BURNT-DOWN SCRUB NATURE RESERVE

PLAN OF MANAGEMENT

National Parks and Wildlife Service
Part of the Department of Environment and Climate Change NSW

July 2008

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

Further information

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FOREWORD

Burnt-Down Scrub Nature Reserve is located north of the Gwydir Highway between Grafton and Glen Innes, in north-eastern New South Wales. It has an area of 364 hectares.

The reserve has highly significant bioregional values and conserves a link between the Richmond River flora and that of the Guy Fawkes and Macleay Rivers. Despite its small size the reserve contains a diversity of native vegetation, with 330 plant species recorded. It includes a southern outlier of the dry rainforests of the Richmond Valley, the value of which was initially recognised through its dedication as a flora reserve, and more recently by its gazettal as a nature reserve. As the name of the reserve suggests, fire has been a key factor in influencing the distribution of native vegetation communities in the reserve.

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

A draft plan of management for Burnt-Down Scrub Nature Reserve was placed on public exhibition from 7th October 2005 until 30th January 2006. The submissions received were carefully considered before adopting this plan.

This plan contains a number of actions to achieve “Better environmental outcomes for native vegetation, biodiversity, land, rivers, and coastal waterways” (Priority E4 in the State Plan) including control of erosion and weeds within the reserve and preparation of a pest species control plan.

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

Verity Firth

Minister for Climate Change and the Environment

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1. MANAGEMENT CONTEXT

1.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the NPW Regulation, the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). Section 72AA of the NPW Act lists the matters to be considered in the preparation of a plan of management. The policies are compiled from the legislative background, the NPW Regulations 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 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, no operations may be undertaken within the Burnt-Down Scrub Nature Reserve except in accordance with the plan. The plan will also apply to any future additions to the reserve. Where management strategies or works are proposed for the reserve or any additions that are not consistent with the plan, an amendment to the plan will be required.

