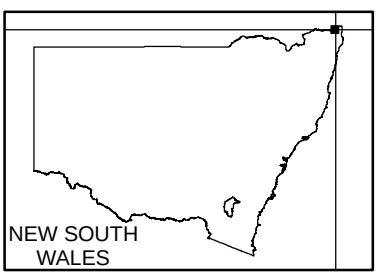
Office of Environment & Heritage
NSW National Parks & Wildlife Service

Plan of Management

Couchy Creek Nature Reserve



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Plan of Management

NSW National Parks and Wildlife Service

July 2014

This plan of management was adopted by the Minister for the Environment on 14 July 2014.

Acknowledgements

This plan of management was prepared by staff of the Northern Rivers Region of the NSW National Parks and Wildlife Service (NPWS), part of the Office of Environment and Heritage, and Southern Cross University student interns Dan Gorton and Angus Collins.

NPWS acknowledges that this reserve is in the traditional Country of the Minjungbal People of the Bundjalung Nation.

NPWS would like to thank those people who took the time to make a submission on the draft version of this plan.

For additional information or any inquiries about this reserve or this plan of management, contact the NPWS Tweed Area Office, PO Box 5081, South Murwillumbah, NSW, 2484 or by telephone on (02) 6670 8600.

Front cover image: Couchy Creek Nature Reserve viewed across Couchy Creek (photo courtesy of Angus Collins).

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Foreword

Couchy Creek Nature Reserve was established in 1999 and covers 217 hectares. It is situated west of Murwillumbah in far north-east New South Wales.

Couchy Creek Nature Reserve is part of an important vegetation corridor and contains remnant lowland forests, including old-growth open forest and an endangered ecological community of lowland rainforest. Ten threatened species have been recorded in the reserve including the endangered Davidson's plum and Crystal Creek walnut.

The reserve lies within the traditional Country of the Minjungbal People and within the area covered by the Tweed Byron Local Aboriginal Land Council. The reserve provides opportunities for low-key, nature-based day use, such as birdwatching. It also provides opportunities for education purposes, for the public to learn about this much-cleared vegetation type.

The NSW *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve. A draft plan of management for Couchy Creek Nature Reserve was placed on public exhibition from 4 May 2012 to 27 August 2012. The four submissions received on the draft plan were carefully considered before adopting this plan.

This plan contains a number of actions to achieve the *NSW 2021* goal to protect our natural environment, including protection of threatened species and communities, control of pest plants and animals, and fire management to protect biodiversity. It also promotes the *NSW 2021* goals to foster partnerships with Aboriginal people through consultation and to enhance recreation opportunities by providing for low-key, nature-based day use.

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

Robert Stokes MP

Minister for the Environment

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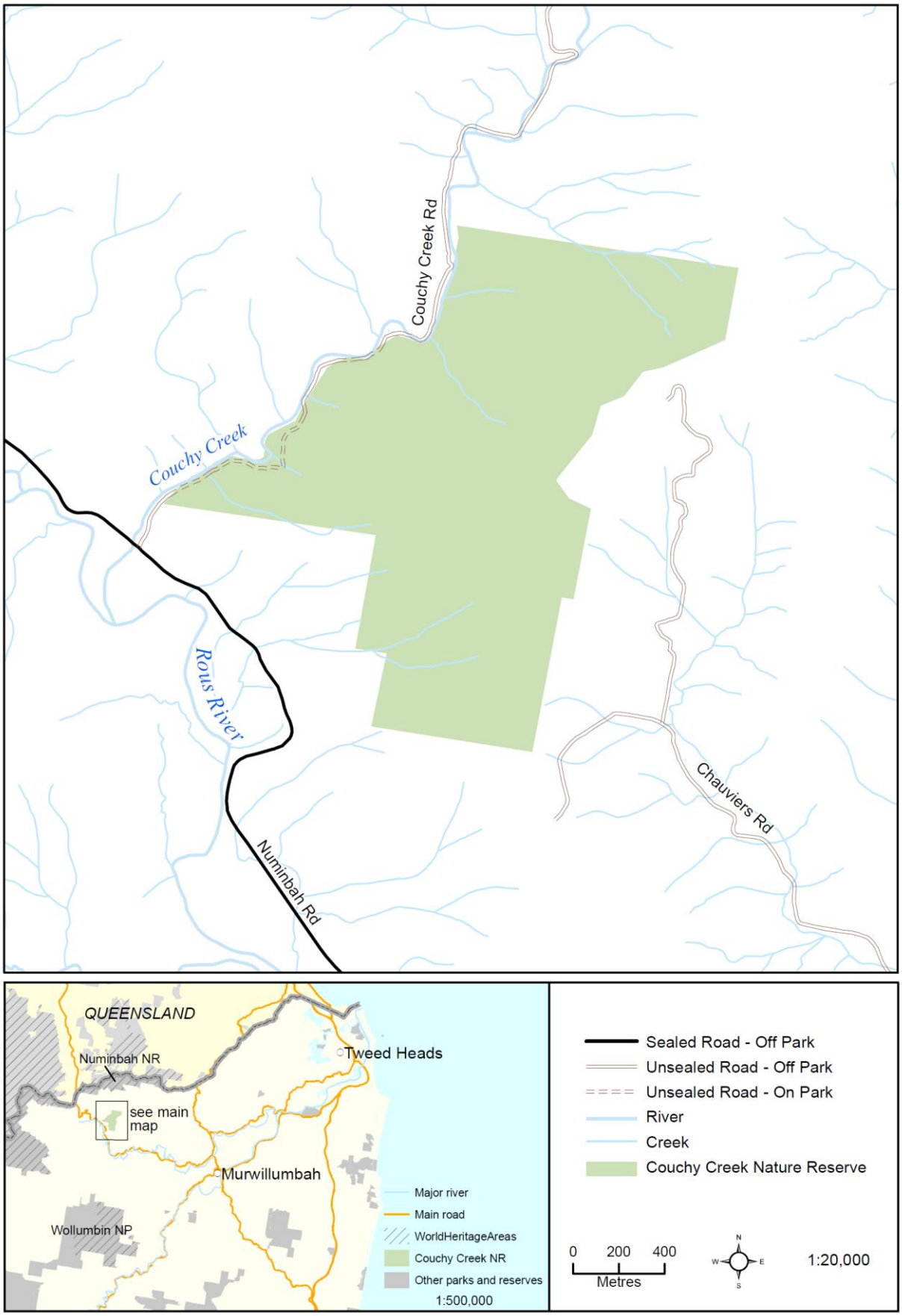
Map 1: Couchy Creek Nature Reserve



