

**BYRNES SCRUB NATURE RESERVE**

**PLAN OF MANAGEMENT**

**NSW National Parks and Wildlife Service**

**Part of the Department of Environment and Conservation (NSW)**

**October 2005**

**This plan of management was adopted by the Minister for the Environment on 28 October 2005.**

### **Acknowledgments**

This plan is based on a draft plan prepared by NPWS Clarence South Area staff, with assistance from North Coast Regional staff and the Northern Directorate Planning Group.

Valuable information and comments were provided by NPWS specialists, the Regional Advisory Committee and members of the public. Thanks are extended to Ken and Nerida Ellem, who gave their time and provided valuable information relating to the history of the reserve.

### **Further information**

For additional information or inquiries on any aspect of the plan, contact the NPWS Clarence South Area Office at Level 3, 49 Victoria Street (PO Box 361), Grafton or by phone on (02) 6641-1500.

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## FOREWORD

Byrnes Scrub Nature Reserve is located in the Clarence Valley on the north coast of NSW, approximately ten kilometres directly west of Glenreagh.

Byrnes Scrub Nature Reserve protects a large stand of dry rainforest dominated by hoop pine. This is considered to be one of the most important dry rainforest stands in the Clarence River catchment. It also contains adjacent smaller areas of dry and moist old growth sclerophyll forest, and an area of wetter subtropical rainforest along the main creek line.

The reserve has been identified as a centre of endemism for wet forest vertebrate fauna, which means that there is a high overall probability of occurrence for animals that are restricted to wet forest types in north-eastern NSW.

The reserve experiences a low level of recreational use for bushwalking and educational inquiry. There are no roads and no visitor facilities within the reserve.

The *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 the area will be managed in the years ahead.

A draft plan of management for Byrnes Scrub Nature Reserve was placed on public exhibition from 23 April until 2 August 2004. The exhibition of the plan of management attracted 4 submissions that raised 8 issues. All submissions received were carefully considered before adopting this plan of management.

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

**Bob Debus**

**Minister for the Environment**

## 1. NATURE RESERVES IN NEW SOUTH WALES

### 1.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves in NSW is in the context of the legislative and policy framework, primarily the *National Parks and Wildlife Act 1974 (NPW Act)*, the NPW Land Management 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 site conservation, recreation, commercial use, research and communication.

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

The plan of management is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within Byrnes Scrub Nature Reserve except in accordance with the plan. The plan will also apply to any future additions to the planning area. 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