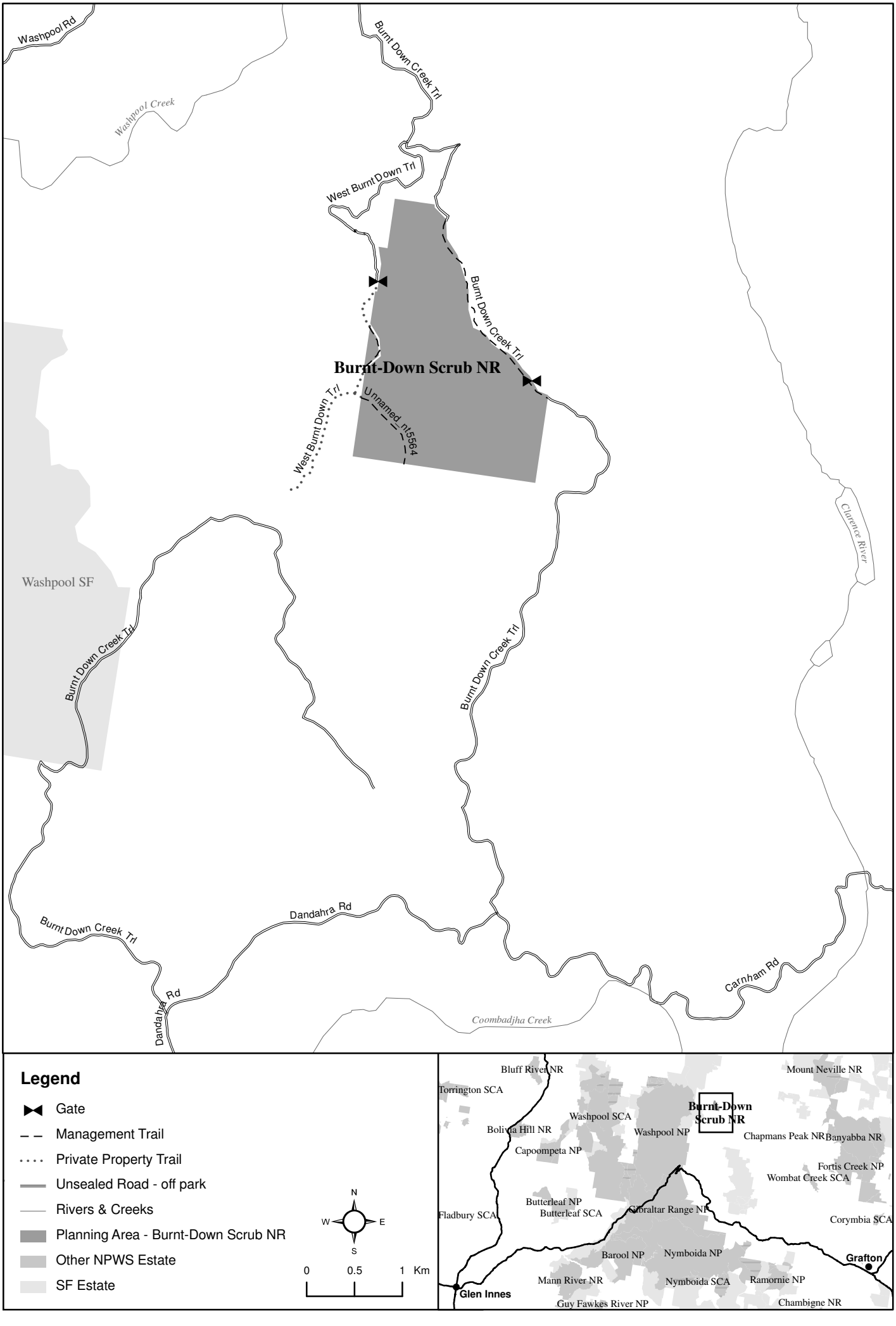
1.2 MANAGEMENT PURPOSES AND PRINCIPLES

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

Under the Act, nature reserves are managed to:

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

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


Washpool Rd
Burnt Down Creek Trl
Washpool Creek
West Burnt Down Trl
Burnt-Down Scrub NR
Unnamed nt5564
Clarence River
Washpool SF
Dandahra Rd
Carnham Rd
Coombadjha Creek
Legend
Gate
Management Trail
Private Property Trail
Unsealed Road - off park
Rivers & Creeks
Planning Area - Burnt-Down Scrub NR
Other NPWS Estate
SF Estate
N
W
E
S
0
0.5
1 Km
Bluff River NR
Torrington SCA
Mount Neville NR
Washpool SCA
Bolivia Hill NR
Washpool NP
Chapmans Peak NR
Banyabba NR
Capoompeta NP
Fortis Creek NP
Wombat Creek SCA
Butterleaf NP
Butterleaf SCA
Fladbury SCA
Gibraltar Range NP
Corymbia SCA
Barool NP
Nymboida NP
Grafton
Mann River NR
Nymboida SCA
Ramornie NP
Glen Innes
Guy Fawkes River NP
Chambigne NR

3. BURNT DOWN SCRUB NATURE RESERVE

3.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Burnt-Down Scrub Nature Reserve (referred to as 'the reserve' in this plan) has an area of 364 hectares. It is located north of the Gwydir Highway between Grafton and Glen Innes, 8 kilometres north-north-west of the junction of the Mann and Clarence Rivers and 15 kilometres south-west of the township of Baryulgil, in north-eastern New South Wales (see Map 1). The reserve was dedicated under the Forestry and National Parks Estate Act 1998 and was reserved on 1 January 1999. The reserve was formerly part of Washpool State Forest, portion 99 of the reserve within the Burnt Down Creek Flora Reserve.

The reserve is separated from Washpool National Park by four kilometres of private holdings of partly cleared land used for grazing. The reserve falls within the Copmanhurst Local Government Area, Northern Rivers Catchment Management Authority, Baryulgil Local Aboriginal Land Council area and Bundjalung tribal area.

The reserve lies within the North Coast bioregion. Rainforest within the reserve is of considerable bio-geographic importance, representing a southern outlier of the dry rainforests of the Richmond Valley (Floyd 1982). It is also a strategic refuge linking those of the Macleay Gorges, Guy Fawkes and Mann Rivers with the larger areas on the Richmond Range to the north (Floyd 1982, Hunter 2000).

The name of the reserve originates in part from the fire history of the area. The area of dry rainforest in the south-east of the reserve (Map 2) became known as "Burnt Up Scrub" describing past fire damage to the rainforest, that apparently dates back to the clearing of adjacent forest areas by early European settlers. The nearby Burnt Down Creek, a tributary of which bounds the west of the reserve, also reflects this history.

3.2 LANDSCAPE CONTEXT

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

The geology, landform, climate and plant and animal communities of the area, plus its location, have determined how it has been used by humans. The natural environment was conducive to year-round use of the forests by Aboriginal people. The native vegetation also attracted selective logging, and State Forests later managed much of the reserve as a timber resource. To a large extent, the area surrounding the reserve has been cleared for agriculture and, as the name of the reserve suggests, fire has been a key factor in influencing the landscape. The value of the rainforest community was initially

officially recognised through its dedication as a flora reserve, and more recently by its gazettal as a nature reserve.