1. Introduction

1.1 Location, gazettal and regional setting

Features	Description
Location	Couchy Creek Nature Reserve (referred to as 'the reserve' in this plan) is located approximately 13 kilometres west of Murwillumbah in the far north-east of New South Wales. Access is via Numinbah Road.
Area	The reserve covers 217.5 hectares. Couchy Creek and Couchy Creek Road form the western boundary of the reserve.
Reservation date	The reserve was gazetted on 5 March 1999, as part of the North East Regional Forest Agreement. The reserve is named after the adjoining Couchy Creek. The name of the creek may have Aboriginal origins or may have arisen from the couch grass growing in the area (GNB 2013).
Previous tenure	Prior to its dedication as a nature reserve, the area was a Crown reserve managed by the NSW Department of Lands (it was reserved from sale in 1939 and 1940 for future public requirements). Logging was carried out on the land until as recently as the 1970s.
Regional context	
Biogeographic region	The reserve is located in the South Eastern Queensland Bioregion and across two subregions: the Richmond–Tweed and the Murwillumbah subregions. It forms part of a regional system of conservation reserves that complement and enhance nearby Gondwana Rainforests of Australia World Heritage areas on the surrounding Tweed, McPherson and Nightcap ranges (DEWHA 2008).
Surrounding land use	Lands surrounding the reserve are private tenure, with uses including: livestock grazing, banana plantations and rural residential areas. Properties to the north of the reserve have native vegetation providing a largely unbroken link to Numinbah Nature Reserve. The land to the south, although compromised by a wide road easement and some cleared land on private tenure, forms a vegetation link with the Rous River.
Other authorities	The reserve is located within the areas of the Tweed Byron Local Aboriginal Land Council, North Coast Local Land Services and Tweed Shire Council.

1.2 Statement of significance

Couchy Creek Nature Reserve is significant because of its natural and cultural values.

Landscape/Catchment values

- The reserve forms part of the regional system of conservation reserves with areas on the surrounding Tweed, McPherson and Nightcap ranges that complement and enhance the World Heritage Gondwana Rainforests of Australia (DEWHA 2008).

Geological values

- Couchy Creek Nature Reserve comprises part of the eroded remains of the early Miocene-aged Tweed (or Mount Warning) Shield Volcano which dominates the far north-east corner of New South Wales and straddles the Queensland border (Percival 1985).
- Surrounding the central complex is an erosion caldera with a relatively flat-lying floor bounded to the west, north and south by the steep escarpments of the outer shield remnants. The erosion caldera and the dissected outer remnants of the volcano exhibit a stage of dissection probably not observed on such a large scale elsewhere in the world (Percival 1985).
- The geology of the reserve consists of Lismore Basalt (in the east), feldspar of the Neranleigh–Fernvale beds (in the north), and rhyolite of the Chillingham Volcanics (in the southern part of the reserve).

Biological values

- The reserve is a significant part of an important vegetation corridor. The *Border Ranges Rainforest Biodiversity Management Plan* (DECCW 2010a) includes the reserve area within a 'Conserve Precinct' that recognises the conservation significance of the reserve and surrounding lands.
- Rainforest within the reserve constitutes an endangered ecological community which is recognised as critically endangered at the national level.
- Ten threatened species are known to occur within and in the immediate vicinity of the reserve, including two species which are listed as endangered: Davidson's plum (*Davidsonia jerseyana*) and Crystal Creek walnut (*Endiandra floydii*).
- The reserve contains remnant lowland forests, including old-growth stands of moist blackbutt (*Eucalyptus pilularis*) forest.