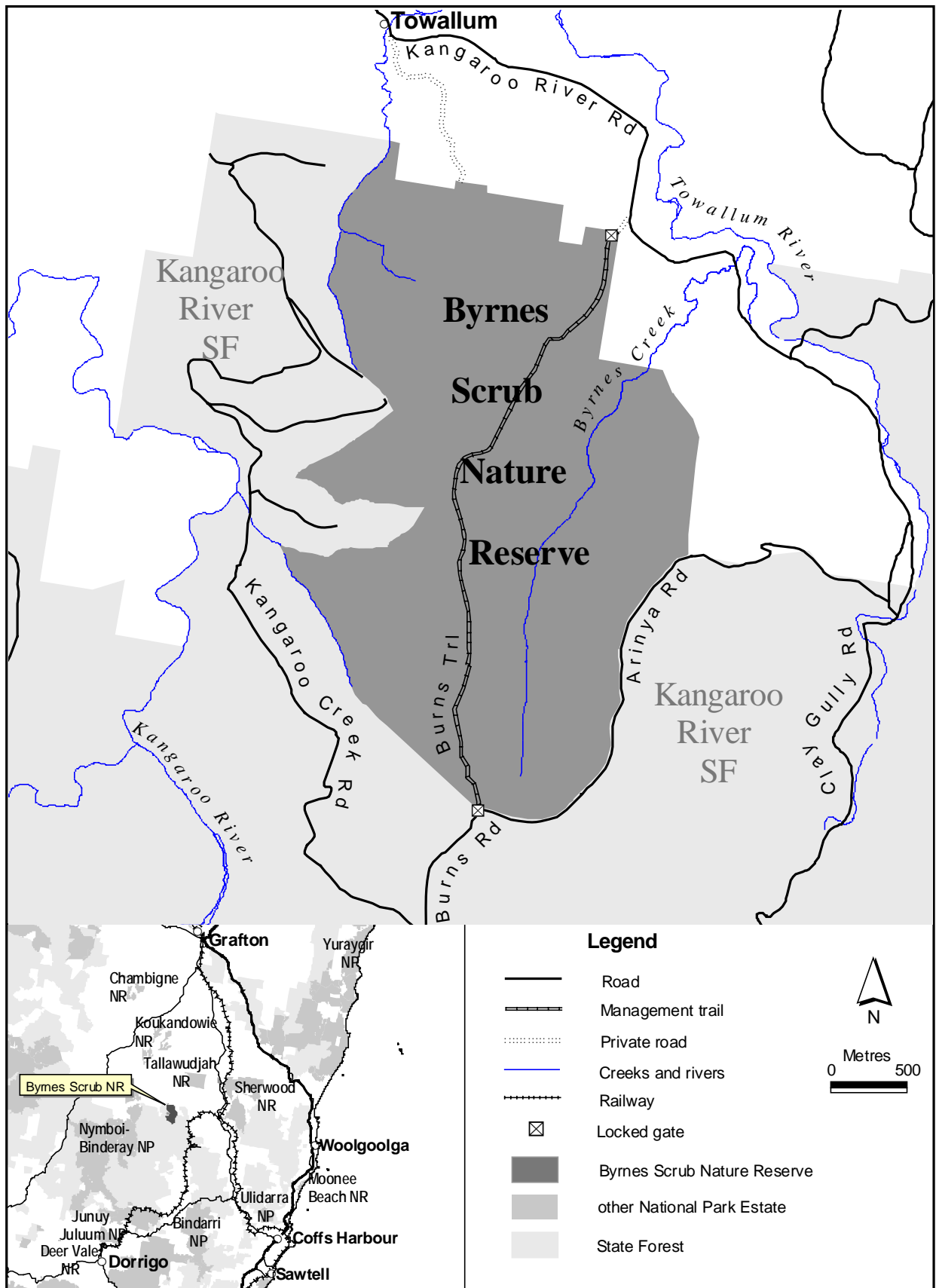
Nature reserves are reserved under the NPW Act to protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena.

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. Nature reserves are part of the regional pattern of land use. Management of nature reserves aims to minimise disturbance to natural and cultural heritage. Other land uses such as agriculture, forestry and mining are distinguished by an acceptance or encouragement of environmental modification. Nature reserves, therefore, provide for only a limited part of the range of land uses in a region.

2. BYRNES SCRUB NATURE RESERVE — LOCALITY



Map 1. Boundary and Locality of Byrnes Scrub Nature Reserve

### 3. BYRNES SCRUB NATURE RESERVE–BASIS FOR MANAGEMENT

#### 3.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Byrnes Scrub Nature Reserve (referred to herein as ‘the reserve’) is located in the Clarence Valley on the north coast of NSW, approximately ten kilometres directly west of Glenreagh (see *Map 1*).

The majority of the reserve was gazetted on 1 January 1999, with a subsequent addition gazetted on 1 January 2003 under the *National Park Estate (Reservations) Act 2002* as part of the North East Regional Forests Agreement (RFA) process (refer below). The reserve now comprises approximately 737 hectares. Prior to gazettal, the reserve was part of Kangaroo River State Forest, dedicated in 1913. The reserve was affected by a Permissive Occupancy Licence for grazing issued by State Forests of NSW (SFNSW), which expired in June 2000 following gazettal.