Both Aboriginal and non-Aboriginal people place cultural values on natural areas, including aesthetic, social, spiritual, recreational and other values. Cultural values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. This plan of management aims to conserve both natural and cultural values. For reasons of clarity and document usefulness natural and cultural heritage, non-human threats and on-going use are dealt with individually, but their inter-relationships are recognised.

3.3 MANAGEMENT DIRECTIONS

In addition to the management purposes and principles (section 1.2), the following specific objectives apply to the management of Burnt-Down Scrub Nature Reserve:

- Conserve diversity of habitat types within the reserve, with particular emphasis on protection of the remnant dry rainforest;
- Undertake targeted surveys to confirm the population sizes of significant species and for species predicted to occur;
- Protect natural values in the reserve by allowing forest regrowth and minimising threatening processes such as inappropriate fire regimes, pest species and cattle grazing;
- Undertake or encourage research into appropriate fire regimes and introduced species; and
- Develop a cooperative working relationship with reserve neighbours regarding cross-boundary issues.

4. VALUES OF THE RESERVE

4.1 NATURAL VALUES

4.1.1 Landform, Geology and Soils

The reserve has the undulating to rugged terrain associated with the upper reaches of the Clarence River catchment. Aspects are predominantly southern and western. Burnt Down Creek is a lesser tributary of the Mann River, and drains the reserve towards the south. The reserve falls from 520 metres to 200 metres altitude over its length (Hunter 2000). The mean annual rainfall for the reserve is between 1100 and 1200 millimetres, predominantly between December to March/April. The mean annual temperature is around 18-19°C, with infrequent frosts.

The surface of the reserve is underlain by the Willowie Creek Beds of Devonian-Silurian age. The Willowie Creek Beds comprise tuffaceous mudstone, fine-grained greenstones with minor lithic wacke, foliated metaclaystone and metasiltstone, conglomerate, limestone breccia, chert and jasper (Fergusson 1984, Henley et al. 2001). The greenstones are basalt and andesite that have been altered to predominantly green minerals.

Mapping to the south-east of the Nature Reserve (Fergusson 1984) indicates that the Willowie Creek Beds can be divided in that area into a greenstone-dominant unit to the south-west and a greenstone-poor unit to the north-east. The boundary between those subdivisions projects north-westerly across the south-western corner of the Nature Reserve (Barnes et al, 1995). These greenstones are a likely parent material for the rich reddish loamy soils found amongst the closed forests of the reserve during floristic field surveys (Hunter 2000).

4.1.2 Native Plants

The distributions of native vegetation communities in the reserve are related to past disturbances, particularly fire, as well as drainage and aspect (Hunter 2000). The northern half of the reserve is predominantly tall open forest, dominated by eucalypt species with a grassy understorey and in some cases a prominent moist shrub layer. The tall open forest communities are further divided into, white mahogany–grey ironbark grassy dry sclerophyll forest, brush box–scrub turpentine wet sclerophyll forest and grey ironbark–grey gum semi mesic grassy forest. Throughout the southern half of the reserve two varieties of low closed forests or dry rainforest, are found, the brush box–giant stinging tree dry rainforest and wild lime–python tree–teak dry rainforest (Hunter 2000). Map 2 shows the distribution of vegetation communities in the reserve.

The reserve has highly significant bioregional values and conserves a link between the Richmond River flora and that of the Guy Fawkes and Macleay Rivers (Hunter 2000). Despite its small size, the reserve contains a diversity of native vegetation - 330 native plants species are recorded in the reserve (Hunter 2000). There are 16 known species of significance, 12 of these being

of regional significance, most of which are at or near their southern limit of distribution. Four species are considered rare or threatened. Table 1 lists the significant species in the reserve (Hunter 2000).

Table 1 Significant plant species recorded in the reserve

Common Name	Scientific Name	Status
Large-flowered milk vine	*Marsdenia liisae*	ROTAP (3RC-)
Daisy bush	*Olearia heterocarpa*	ROTAP (2Rca)
	Sarcochilus weinthalii	Vulnerable (TSC Act), ROTAP (3VC-)
	Tinospora smilacina	Endangered (TSC Act)
	Acalypha capillipes	(8S)
	Atalaya salicifolia	(8S)
	Flindersia australis	(8S)
	Flindersia xanthophylla	(8S)
	Macrozamia fawcetii	(6)
	Melicope elleryana	(8S)
	Olearia agrophylla	(4 7 8N)
	Ophioglossum reticulatum	(4)
	Solanum opacum	(4)
	Typhonium brownii	(4)
	Vittadinia tenuissima	(4)
	Zanthoxylum brachyacanthum	(8S)

ROTAP – Rare or Threatened Australian Plant
2 Geographic range in Australia less than 100 km,
3 Geographic range in Australia greater than 100 km,
4 regionally uncommon,
6 Endemic,
7 Disjunct,
8 Distributional limit.
R Rare,
V Vulnerable,
C Reserved,
a 1000 plants or more are known to occur within a conservation reserve(s)
- reserved population size is not currently known
N Northern limit,
S Southern limit
Categories of Conservation Significance in Upper North East NSW (Sheringham & Westaway 1995).