2. Management context

2.1 Legislative and policy framework

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

Other legislation, strategies and international agreements may also apply to management of the area. In particular, the NSW *Environmental Planning and Assessment Act 1979* may require assessment of the environmental impact of works proposed in this plan. The NSW *Heritage Act 1977* may apply to excavation in known archaeological sites or in sites with potential to contain historical archaeological relics. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) may apply in relation to actions that impact on matters of national environmental significance, such as threatened species and communities listed under that Act.

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 in relation to the lands to which the plan relates unless the operations are in accordance with the plan. This plan will also apply to any future additions to Couchy Creek Nature Reserve. Should management strategies or works be proposed in future that are not consistent with this plan, an amendment to the plan will be required.

2.2 Management purposes and principles

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

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

The primary purpose of nature reserves is to conserve nature. Nature reserves differ from national parks in that they do not have the provision of visitor use as a management purpose or principle.

3. Values

This plan aims to conserve both natural and cultural values of the reserve. The location, landforms and plant and animal communities of an area have determined how it has been used and valued by both Aboriginal and non-Aboriginal people. 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.

3.1 Geology, landscape and hydrology

The reserve is composed primarily of rocks of the Neranleigh–Fernvale beds in its north, the Chillingham Volcanics groups in its south, and a small area of rocks from the Lismore Basalts in the far east of the reserve. The Neranleigh–Fernvale beds are the oldest rocks, comprising marine sediments which accumulated from 290 to 370 million years ago in the ocean off the eastern edge of Australia and were subsequently uplifted and metamorphosed. The Chillingham Volcanics consist of basalt, feldspar and rhyolite. The topography is undulating with steep gullies and has an altitude range of 60–350 metres above sea level (LPI 2002).

Soils of the valley slopes are mostly derived from rhyolite and tuffs of the Chillingham Volcanics (Floyd 1977). Alluvium along the creek is derived in part from basalts only 500 metres upstream (Holloway 1980).

The reserve comprises part of a north–south ridge that lies between Couchy and Crystal creeks. Couchy Creek bounds the reserve on much of its western side. These creeks flow into the Rous River and form part of the upper catchment of the Tweed River (see Map 1).

Issues

- Increasing frequency of flood events along Couchy Creek due to climate change (see Section 4.3) may result in an increase in disturbance to creek banks, hindering natural regeneration and exacerbating the spread of weeds.

Desired outcomes

- The integrity of the riparian zone is improved.

Management response

3.1.1 Enhance the integrity of the riparian vegetation communities through continued bush regeneration programs to control weed species (see Section 4.1).

3.2 Native plants

The majority of vegetation in the reserve is wet sclerophyll forest dominated by brush box (*Lophostemon confertus*), flooded gum (*Eucalyptus grandis*) and tallowwood (*E. microcorys*), with lowland rainforest occurring along water courses and at low altitudes in the north of the reserve. Rainforest of this type is listed under the TSC Act as an endangered ecological community (Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions), and as the critically endangered Lowland Rainforest of Subtropical Australia under the EPBC Act. A total of eight threatened plant species have been recorded in the reserve (see Table 1).

Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide *Threatened Species Priorities Action Statement* (DECC 2007a; OEH 2013a). These actions are currently prioritised and implemented through the Saving our Species program which aims to maximise the number of threatened species that can be secured in the wild in New South Wales for 100 years (OEH 2013b). Individual

recovery plans may also be prepared for threatened species to consider management needs in more detail.

All eight plant species listed under the TSC Act recorded in the reserve have relevant actions included in the *Priorities Action Statement*, with weeds and fire being seen as significant threats. A recovery plan is in place for Davidson's plum (DEC 2004), with durobby (*Syzygium moorei*) and Crystal Creek walnut covered by a multi-species recovery plan (DECCW 2010a).

Table 1: Significant plant species recorded in Couchy Creek Nature Reserve

Common name	Scientific name	TSC Act status	EPBC Act status	ROTAP^
Veiny lace flower	*Archidendron muellerianum*			3RCa
Ardisia	*Ardisia bakeri*			2RC-
Silver leaf	*Argophyllum nullumense*			3RCa
Pink cherry	*Austrobuxus swainii*			3RCa
Long-leaved tuckeroo	*Cupaniopsis newmanii*			2RC-
Davidson's plum *#	*Davidsonia jerseyana*	Endangered	Endangered	2ECi
Crystal Creek walnut *#	*Endiandra floydii*	Endangered	Endangered	2VC-
Red boppel nut #	*Hicksbeachia pinnatifolia*	Vulnerable	Vulnerable	3RC-
Fine-leaved tuckeroo #	*Lepiderema pulchella*	Vulnerable		2RC-
Rough-shelled bush nut #	*Macadamia tetraphylla*	Vulnerable	Vulnerable	2VC-
Rusty plum #	*Niemeyera whitei*	Vulnerable		3RCa
Quassia	*Quassia* sp. 'Mt Nardi'			3RC-
Red lilly pilly #	*Syzygium hodgkinsoniae*	Vulnerable	Vulnerable	3VC-
Durobby *#	*Syzygium moorei*	Vulnerable	Vulnerable	2VCi

* Denotes recovery plan in place for species.