The reserve abuts State Forest to the west, south and south-east, as well as private freehold and leasehold land to the north and north-east. Adjacent forested lands form part of a vegetated corridor linking the reserve to other conservation areas, including Tallawudjah, Flaggy Creek and Sherwood Nature Reserves to the north-east and Nymboi-Binderay National Park to the west, as well as private forested land in the vicinity.

Byrnes Scrub Nature Reserve falls within the boundaries of the Grafton-Ngerrie Local Aboriginal Land Council and within the country of the Gumbayngirr Aboriginal people. The reserve occupies part of a landscape of importance to the Aboriginal community.

The reserve is located within the boundaries of the Clarence Valley Local Government Area, the Grafton Rural Lands Protection Board and the Upper North Coast Catchment Management Board.

The Burns family originally settled the area in which Byrnes Scrub Nature Reserve is situated, around 130 years ago. The land was known in the local area as “Burns Scrub”. The reason for its gazettal in 1999 under an alternative spelling is unknown.

#### **Regional Forest Agreements**

Regional Forest Agreements (RFA) are one of the principal means of implementing the National Forest Policy Statement of 1992. Under this Statement Commonwealth, State and Territory governments agreed to work towards a shared vision for Australia’s forests. This aimed to maintain native forest estate, manage it in an ecologically sustainable manner and develop sustainable forest-based industries. The Statement provided for joint comprehensive assessments of the natural, cultural, economic and social values of forests. These assessments formed the basis for negotiation of Regional Forest Agreements that provide, amongst other things, for Ecologically Sustainable Forest Management.

The North East RFA covers the planning area. The process leading up to the RFA provided for major additions to the reserve system, including the establishment of Byrnes Scrub Nature Reserve.

### 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.

Byrnes Scrub Nature Reserve protects a large stand of dry rainforest on basalt-enriched soils, and adjacent smaller areas of dry and moist old growth sclerophyll forest. The forested slopes feed into Byrnes Creek which, along with other minor streams within the reserve, flows into the Towallum, Kangaroo and Orara Rivers.

The geology, landform, climate, plant and animal communities of the area, and the reserve's location have influenced previous land uses. The geology and landscape of the reserve supports a large stand of dry rainforest, dominated by hoop pines. These trees were highly sought after in the past as a quality timber source, and were harvested within the reserve. Cattle grazing and fire have also shaped the landscape, particularly in the drier sclerophyll forests. Past harvesting and grazing activities have created opportunities for weed infestation in disturbed areas, particularly along old logging tracks.

The reserve occupies part of a landscape of importance to the Aboriginal community. The varying topography of the reserve, from ridges and dry slopes to sheltered gullies and streams, and the varied vegetation communities, contribute to the overall significance of the wider landscape. A number of Aboriginal cultural sites exist within the reserve and on surrounding lands in close proximity to the reserve (refer to section 3.4) indicating the reserve may be of significance for a range of Aboriginal cultural activities.

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

The following specific objectives apply to the management of Byrnes Scrub Nature Reserve:

- Conserve the full range of reserve flora and fauna, with an emphasis on old growth forest and rainforest communities and significant species;
- Reduce the impact on reserve flora and fauna communities from weed and pest animal species located within the reserve and on adjacent lands;
- Protect the reserve's rainforest vegetation and cultural features from the impacts of fire; and
- Promote use of the reserve for low impact, self-reliant recreation and scientific investigation, consistent with its values and nature reserve classification.

### 3.4 NATURAL AND CULTURAL HERITAGE

#### Landform, Hydrology, Geology and Soils

Byrnes Scrub Nature Reserve comprises rugged terrain, characterised by ridges and crests and contrasting creek valleys. Sideslopes of greater than 20 degrees are most common throughout the reserve, with some floodplain areas of less than 10 degrees slope. Elevation within the reserve ranges from 120m to 410m.

The reserve occurs in the Mid Orara River sub-catchment of the Clarence River. Several streams flow northward through the reserve, including Byrnes Creek (see *Map 1*). These streams flow into the Towallum River, which joins the Kangaroo River further to the north. A tributary to the Kangaroo River flows in a north-westerly direction along the south-western boundary of the reserve.