Priorities Action Statements and recovery plans are progressively being prepared and will be used to guide management of threatened species in the reserve.

4.1.3 Native Animals

The dry rainforest and tall open forest in this small reserve provide a diversity of habitats suitable for a wide range of native animal species. The reserve has been identified as having key habitat values and is linked to Washpool National Park by a corridor of vegetation.

A survey of native animals was undertaken in November 2003, however the results were significantly less than expected. This may have been due to the effects of drought and fire. The area had experienced drought conditions for approximately two years prior to the survey and had been frequently burnt, including in 2002. Fire had reduced Acacia shrubs and fire sensitive plants, removed logs, debris and hollow trees, and promoted regeneration of weeds and shrubs (Spark 2003). A reduced ground habitat due to the frequency of fire is thought to severely limit the abundance and diversity of reptiles. Table 2 lists the significant species recorded in the reserve (Spark 2003).

Table 2 Significant animal species recorded in the reserve

Common name	Scientific name	Significance
Amphibians		
Great Barred Frog	*Mixophyes fasciolatus*	Conservation Priority
Tusked Frog	*Adelotus brevis*	Conservation Priority
Mammals		
Rufous Bettong	*Aepyprymnus rufescens*	Vulnerable
Squirrel Glider	*Petaurus norfolcensis*	Vulnerable
Eastern Horseshoe-bat	*Rhinolophus megaphyllus*	Conservation Priority
Common Bentwing Bat	*Miniopterus schreibersii*	Vulnerable
Large-footed Myotis	*Myotis adversus*	Vulnerable
Little Bentwing Bat	*Miniopterus australis*	Vulnerable
Birds		
Wompoo Fruit Dove	*Ptilinopus magnificus*	Vulnerable
Powerful Owl	*Ninox strenua*	Vulnerable
Pacific Baza	*Aviceda subcristata*	Conservation Priority
Russet-tailed Thrush	*Zoothera heinei*	Conservation Priority

Vulnerable - Threatened Species Conservation Act Schedule 2 Vulnerable Species
Conservation Priority - considered a conservation priority in the forests of NE NSW (Gilmore and Parnaby 1994).

The reserve was modelled under the Comprehensive Regional Assessment (CRA) for predicted species habitat. The fauna assessment identified species that occur within the Washpool Creek catchment and are therefore likely to occur within the reserve. Further survey work, in particular target surveys for predicted species, is needed to confirm whether these species are present in the reserve.

4.2 CULTURAL HERITAGE VALUES

4.2.1 Aboriginal Heritage

The reserve lies within the area of the Bundjalung language group and the Baryulgil Local Aboriginal Land Council. The Bundjalung people of Mulabugilmah and Baryulgil have a native title claim (No. NC96/8) over the broader area, inclusive of the reserve.

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

There has been very little assessment of the region's Aboriginal cultural heritage. Some surveys were conducted in response to proposed logging and road development in what was then Washpool State Forest (Longdin 2000).

Rainforests, together with their fauna and flora, were one of the areas utilised in seasonal and non-seasonal nomadic patterns by the Bundjalung people (Riebe 2000). The Bundjalung used the region for potentially thousands of years for ceremonial purposes, as the forest, mountains and other landscape features hold a mystical significance (Longdin 2000, Riebe 2000). There are two declared Aboriginal places, under the NPW Act, in the adjacent Washpool and Gibraltar Range national parks, Waratah Trig and Sugarloaf, and a concentration of cultural areas in the nearby northern section of Washpool National Park has also been recommended for declaration as an Aboriginal place, demonstrating the significance of the wider area to the Aboriginal community (Riebe 2002).

The rugged country of the nearby escarpment and Gibraltar Range became important as a refuge for displaced Aboriginal people following early European occupation. The Bundjalung community of Baryulgil Square and Mulabugilmah retain a close association with the land and some elders retain traditional knowledge of ceremonial and occupation sites (Hall et. al. 1993, Riebe 2000). The Baryulgil Local Aboriginal Lands Council owns Collum Collum Station, the property that connects the north of Washpool National Park and the reserve, where the community undertakes culturally based activities.

