signage at the park boundary and on management trails as necessary. Undertake law enforcement as necessary where illegal access warrants.	High High
6.5 Pest species A Regional Pest Management Strategy has been prepared for the NPWS Northern Rivers Region. A Pest Management Plan has also been prepared for the park. Targeted control of camphor laurel along all roads and trails is identified as a high priority.	• Introduced plants and animals are controlled and their impacts on the park (especially threatened species) are minimised.	6.5.1 Manage introduced species in accordance with the Northern Rivers Region Pest Management Strategy, the Mooball NP Pest Management Plan, the Cane Toad Management Strategy and the Tweed-Lismore Wild Dog Management Plan.	High

Current Situation	Desired Outcomes	Management Response	Priority
Introduced animals recorded in the park include wild dogs, foxes, cane toads and feral cats. The number of wild dogs within the park is not seen as a significant threat. NPWS Northern Branch has prepared a strategy for the management of cane toads. A NPWS regional Cane Toad Management Strategy identifies priority areas for control. Fox and cat predation are listed as Key Threatening Processes under the TSC Act, although the Fox TAP does not identify the park as a priority site for fox control.	• Pest control programs are undertaken in consultation with neighbours.	6.5.2 Liaise with neighbours when planning pest control.	High
6.6 Fire management The most recent fires in the park occurred in the 2006 -07 fire season. A Fire Management Strategy was approved for the park in 2005. Approximately 60% of the park's vegetation has been identified as "overburnt and vulnerable". The majority of the park is comprised of wet sclerophyll and rainforest communities. Built assets within the park include the two telecommunication towers on Twin Towers Road. Roads and management trails in the park and on adjoining lands provide access for fire management purposes.	• Persons and property are protected from fire. • Fire regimes are appropriate for conservation of plant and animal communities as specified in the Fire Management Strategy. • Fire is managed cooperatively.	6.6.1 Implement the Fire Management Strategy for the park. 6.6.2 Ensure occupation permit holders and licensees within the park are aware of their responsibilities with regard to fire management	High High

Current Situation	Desired Outcomes	Management Response	Priority
6.7 Vehicle access Cooradilla – Loders Camp Road provides public vehicle access through the park between Smarts Road and the Tweed Valley Way. Twin Towers Road, a partly sealed management trail, provides access to the telecommunication towers (refer 6.8 Telecommunications). A network of management trails in the park provide access for NPWS fire and other management purposes. The park has numerous old logging tracks and illegal motor bike trails which are impacting on park values. On occasion private property owners access their properties via Condong Ridge and Palmvale Spur Roads. The use of these management trails is on an irregular basis and normally only when it is not practicable for the landowner to use alternative access. There are several roads which provide access to the boundaries of the park through private property. These roads (not shown on the map) may provide access for NPWS for fire fighting purposes subject to the agreement of the relevant landholder.	• Roads and trails are appropriately maintained to minimise environmental impacts. • Roads and trails not required for public access or management purposes are closed and rehabilitated. • Unauthorised vehicle use of management trails and closed roads/trails is excluded from park. • Access arrangements for authorised uses of management trails in the park are formalised. • NPWS is able to access trails on private property for fire management purposes.	6.7.1 Maintain park roads and management trails as identified in the Fire Management Strategy. 6.7.2 Gate management trails as necessary to restrict unauthorised access. 6.7.3 Prohibit private vehicles on NPWS management trails other than for private property access along Condong Ridge and Palmvale Spur Roads. Such access will be formalised by licence or consent to the relevant property owners in accordance with the NPW Act/Regulations to use the trails when normal access is impractical.	Medium High Medium

Current Situation	Desired Outcomes	Management Response	Priority
6.8 Other Uses (telecommunication towers and power lines and trig station) Two telecommunication/transmission towers are located at the end of Twin Towers Road. There has been minimal maintenance of Twin Towers Road since reservation of the park. A Country Energy power line traverses the park and requires vegetation management within a 10 metre corridor. The towers predate gazettal of the park and require negotiation of new occupancy agreements consistent with the NPW Act as the existing interests expire. A trig station is located at the summit of Mt Burringbar and is accessed via Burringbar Trig Trail.	• Utilities in the park (such as the telecommunication towers and the electricity transmission line) have appropriate approvals under the NPW Act. • Non NPWS infrastructure is managed to minimise impacts on natural and cultural values of the park.	6.8.1 Develop new occupancy agreements for the telecommunication/transmission towers in the park in accordance with the NPW Act and in consultation with tower operators. 6.8.2 Install a gate at the intersection of Twin Towers Road and Cooradilla Road to restrict access to the telecommunication towers. Keys will be provided to appropriate authorised Telecommunication and Country Energy staff. 6.8.3 Seek an agreement with Country Energy about the maintenance of the power line and other relevant conditions to protect natural and cultural values. 6.8.4 Allow unrestricted access by Department of Lands officers to the trig station. Any site management (such as vegetation clearing) will be consistent with the NPWS agreement with the Crown Lands Office and Central Mapping Authority including requirements for a full assessment of environmental impacts.	Medium Low Medium High

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

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

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

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