The reserve is located near the southern edge of the Clarence-Moreton sedimentary basin. The majority of the reserve lies on the geological formation of the Coramba Beds, which are part of the siltstone dominant Coffs Harbour Block. In parts of the reserve this block is overlain by the Clarence-Moreton Basin formations (SCS NSW 1994). The most extensive of these formations within the reserve is the Bundamba Group. A Jurassic intrusion of Walloon Coal Measures, which reach their southern extent within the Clarence-Moreton Basin in the Glenreagh area (McElroy 1969), occurs in the south-east of the reserve. A small strip of Nymboida Coal Measures Tuff and Basalt also occurs in the centre of the reserve (SFNSW 1995). The rainforest vegetation of the reserve is situated on and below this residual basalt capping, and is sustained by rich basaltic soil (Floyd 1990b). A coal seam uncovered some years ago in this central area of the nature reserve was not utilised, due to access constraints as a result of the terrain.

Soils within the reserve range from well structured red brown earths to yellow and red textured contrast soils. Bagawa, Timber Top, Walters Creek and Arthurs Gap soil landscapes are predominant within the reserve. Kremnos, Tweed, Delicate, Torrens and Cloughers Creek soil landscapes also occur in smaller patches (Milford 1996 and 1999). Soils within the reserve are typically identified as moderately to highly erodible, with erosion hazard increasing significantly in wet conditions.



## Native Plants

At least eight forest ecosystems are conserved within Byrnes Scrub Nature Reserve (NPWS 1999). The most extensive of these are hoop pine (*Araucaria cunninghamii*) dominated dry rainforest on the sheltered slopes surrounding Byrnes Creek and dry foothills spotted gum (*Corymbia variegata*) on the more exposed slopes and foothills to the north and west (see *map 2*).

Dry rainforest grows on fertile to moderately fertile soils within the drier parts of the Byrnes Scrub Nature Reserve (Floyd 1990a). An estimated 75-80% of the rainforest that existed in NSW prior to non-Aboriginal settlement has been cleared (RACAC 1996). Dry rainforest is mostly considered to be inadequately represented in conservation reserves in upper north-east NSW (Floyd 1990a). Byrnes Scrub Nature Reserve protects one of the most important dry rainforest stands in the Clarence River catchment.

The reserve conserves an area of wetter subtropical rainforest along the main creek line. Other forest ecosystems found within the reserve include moist foothills spotted gum, tallowwood–blue gum (*Corymbia variegata*–*Eucalyptus microcorys*–*E. saligna*), open coastal brushbox (*Lophostemon confertus*), dry grassy blackbutt–tallowwood (*E. pilularis*–*E. microcorys*), foothills grey gum–spotted gum (*E. propinqua*–*C. variegata*) and dry foothills blackbutt–turpentine (*E. pilularis*–*Syncarpia glomulifera*) (NPWS 1999). The majority of the reserve contains disturbed mature forest. Some sections, however, are considered to be in old growth condition, particularly in the northern and western portions of the reserve.

A total of 84 plant species have been recorded in the reserve to date, with many more species likely to be present. Habitat models produced for the reserve during the Comprehensive Regional Assessment (CRA) process predict the occurrence of suitable habitat for several significant plant species within the reserves, including seven listed under the TSC Act and two listed as Rare or Threatened Australian Plants (ROTAP) (Briggs & Leigh 1996) (refer to *Table 1*). Five of these species are also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The forest communities of the reserve are likely to support a diverse range of rare and threatened fauna species (refer to *Native animals*). NPWS is required by the TSC Act to prepare and implement recovery plans for all listed threatened plant and animal species. These are progressively being prepared and will be used to guide management of threatened species in the reserve.