4.2.2 Historic Heritage

The first Europeans to reach the Clarence River in the early 1830s were attracted by the rich stands of cedar. By 1838 cedar cutters had set up camp along the river (Allan 2003). In the 1840s the Ogilvie family managed an immense pastoral claim known as "Yulgilbar", embracing the entire mid-Clarence valley for some 30 miles on both sides of the Clarence River,

extending west well into what is now part of Washpool National Park and including the reserve (Allan 2003).

A floristic assessment of the reserve undertaken in 1999 indicated evidence of isolated patches of past clearing, associated grazing and selective logging, including for red cedar (Forestry Commission 1988, Hunter 2000). Some selective logging is evident in the closed forest patches, along with greater selective logging in the open forest areas. The exact date and duration of these operations is unknown (Hunter 2000). Poor access and the terrain was a deterrent to more extensive operations within the reserve, although extensive clearing of land occurred in the surrounding area following settlement.

The reserve was held as a Special Lease, until its dedication as the No. 5 Extension to Washpool State Forest on 26 August 1986. Much of the western boundary was held under an occupational grazing permit (Hunter 2000). Within the boundary of the reserve, Portion 94 was managed by State Forests for timber resources and Portion 99 was managed as a State Flora Reserve for the protection of dry rainforest assemblages (Hunter 2000). Rainforest specialist Alex Floyd investigated both Portions in 1982 to evaluate the rainforest and recommended that, based on its considerable biogeographical importance, the conservation status be secured by dedication under the National Parks and Wildlife Act 1974 (Floyd 1982).

4.3 VISITOR USE AND ACCESS

The reserve boundary is indicated with park signs and sections of the boundary are fenced. There are no visitor facilities in the reserve. Visitor access is not available, without permission from the private holdings that surround all boundaries of the reserve. There is no known history of recreational use of the reserve.

Recreational activities not consistent with the study of nature and natural environments are generally considered inappropriate uses of a nature reserve. Activities such as horse riding, recreational trail bike riding, four-wheel driving and camping are generally considered inconsistent with the purposes of a nature reserve under the NPW Act. Horse riding is not permitted in nature reserves under NPWS policy. The size of the reserve, restricted access and the sensitivity of the habitat does not lend itself to visitation.

Nearby national parks and state forests in the region, such as Washpool and Gibraltar Range National Parks and Washpool State Forest provide for a range of recreational opportunities. Activities available include camping, picnicking, interpretation of World Heritage values, bird watching, bush-walking and four-wheel driving (NPWS 2002a).

Access to the reserve is via trails through private property and along NPWS management trails (see Map 1). These trails will be maintained to a suitable standard for fire, pest and fence management. Works are required to improve access along West Burnt Down Fire Trail and Burnt Down Fire Trail.

5. THREATS TO THE RESERVES VALUES

5.1 Fire

Fire is a natural feature of the landscape in which the reserve is located and is essential to the survival of some plant communities. It is one of the continuing physical factors influencing the Australian environment. However, inappropriate fire regimes have been identified as a key threatening process affecting the biological diversity of NSW as frequent fire can cause loss of particular plant and animal species and communities. Fire can also damage cultural features, fences and threaten neighbouring land.

The most recent fire occurred in the west and south of the reserve in November 2002. A major fire is recorded to have swept through much of the reserve in 1985 (SFNSW 1995). Earlier fire history is unavailable, but field investigations indicate that some major fires occurred over much of the reserve in recorded history. Holders of grazing permits and State Forests used fire as a management tool for both fuel reduction and green pick for cattle (Hunter 2000). Degeneration of the dry rainforest has occurred as a result of these fires, most obviously on the reserve boundaries where lantana has invaded (Forestry Commission 1988).

The NPWS is a fire authority under the *Rural Fires Act 1997* and is required to implement the provisions of district Bush Fire Risk Management Plans. Management of NPWS estate is in accordance with the adopted state-wide NPWS Strategy for Fire Management (2003). An important part of NPWS fire management is participation in local cooperative fire management arrangements. The NPWS is an active member of the Clarence Valley Zone bush fire management committee (BFMC) and works closely with the local Rural Fire Service (RFS) brigades and land holders.

A separate fire management strategy has been prepared for this reserve. Fire management strategies such as fuel reduction, fire trail maintenance and detection and cooperative arrangements will be applied where appropriate to best protect life, property and natural and cultural assets within and adjacent to the reserve.

Existing trails approximately follow the north-eastern and western boundaries of the reserve. The western and southern boundaries of the reserve are relatively exposed to the threat of fire from private property.