# Denotes actions included in *Priorities Action Statement* at time of publication.

^ Denotes species considered a rare or threatened Australian plant (ROTAP) using the coding of Briggs & Leigh (1996):

2 = Geographic range in Australia less than 100 km
3 = Geographic range in Australia more than 100 km
E = Endangered - at serious risk in the short term (one or two decades)
R = Rare
V = Vulnerable - at risk over a longer period (20–50 years)
C = Occurs within a conservation reserve
a = Species is considered adequately reserved. 1000 or more plants occur within a proclaimed reserve
i = Species is considered to be inadequately reserved. Less than 1000 plants occur within a proclaimed reserve
- = Species is recorded from a reserve but the population size is unknown.

Issues

- The most significant threats to vegetation are from competition with weeds (see Section 4.1), inappropriate fire regimes (see Section 4.2), periodic flooding (see Section 4.3) and further isolation and fragmentation of habitat.

Desired outcomes

- Threatened and significant plant species and ecological communities are conserved.

- Negative impacts on threatened species and ecological communities are minimised.
- The habitat and populations of all threatened plant species are protected and maintained.
- Structural diversity and habitat values are restored in degraded areas.

Management response

3.2.1 Implement relevant strategies and actions in the *Priorities Action Statement* and recovery plans for threatened species, populations and ecological communities in the reserve including appropriate pest and fire management (see Sections 4.1 and 4.2).

3.2.2 Develop and maintain installation of a 'green guide post' system identifying sensitive zones and spot locations for threatened plants along Couchy Creek Road.

3.3 Native animals

Two native animals listed as threatened under the TSC Act have been recorded in the reserve: the spotted-tailed quoll (*Dasyurus maculatus*) and white-eared monarch (*Monarcha leucotis*). Under the EPBC Act, the south-east mainland subspecies of the spotted-tailed quoll (*Dasyurus maculatus maculatus*) is listed as endangered. No targeted fauna surveys have been undertaken in the reserve, and more threatened species could reasonably be expected to occur because of the habitat values of the reserve. As a significant part of an important vegetative corridor (DECCW 2010a), the reserve is likely to serve an important role in providing habitat for the movement of native animals through the area.

Although the reserve area has good connectivity to other significant areas of habitat such as Numinbah Nature Reserve, further fragmentation and loss of habitat and inappropriate fire regimes pose a threat to native animals. Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide *Threatened Species Priorities Action Statement* (DECC 2007a). These actions are currently prioritised and implemented through the Saving our Species program which aims to maximise the number of threatened species that can be secured in the wild in New South Wales for 100 years (OEH 2013b). Individual recovery plans may also be prepared for threatened species to consider management needs in more detail.

The *Priorities Action Statement* will be used to guide management of threatened species in the reserve. Recovery actions are included in the statement for the spotted-tailed quoll and white-eared monarch.

Issues

- Habitat isolation and fragmentation, weeds, pest animals and fire are the major threats to native fauna in the reserve (see Sections 4.1 and 4.2).

Desired outcomes

- Populations of significant animal species are conserved.
- Negative impacts on threatened species are minimised.
- The habitat and populations of all threatened animal species are protected and maintained.
- Knowledge of native animals in the reserve is improved.
- Structural diversity and habitat values are restored in degraded areas.

Management response

3.3.1 Implement relevant strategies in the *Priorities Action Statement*, and recovery plans for threatened species and populations in the reserve including appropriate pest and fire management (see Sections 4.1 and 4.2).

3.4 Aboriginal heritage and historic heritage

The reserve lies within the traditional Country of the Minjungbal People. The land, water, plants and animals within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge, kinship systems and strengthening social bonds. Aboriginal heritage and connection to nature are inseparable and need to be managed in an integrated manner across the landscape.

While the NSW Government has legal responsibility for the protection of Aboriginal sites and places under the NPW Act, it acknowledges the right of Aboriginal people to make decisions about their own heritage. It is therefore policy that Aboriginal communities be consulted and involved in the management of Aboriginal sites, places and related issues, and the promotion and presentation of Aboriginal culture and history. No formal records of Aboriginal heritage sites exist for the reserve and no surveys have been undertaken.

Heritage places and landscapes are made up of living stories as well as connections to the past which can include natural resources, objects, customs and traditions that individuals and communities have inherited and wish to conserve for current and future generations. Cultural heritage comprises places and items that may have historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance. NPWS conserves the significant heritage features of NSW parks and reserves.