The NPWS Key Habitats and Corridors project (NPWS 2001) has identified Byrnes Scrub Nature Reserve as occupying part of a regional vegetation corridor for fauna movement. This corridor links the reserve to other conservation areas, including Tallawudjah, Flaggy Creek and Sherwood nature reserves to the north-east and Nymboi-Binderay National Park to the south and west. Vegetated State Forest and private lands surrounding the reserve are vital to the connectivity of fauna habitats in the region.

**Table 1** Significant plants known or likely to occur in Byrnes Scrub Nature Reserve

Common name	Scientific name	Status
<b>Species known to occur in the reserve</b>		
–	<i>Eucalyptus rummeryi</i>	ROTAP 3RC-
<b>Species considered likely to occur in the reserve</b>		
native justica	<i>Calophanoides hygrophiloides</i>	Endangered
–	<i>Cynanchum elegans</i>	Endangered*
tinospora vine	<i>Tinospora smilacina</i>	Endangered*
–	<i>Senna acclinis</i>	Endangered
stinky lily	<i>Typhonium</i> sp. aff. <i>brownii</i>	Endangered
–	<i>Sarcochilus dilatatus</i>	Endangered
milky silkpod	<i>Parsonsia dorrigoensis</i>	Vulnerable*
large-flowered milk vine	<i>Marsdenia liisae</i>	ROTAP 3RC-

Source: NPWS Atlas of NSW Wildlife 2002; NPWS Flora model database (NPWS 1999).

Note: Endangered and Vulnerable species are listed on the TSC Act.

\* Denotes species also listed on the EPBC Act.

ROTAP 3RC – Geographic range in Australia greater than 100km, Rare, Reserved.

## Native animals

The NPWS Key Habitats and Corridors Project (NPWS 2001) has identified much of Byrnes Scrub Nature Reserve as key habitat for priority forest fauna in the Upper North Coast. Key habitat for species in the Moist Escarpment–Foothills, Wet Escarpment–Foothills and Wet Escarpment fauna assemblages occurs throughout the reserve. *Appendix A* lists the species that make up each of these fauna assemblages.

The reserve has also been identified as a centre of endemism for wet forest vertebrate fauna (NPWS 2001), which means that there is a high overall probability of occurrence for animals that are restricted to wet forest types in north-eastern NSW.

Two threatened animal species listed under the TSC Act are known to occur in the reserve, with an additional 27 threatened species predicted to occur during the CRA process (Table 2).

In addition to the threatened species listed in Table 2, several conservation priority forest fauna species endemic to north-east NSW are also considered likely to occur within Byrnes Scrub Nature Reserve. These species include small reptiles such as *Ophioscincus truncatus* (a burrowing skink), *Saltuarius swaini* (a leaf-tailed gecko), Murray's skink (*Eulamprus murrayi*) and *Saproscincus rosei* (a skink). A range of other species such as the pale-yellow robin (*Tregellasia capito*), Pacific baza (*Aviceda subcristata*), eastern horseshoe-bat (*Rhinolophus megaphyllus*), eastern forest bat (*Vespadelus pumilus*) and whirring tree frog (*Litoria revelata*) are also likely to occur (NPWS 1999).