5.2 Introduced Species

A total of 11 introduced plant species have been identified within the reserve. Lantana (*Lantana camara*), which is listed as a noxious weed within the Clarence Valley Council area, is the most prevalent weed species and the most widespread. It is found in dense infestations in some areas subject to past clearing and fire (Hunter 2000). Several highly invasive species, in particular tree of heaven (*Ailanthus altissima*), cats claw creeper (*Macfadyena unguis-cati*) and Giant Parramatta grass (*Sporobolus fertilis*), are within closely proximity to the reserve and vigilance will be needed to ensure that these species do not become established within the reserve (Hunter 2000).

Table 3 Introduced plants identified within the reserve

Scientific name	Common name	Invasiveness	Control & management
Anagallis avernsis	Scarlet Pimpernel	3	Chemical control, hand weeding
Bidens pilosa	Cobbler's pegs	2	Chemical control
Bidens subalternans	Greater beggar's ticks	3	Chemical control
Cirsium vulgare	Spear thistle	3	Chemical control, hand removal
Conyza albida	Tall fleabane	3	Chemical control
Conyza bonariensis	Flax-leaf fleabane	3	Chemical control, hand removal
Gomphocarpus fruticosus	Narrow leaf cotton bush	2	Hand removal, chemical control
Hypochaeris radicata	Flatweed	5	Chemical control, hand removal
Lantana camara	Lantana	1 Noxious Weed	Integrated management
Sigesbeckia orientalis subsp. *Orientalis*	Indian weed	5	Pulling & chipping
Verbena officionalis	Common verbena	3	Grubbing, chemical control

Source: (Hunter 2000)

Invasiveness – 1 being of highest priority for eradication due to high invasiveness of natural habitats and 5 either ubiquitous or non-invasive.

Livestock and domestic animals from adjacent lands may occasionally stray into parts of the reserve where fencing is inadequate or absent. Although not bound by legislation to provide for fencing of NPWS estate, the NPWS recognises that cooperative boundary fencing may enhance conservation values and resolve management problems within reserves. NPWS policy on boundary fencing covers fencing adjacent to private property, leasehold and Crown lands.

The introduced species listed in Table 4 are those listed as potentially occur within the Washpool Creek catchment and may also occur in the reserve. Predation by introduced carnivorous species may impact on the population sizes of a range of native wildlife, including mammals, ground nesting birds and reptiles (NPWS 2002b).

Table 4 Introduced mammals potentially occurring in the Washpool Creek catchment

Scientific Name	Common Name	Preferred Habitat
Mus musculus	House mouse	All habitats
Rattus rattus	Black rat	Moist and dry forests/ woodlands, urban
Lepus capensis	Brown hare	Dry forests & woodland, farmlands
Oryctolagus cuniculus	Rabbit	Dry woodlands & open forests, farmlands
Equus caballus	Brumby	Grassy woodlands & open forests, farmlands
Cervus elaphus	Red deer	Moist and dry forests & woodlands
Dama dama	Fallow deer	Moist and dry forests & woodlands
Sus scrofa	Pig	Moist and dry forests & woodlands
Felis catus	Cat (feral)	All habitats
Canis familiaris	Dog (feral)	All habitats
Vulpes vulpes	Red fox	Dry open forest & woodland
Bos taurus	Cattle (feral)	Grassy dry woodlands & open forests, farmlands
Capra hircus	Goats	Grassy & rocky dry woodlands & open forests, farmlands

Source: Spark 2003

5.3 Fragmentation

Clearing of vegetation within the bioregion has resulted in a high loss of biodiversity and fragmentation of habitat. Long term conservation of biodiversity depends upon the protection, enhancement and connection of remaining habitat across the landscape, involving vegetation remnants on both public and private lands. Nearby vegetated areas consolidate the habitat values of the reserve and provide ecological corridors to other surrounding forested areas.

6. MANAGEMENT ISSUES AND STRATEGIES

Current Situation	Desired Outcomes	Strategies	Priority
Soil and water conservation			
Red loam soils in the reserve have low soil erodibility, but the clay component of the soil reduces trafficability during wet weather conditions, particularly from December to March/April.	There is no evidence of increased soil erosion from reserve management activities.	Undertake all works, such as trail maintenance and fire management, in a manner that minimises erosion and water pollution.	High
Minor erosion has occurred on trails, but does not threaten water quality in waterways.	There is no reduction in the water quality and health of watercourses in the reserve and natural flow regimes are maintained.	Monitor erosion from “non natural processes” such as management trails and instigate control measures as necessary (refer also Management operations).	High