Few records exist on the logging history of Couchy Creek but the more accessible ridgelines provide evidence of past timber-getting practices that pre-date the use of chainsaws, such as tree stumps that contain springboard markings. Logging of blackbutt occurred as recently as the 1970s within the reserve and, on the ridge lines adjoining the reserve, brush box, flooded gum and tallowwood have been logged (Floyd 1977).

Issues

- Due to the lack of surveys, an archaeological survey and cultural assessment needs to be undertaken prior to any works with the potential to impact on Aboriginal or historic sites and places.

Desired outcomes

- Significant Aboriginal places and values are identified and protected.
- Aboriginal people are involved in management of the Aboriginal cultural values of the reserve.
- Understanding of the cultural values of the reserve is improved.
- Negative impacts on historic heritage values are minimised.

Management response

3.4.1 Continue to consult and involve the Tweed Byron Local Aboriginal Land Council, the Bundjalung Elders group, other relevant Aboriginal community organisations and custodial families in the management of their Country, including the management of Aboriginal sites, places and cultural values.

3.4.2 Encourage further research into the Aboriginal heritage values of the reserve with the Tweed Byron Local Aboriginal Land Council, Bundjalung Elders and other relevant Aboriginal community organisations.

3.5 Visitor use

NPWS parks and reserves provide a range of visitor opportunities. NPWS aims to ensure that visitors enjoy, experience and appreciate the parks while park values are conserved and protected.

Couchy Creek Nature Reserve experiences low levels of visitation. There are no visitor facilities in the reserve and current levels of visitation are centred on low-impact, self-reliant nature-based recreation such as bushwalking and birdwatching, mostly along Couchy Creek and Couchy Creek Road. The reserve provides these opportunities in a natural hinterland setting which includes endangered lowland rainforest. Recreational fishing is not known to occur in Couchy Creek but this activity is regulated under the *Fisheries Management Act 1994* and is permitted subject to a person holding a general recreational fishing receipt or being exempt from paying the general recreational fishing fee and using approved catching methods/equipment.

Couchy Creek Nature Reserve does not have park roads or management trails. Access to the reserve is via Couchy Creek Road, an unsealed road which runs adjacent to Couchy Creek. This road allows access by two-wheel drive vehicles, horses or bicycles to the edge of the reserve. Couchy Creek Road is managed by Tweed Shire Council. Although no formal car parking spaces are provided, the road provides easy access to the creek, which is popular with swimmers. Camping, campfires, mountain biking and horse riding are not permitted within the reserve.

Other areas managed by NPWS, other authorities and private operators in the region provide opportunities for a range of recreation activities — including horse riding pursuant to the *Strategic Directions for Horse Riding in NSW National Parks* (OEH 2012a) and mountain biking pursuant to the *Sustainable Mountain Biking Strategy* (OEH 2011a). Other reserves in the region which provide for visitor access to rainforest include Wollumbin and Mebbin national parks within the Tweed Area, and nearby Springbrook and Lamington national parks in Queensland.

Issues

- There is some history of littering, illegal camping and lighting of fires within the reserve, mostly adjacent to Couchy Creek along Couchy Creek Road.
- Collecting of firewood in the reserve can result in the loss of woody debris and fallen logs, reducing or eliminating habitat. The removal of woody debris, dead wood and dead trees has been identified as having a significant negative impact on habitat availability and ecosystem functioning and is listed as a key threatening process under the TSC Act.
- Parking of vehicles and illegal camping along Couchy Creek have damaged and removed vegetation in some sections. These areas are open to weed invasion and soils may be compacted, hindering plant regeneration.
- Couchy Creek Road, which traverses the reserve, is maintained by Tweed Shire Council. There is an anomaly whereby the formed Couchy Creek Road follows a slightly different alignment to the legal ‘paper road’ reservation. As such, some sections of the formed Couchy Creek Road are in the reserve and some sections of unformed road reserve are within the reserve. It may be appropriate to adjust the boundary of Couchy Creek Nature Reserve so the existing formed path of Couchy

Creek Road is excluded from the reserve. As part of this process, areas of unformed road reserve with high conservation value could be included in Couchy Creek Nature Reserve.

- Off-road trail bike riding has caused a number of impacts, including creation of new tracks, erosion, damage to native vegetation and alteration of water flows. Appropriate regulatory and interpretative signage at strategic locations along Couchy Creek Road may assist in discouraging these unauthorised activities.

Desired outcomes

- Visitor use of the reserve is low-key and ecologically sustainable.
- Negative impacts of visitors on reserve values are minimised.
- Visitor opportunities encourage appreciation and awareness of the reserve's values and their conservation.

Management response

3.5.1 Manage the reserve for low-key, nature-based day use such as birdwatching and education purposes. No visitor facilities will be provided in the reserve.

3.5.2 Include the reserve as part of a regional law enforcement program to manage the illegal use of trail bikes.

3.5.3 Install bollards and regulatory signage where required along Couchy Creek Road to control impacts from vehicles and illegal camping.

3.5.4 Liaise with Tweed Shire Council to amend the boundaries of the road reserve so that they align with the practical alignment of Couchy Creek Road. Any proposal to adjust the boundary of Couchy Creek Nature Reserve will be in accordance with the NPWS *Revocation, Recategorisation and Road Adjustment Policy* (NPWS 2014).

4. Threats

4.1 Pests

Pest species include mainly introduced plants, animals and pathogen species that have negative environmental, economic and social impacts. Pest species can have impacts across the range of park values, including impacts on biodiversity, cultural heritage, catchment and scenic values. Pest species, especially weeds, are recognised as a major threat to the reserve's most important values.

The NPWS *Regional Pest Management Strategy: Northern Rivers Region* (OEH 2012b) identifies pest species across the region's parks and details priorities for control (including actions listed in the *Threatened Species Priorities Action Statement* and threat abatement plans prepared under the TSC Act). The overriding objective of the pest management strategy is to minimise the adverse impacts of introduced species on biodiversity and other reserve and community values whilst complying with legislative responsibilities. It also identifies where other site- or pest-specific plans or strategies need to be developed to provide a more detailed approach. High-priority pest species for the reserve are listed in Table 2.

Table 2: Weeds and pest animals recorded in the reserve

Common name	Scientific name	Comment
Weeds		
Crofton weed	*Ageratina adenophora*	Widespread
Mistflower	*Ageratina riparia*	Widespread
Blue billygoat weed	*Ageratum houstonianum*	Widespread
Farmer's friend / cobbler's peg	*Bidens pilosa*	Widespread
Canna lily	*Canna* x *generalis*	Scattered along Couchy Creek and in moist gullies
Montbretia	*Crocosmia* x *crocosmiiflora*	Scattered along Couchy Creek
Colombian waxweed	*Cuphea carthagenensis*	Scattered in moist vegetation
Coral tree	*Erythrina* x *sykesii*	Localised in rainforest near Couchy Creek, has been intensively treated
Ginger lily	*Hedychium gardnerianum*	Scattered along Couchy Creek and in wet gullies
Lantana *	*Lantana camara*	Widespread, scattered
Fruit salad plant / ceriman	*Monstera deliciosa*	Scattered in wetter vegetation
Broadleaf paspalum	*Paspalum mandiocanum*	Along road verge Couchy Creek Road
Kudzu #	*Pueraria lobata*	Confined to approximately 0.5 ha along Couchy Creek Road, has been intensively treated and appears to be diminishing
Winter senna / Easter cassia	*Senna pendula* var. *glabrata*	Scattered, widespread in moist vegetation especially along Couchy Creek Road
Palm grass	*Setaria palmifolia*	Scattered along Couchy Creek Road
Giant devil's fig	*Solanum chrysotrichum*	Scattered along Couchy Creek Road
Wild tobacco	*Solanum mauritianum*	Scattered mostly along Couchy Creek

Common name	Scientific name	Comment
		Road
Trad	*Tradescantia fluminensis* (syn. *Tradescantia albiflora*)	Scattered in rainforest vegetation along and near Couchy Creek
Pest animals		
European red fox ~	*Vulpes vulpes*	Known to occur
Cane toad	*Bufo marinus*	Known to occur (Couchy Creek Road)
Black rat	*Rattus rattus*	Likely to occur
Feral cat	*Felis catus*	Likely to occur
Wild dog ~	*Canis lupus familiaris*	Likely to occur

* Declared Weed of National Significance.

Declared 'noxious' under the *Noxious Weeds Act 1993*.

~ Declared 'pest' under the *Local Land Services Act 2013*.

Weeds

Bush regeneration work has been conducted by the Couchy Creek Landcare Group since the mid 1990s (i.e. prior to dedication of the reserve). In recent years, further work has been conducted by bush regeneration contractors and local staff, particularly targeting kudzu in the riparian rainforest along Couchy Creek Road and including follow-up weed control works.

Lantana is a large flowering shrub native to Central and South America. Lantana is a vigorous invader of disturbed areas, often forming dense thickets. It is spread mainly by birds and thrives in warm environments with high rainfall, where the weed grows along forest edges, penetrates disturbed rainforest and invades open eucalypt woodlands and pastures. Lantana is declared a noxious weed in New South Wales and it is considered a Weed of National Significance. Invasion, establishment and spread of lantana is listed as a key threatening process under the TSC Act.

The national *Plan to Protect Environmental Assets from Lantana* (Biosecurity Queensland 2010) establishes national conservation priorities for the control of lantana. It identifies the research, management and other actions needed to ensure the long-term survival of native species and ecological communities affected by the invasion of lantana.

Lantana is scattered through the reserve, especially in wetter gullies. Priority has been given to its control within the riparian rainforest along Couchy Creek.

Kudzu is a rapidly growing perennial vine and a major environmental weed in parts of the NSW north coast. Kudzu has been declared a noxious weed under the *Noxious Weeds Act 1993* across a number of local government areas in north-east New South Wales, including the Tweed Shire. An infestation in the riparian rainforest along Couchy Creek has been controlled and Kudzu is now well contained within the reserve but needs to be closely monitored because of its potential for rapid growth.