Current Situation	Desired Outcomes	Strategies	Priority
Native plant and animal conservation			
The reserve has a diversity of plant species, including 16 significant species. It is also an important vegetative link between the Richmond River area and the gorge country associated with the Guy Fawkes and Macleay Rivers.	Improved knowledge of the reserves plant and animal communities and their ecological requirements.	Undertake or encourage target surveys for threatened animal species.	Medium
		Encourage appropriate research that increases knowledge of native plants and animals within the reserve, their populations, distribution and ecological requirements.	Medium
Encroachments by weeds and impacts from fire threaten the integrity of the closed vegetation communities (refer Introduced species and Fire management). Some vegetation communities, particularly dry rainforest, are sensitive to fire.	There is no reduction in native plant and animal species or communities found in the reserves, particularly significant species, or reduction in habitat diversity.	Implement measures included in recovery plans and threat abatement plans for threatened species.	Medium
Targeted fauna survey work is required to establish the presence of threatened species and any threats.	Structural diversity and habitat values are restored in areas subject to disturbance.	Allow disturbed areas to regenerate naturally, and if necessary undertake works such as weed control to encourage successful revegetation.	Medium
Protection of adjoining native vegetation is important to maintain wildlife corridors and enhance ecological viability of the reserve.	Conservation and corridor values of the reserve are enhanced by retention of vegetated areas on nearby land.	Work with neighbours, local Landcare groups and catchment management boards to encourage conservation of remnant native vegetation in the vicinity of the reserve where there are high natural values or which add to the ecological integrity to the reserve.	Medium

Current Situation	Desired Outcomes	Strategies	Priority
Introduced species			
A Pest Management Strategy (NPWS 2002) has been developed for the Northern Tablelands region, which identifies pest populations, priorities for control and outlines suggested control methods. There is currently no reserve specific pest management strategy.	The impact of introduced species on the reserves values and neighbouring lands is minimised.	Monitor, control and, where possible, eradicate introduced plant and animal species in accordance with the Regional Pest Management Strategy. Priority weeds for control will be based on the invasive threat of species (see Table 3), with highest priority to ongoing lantana control programs and new outbreaks of noxious or other significant weeds.	High
Eleven weed species have been identified within the reserve but most are not of major concern, other than lantana. Several highly invasive species, in particular tree of heaven (*Ailanthus altissima*), cats claw creeper (*Macfadyena unguis-cati*) and giant Parramatta grass (*Sporobolus fertilis*), are within close proximity of the reserve. Vigilance is required to ensure that these species do not become established in the reserve.	Introduced species are controlled and, where possible, eradicated. Where eradication is not feasible, population and distribution of introduced species will not expand beyond their current extent.	Undertake or encourage research into the distribution and impact of pest species, effectiveness of control programs and appropriate control measures within the reserve.	Medium
		Seek the cooperation of other authorities, including the Catchment Management Authority, and neighbours in implementing weed and pest animal control programs.	Medium
No specific surveys have been undertaken for pest animals, however, 13 species may potentially occur in the reserve including red foxes, wild dogs and cats (refer Table 4).	Control of introduced species has minimal impact on native species.	Prepare a pest species control plan for the reserve.	Medium
Domestic stock stray into the reserve where fencing is inadequate and is an ongoing threat to species and communities within the reserve (refer to Management operations).	Domestic stock are excluded from the reserve.	Work cooperatively with relevant reserve neighbours to improve boundary fencing, where necessary to prevent livestock incursion (refer to Management operations).	Medium

Current Situation	Desired Outcomes	Strategies	Priority
Fire management			
Field investigations suggest the reserve has been regularly burned in the past for management purposes to an extent that species diversity has been reduced. The closed forest communities, particularly dry rainforest, in the reserve are sensitive to fire.	Life, property and natural and cultural values within and adjacent to the reserve are protected from fire.	Implement the Reserve Fire Management Strategy for the reserve.	High
		Avoid the use of heavy machinery for fire suppression in the reserve.	Low
Fires within the reserve are unlikely to threaten neighbouring assets.	Fire regimes are appropriate for conservation of plant and animal communities, particularly threatened species.	Monitor the impacts of fire on ecosystems and encourage further research into the ecological effects of fire in the reserve (refer to Native plants and animals and Research).	High
Fire management trails exist on the north-eastern and western boundary and south-western corner of the Reserve. The Clarence River east of the reserve provides suitable vehicle and helicopter watering points during fire suppression activities, accessible through private property.	The potential for spread of bushfires on, from, or into the park is reduced.	Continue to participate in Clarence Valley Zone Bush Fire Management Committees. Maintain coordination and cooperation with Rural Fire Service brigades, Clarence Valley Council fire control officers and neighbours with regard to fuel management and fire suppression.	High
A Reserve Fire Management Strategy has been prepared for the reserve.		Encourage neighbours efforts to contain fire on their own properties, protect their own assets and report unplanned ignitions. Provide information and advice to neighbours regarding the ecological impact of fire and management issues.	Medium