Pest animals

Although there has been no comprehensive survey of introduced species, foxes and cane toads are known to occur within the reserve and surrounding area. Other species likely to occur include wild dogs and feral cats as they are widespread across the far north coast region.

Cane toads are widespread within the Tweed Valley. A cane toad management strategy (DECC 2008) has been prepared to guide the management and control of cane toads in northern NSW parks. The reserve is not identified as a priority site for cane toad control.

Introduced pathogens

Myrtle rust is a plant disease caused by the exotic fungus, *Uredo rangelii*, which is recognised as a key threatening process under the TSC Act. It is known to effect plants in the Myrtaceae family and was first detected in New South Wales in April 2010 (Gollnow et al. 2010).

The rust is spread by the transport of spores by wind, water splash, insects and human activity. It can be spread in bushland by people moving infected plant material, dirty equipment including containers and tools, contaminated clothing and vehicles. Management of myrtle rust in the reserve will be in accordance with the *Management Plan for Myrtle Rust on the National Parks Estate* (OEH 2011b). Myrtle rust poses a significant threat to the biological values of the reserve. It is known to infect various species of Myrtaceae that occur in the reserve, including durobby.

Phytopthora is another pathogen known to occur on the NSW far north coast. Infection of native plants by *Phytophthora cinnamomi* is currently listed as a key threatening process under the TSC Act and the EPBC Act. It is unknown whether it is present within the reserve.

Desired outcomes

- Pest plants, animals and pathogens are controlled and managed where possible.
- Negative impacts of introduced plant, animal and pathogen species on reserve values are minimised.

Management response

4.1.1 Implement relevant control programs in accordance with the regional pest management strategy.

4.1.2 Continue the bush regeneration program and implement the site-specific plan for control of lantana in the reserve.

4.1.3 Support initiatives to develop a long-term program for weed control, vegetation restoration, and connectivity works for the reserve and surrounding lands involving interested landholders and reserve neighbours, Landcare groups, Tweed Shire Council, North Coast Local Land Services and other interested agencies and land managers.

4.1.4 Monitor noxious and significant environmental weeds and their impacts. Treat any new outbreaks where possible.

4.1.5 Manage myrtle rust on the reserve in accordance with the *Management Plan for Myrtle Rust on the National Parks Estate* (OEH 2011b). Practise appropriate hygiene protocols during bush regeneration and general maintenance work to reduce the risk of myrtle rust infection and other potential pathogens.

4.2 Fire

The primary objectives of NPWS fire management are to protect life, property, community assets and cultural heritage from the adverse impacts of fire, while also managing fire regimes in parks to maintain and enhance biodiversity. NPWS also assists in developing fire

management practices that contribute to conserving biodiversity and cultural heritage across the landscape, and implements cooperative and coordinated fire management arrangements with other fire authorities, neighbours and the community (OEH 2013c).

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

The fire history in the reserve is only partially known. A fire in the early 1990s is the only occurrence recorded since the 1940s and this fire burnt approximately one-third of the reserve, largely along the main north–south ridge.

A reserve fire management strategy to guide fire management for the reserve has been prepared (DEC 2007). The fire management strategy details the recent fire history of the reserve, key assets within and adjoining the reserve including sites of natural and cultural heritage value, fire management zones and fire control advantages such as management trails and water supply points. It also contains fire regime guidelines for conservation of the reserve's vegetation communities.

Under the strategy, the whole of the reserve is zoned as a land management zone, the objective of which is to conserve biodiversity and to protect cultural heritage. No parts of the reserve are zoned as either asset protection zones or strategic fire advantage zones reflecting the absence of adjoining assets that may be at threat from wildfire.

NPWS maintains cooperative arrangements with surrounding landowners and the Rural Fire Service and is actively involved with the Far North Coast Bush Fire Management Committee. Cooperative arrangements include fire planning, fuel management and information sharing. Hazard reduction programs, ecological burning proposals and fire trail works for the region are submitted annually to the bush fire management committee.

Desired outcomes

- Negative impacts of fire on life, property and the environment are minimised.
- The potential for spread of bushfires on, from, or into the reserve is minimised.
- Fire regimes are appropriate for conservation of native plant and animal communities.

Management response

4.2.1 Implement the reserve fire management strategy for Couchy Creek Nature Reserve.

4.2.2 Continue to be involved in the Far North Coast Bush Fire Management Committee and maintain cooperative arrangements with local Rural Fire Service brigades and other fire authorities and surrounding landowners in regard to fuel management and fire suppression.

4.2.3 Manage the reserve to protect biodiversity in accordance with the identified fire regimes in the reserve fire management strategy.

4.3 Climate change

Anthropogenic climate change has been listed as a key threatening process under the TSC Act. Projections of future changes in climate for northern New South Wales include higher temperatures, increasing sea levels and water temperatures, increases in summer and autumn rainfall and decreases in winter rainfall, increased temperature extremes and higher

evaporative demand. These changes are likely to lead to greater frequency of fires, more severe droughts, and increased erosion and flooding frequency (DECCW 2010b).

Climate change may significantly affect biodiversity by changing population size and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration and pressure from feral animals. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates.

OEH has mapped climate change corridors along climatic gradients for native animals occupying coastal, dry and moist habitats on the NSW north coast (DECC 2007b). These corridors are predicted to be important for wildlife adapting to the threatening processes of climate change. The reserve forms part of a corridor for fauna occupying coastal habitats and links significant habitats from the Springbrook Plateau to the Rous River.

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

Desired outcomes

- The effects of climate change on natural systems are reduced.

Management response

4.3.1 Continue existing fire, pest and weed management programs to increase the reserve's ability to cope with future disturbances, including climate change, and encourage research into appropriate indicators to monitor the effects of climate change (see Sections 4.1 and 4.2).

5. Implementation

This plan of management establishes a scheme of operations for the reserve. Implementation of this plan will be undertaken within the annual program of the NPWS Northern Rivers Region. Identified activities for implementation are listed in Table 3. Relative priorities are allocated against each activity as follows:

High priority activities are those imperative to achievement of the objectives and desired outcomes of this plan. 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 the objectives and desired outcomes but can wait until resources become available.

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

This plan of management does not have a specific term and will stay in force until amended or replaced in accordance with the NPW Act.

Table 3: Actions

Management response	Priority*
Geology, landscape and hydrology	
3.1.1 Enhance the integrity of the riparian vegetation communities through continued bush regeneration programs to control weed species (see Section 4.1).	High
Native plants and native animals	
3.2.1 & 3.3.1 Implement relevant strategies and actions in the *Priorities Action Statement* and recovery plans for threatened species, populations and ecological communities in the reserve including appropriate pest and fire management (see Sections 4.1 and 4.2).	High
3.2.2 Develop and maintain installation of a ‘green guide post’ system identifying sensitive zones and spot locations for threatened plants along Couchy Creek Road.	Medium
Aboriginal heritage and historic heritage	
3.4.1 Continue to consult and involve the Tweed Byron Local Aboriginal Land Council, the Bundjalung Elders group, other relevant Aboriginal community organisations and custodial families in the management of their Country, including the management of Aboriginal sites, places and cultural values.	High
3.4.2 Encourage further research into the Aboriginal heritage values of the reserve with the Tweed Byron Local Aboriginal Land Council, Bundjalung Elders and other relevant Aboriginal community organisations.	Medium
Visitor use	
3.5.1 Manage the reserve for low-key, nature-based day use such as birdwatching and education purposes. No visitor facilities will be provided in the reserve.	High

Management response	Priority*
3.5.2 Include the reserve as part of a regional law enforcement program to manage the illegal use of trail bikes.	High
3.5.3 Install bollards and regulatory signage where required along Couchy Creek Road to control impacts from vehicles and illegal camping.	High
3.5.4 Liaise with Tweed Shire Council to amend the boundaries of the road reserve so that they align with the practical alignment of Couchy Creek Road. Any proposal to adjust the boundary of Couchy Creek Nature Reserve will be in accordance with the NPWS *Revocation, Recategorisation and Road Adjustment Policy* (NPWS 2014).	Low
Pests and weeds	
4.1.1 Implement relevant control programs in accordance with the regional pest management strategy.	High
4.1.2 Continue the bush regeneration program and implement the site-specific plan for control of lantana in the reserve.	High
4.1.3 Support initiatives to develop a long-term program for weed control, vegetation restoration, and connectivity works for the reserve and surrounding lands involving interested landholders and reserve neighbours, Landcare groups, Tweed Shire Council, North Coast Local Land Services and other interested agencies and land managers.	High
4.1.4 Monitor noxious and significant environmental weeds and their impacts. Treat any new outbreaks where possible.	High
4.1.5 Manage myrtle rust on the reserve in accordance with the *Management Plan for Myrtle Rust on the National Parks Estate* (OEH 2011b). Practice appropriate hygiene protocols during bush regeneration and general maintenance work to reduce the risk of myrtle rust infection and other potential pathogens.	High
Fire	
4.2.1 Implement the reserve fire management strategy for Couchy Creek Nature Reserve.	High
4.2.2 Continue to be involved in the Far North Coast Bush Fire Management Committee and maintain cooperative arrangements with local Rural Fire Service brigades and other fire authorities and surrounding landowners in regard to fuel management and fire suppression.	High
4.2.3 Manage the reserve to protect biodiversity in accordance with the identified fire regimes in the reserve fire management strategy.	
Climate change	
4.3.1 Continue existing fire, pest and weed management programs to increase the reserve's ability to cope with future disturbances, including climate change, and encourage research into appropriate indicators to monitor the effects of climate change (see Sections 4.1 and 4.2).	High

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