		Liaise with adjoining land holders about the continued use of private trails which provide access to the reserve for fire management purposes.	Low
		Liaise with neighbours about the maintenance of fire breaks on private land, where necessary, for mutual protection of the reserve and private property values from wildfire.	High
		Undertake maintenance works on management trails as necessary to allow adequate access for fire management purposes, in particular on the western boundary.	High

Current Situation	Desired Outcomes	Strategies	Priority
Cultural Heritage			
There are no Aboriginal or historic sites recorded in the reserve, however, no formal surveys have been undertaken. A number of Aboriginal sites have been recorded nearby suggesting there is potentially sites in the reserve.	Aboriginal and historic features and values are identified, protected and managed in accordance with their significance.	Assess the cultural heritage values within the reserve and identify management strategies for the protection of any cultural heritage values from disturbance, natural process and fire.	Low
The reserve is located within the boundaries of the Bundjalung tribal group and the Baryulgil Local Aboriginal Land Council area.	Aboriginal heritage values are protected in partnership with the local Aboriginal community.	Encourage appropriate research including archaeological survey and formal documentation of cultural values of the reserve (refer Research).	Medium
It is important that the local Aboriginal community is involved in the protection of any cultural values in the reserves.	Understanding of the cultural significance of the reserve is improved.	Precede all new ground disturbance work by an assessment for cultural features as part of the Review of Environmental Factors process.	Medium
		Consult and involve the Baryulgil LALC, the Bundjalung Elders group and other relevant Aboriginal community organisations or knowledge holders in all aspects of management of any Aboriginal sites, places and values, including interpretation of places or values if recorded.	Medium

Current Situation	Desired Outcomes	Strategies	Priority
Visitor Use and Access			
Visitor access requires the permission of land holders for access through private property to the reserve. There are no visitor facilities in the reserve and no known history of recreational use of the reserve. The size of the reserve, restricted access and the sensitivity of the habitat does not lend itself to visitation.	The community and neighbours are aware of the significance of the reserves and supports management programs.	Visitor use will not be promoted and no facilities will be developed in the reserve.	High
		Neighbour contact details will not be provided to members of the public seeking access to the reserve.	High
Opportunities for a range of recreational activities are available in other nearby national parks and state forests in the region.		Camping, recreational fires, bike riding, horse riding, trail bike riding and recreational 4-wheel-driving will not be permitted within the reserve.	High

Current Situation	Desired Outcomes	Strategies	Priority
Research No formal cultural heritage surveys have been conducted in the reserve and limited biodiversity survey work has been undertaken. Further research would improve understanding of the reserve's natural and cultural heritage, the processes that affect them and the requirements for management of particular species or sites.	Research enhances the management information base and has minimal environmental impact.	Undertake and/or encourage appropriate research to improve knowledge and management of natural and cultural heritage (refer to Native plants and animals, Introduced plants and animals, Cultural heritage and Fire management). Priority research topics to include: • targeted surveys to establish the population sizes of significant species known to occur in the reserve and for species predicted in the reserve; • research into appropriate fire regimes for vegetation communities; • methods of reducing the distribution and/or spread of introduced species in the reserve, in particular lantana; and • interrelationships between fire and weed control.	Low Medium

Current Situation	Desired Outcomes	Strategies	Priority
Management Operations			
Limited management trails exist within the reserve. NPWS relies on access via adjoining privately owned lands.	NPWS is able to continue to access the reserve through privately owned lands.	Liaise with relevant reserve neighbours about formal access agreements to provide ongoing access for NPWS and landowner management purposes.	High
Access trails are currently periodically slashed. Works are required to improve access along West Burnt Down Fire Trail and Burnt Down Fire Trail.	The reserve boundary is fenced to a stock-proof standard.	Repair and/or maintain trails required for management purposes (see Map 1) to four-wheel drive dry-weather standard, in accordance with formal access agreements with neighbours.	Low
Boundary fencing is inadequate in parts of the reserve, resulting in stock incursions (refer to Introduced plants and animals).		Where appropriate, negotiate fencing agreements with neighbours to install and maintain boundary fences to exclude stock in accordance with NPWS Boundary Fencing Policy and determine strategies to exclude stock where boundary fencing is difficult.	Medium

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

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

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

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