**Table 2** Threatened animals known or likely to occur in Byrnes Scrub Nature Reserve

Common name	Scientific name	Status
<b>Species known to occur in the reserve</b>		
grey-crowned babbler	<i>Pomatostomus temporalis temporalis</i>	Vulnerable
wompoo fruit-dove	<i>Ptilinopus magnificus</i>	Vulnerable
<b>Species considered likely to occur in the reserve</b>		
giant barred frog	<i>Mixophyes iteratus</i>	Endangered*
green-thighed frog	<i>Litoria brevipalmata</i>	Vulnerable
pale-headed snake	<i>Hoplocephalus bitorquatus</i>	Vulnerable
Stephens' banded snake	<i>Hoplocephalus stephensii</i>	Vulnerable
barred cuckoo-shrike	<i>Coracina lineata</i>	Vulnerable
black-breasted button-quail	<i>Turnix melanogaster</i>	Endangered
regent honeyeater	<i>Xanthomyza phrygia</i>	Endangered*
glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	Vulnerable
red-tailed black-cockatoo	<i>Calyptorhynchus banksii</i>	Vulnerable
rose-crowned fruit-dove	<i>Ptilinopus regina</i>	Vulnerable
superb fruit-dove	<i>Ptilinopus superbus</i>	Vulnerable
swift parrot	<i>Lathamus discolor</i>	Endangered*
masked owl	<i>Tyto novaehollandiae</i>	Vulnerable
powerful owl	<i>Ninox strenua</i>	Vulnerable
sooty owl	<i>Tyto tenebricosa</i>	Vulnerable
koala	<i>Phascolarctos cinereus</i>	Vulnerable
red-legged pademelon	<i>Thylogale stigmatica</i>	Vulnerable
parma wallaby	<i>Macropus parma</i>	Vulnerable
rufous bettong	<i>Aepyprymnus rufescens</i>	Vulnerable
yellow-bellied glider	<i>Petaurus australis</i>	Vulnerable
squirrel glider	<i>Petaurus norfolkensis</i>	Vulnerable
golden-tipped bat	<i>Kerivoula papuensis</i>	Vulnerable
large-footed myotis	<i>Myotis adversus</i>	Vulnerable
little bentwing-bat	<i>Miniopterus australis</i>	Vulnerable
common bentwing-bat	<i>Miniopterus schreibersii</i>	Vulnerable
eastern cave bat	<i>Vespadelus trougtoni</i>	Vulnerable
greater broad-nosed bat	<i>Scoteanax rueppellii</i>	Vulnerable

Source: NPWS Atlas of NSW Wildlife 2002; NPWS fauna model database (NPWS 1999)

Note: Endangered and Vulnerable species are listed on the TSC Act.

\* Denotes species also listed on the EPBC Act.

### Aboriginal cultural heritage

The land and water biodiversity values within a whole landscape context are the centre of Aboriginal spirituality and contribute to Aboriginal peoples identity. Aboriginal communities associate natural resources with the use and enjoyment of valued 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.

No formal cultural heritage survey work has been undertaken in the reserve. One Aboriginal site, a bora/ceremonial site, has been recorded within the reserve, indicating the likely significance of the area for tribal ceremonies and the teaching and maintenance of Gumbayngirr religious and social values. This site may require a conservation assessment to determine its significance and suitable management strategies for ongoing protection.

Aboriginal sites have also been recorded on surrounding lands within close proximity to the reserve, suggesting use of the area by Aboriginal people for a range of activities. These include open camp, scarred tree, shelter with art, natural mythological (ritual), burial, quarry and rock engraving sites. Further survey of the reserve for Aboriginal heritage values is required, as well as research into the oral history of the area, to identify sites and places of significance to the Aboriginal community and formulate appropriate protection strategies.

### **Cultural heritage since European settlement**

The area in which Byrnes Scrub Nature Reserve is situated was settled by the Burns family, who selected the property over 130 years ago (Coutts Crossing and Nymboida Districts Historical Society (CCNDHS) 1985). The property is understood to have been part of the original Kangaroo Creek Run, an extensive cattle and sheep grazing area established by Thomas Coutts around 1840. A small headstone on a neighbouring property marks the grave of a member of the Burns family, who died in 1872. The reserved land was known in the local area as “Burns Scrub,” and the main road leading to the reserve is identified as Burns Road. The reason for its gazettal in 1999 under an alternative spelling may be a result of some SFNSW and Nymboida Shire maps dating back to 1986 that describe the main creek line as “Byrnes Creek” (Forestry Commission 1986; NSW Department of Lands 1991). It is proposed to investigate the most appropriate spelling of the reserve name with a view to amending the gazetted name if required.

Other families have an historical association with the Burns Scrub area, including the Wilson and Nagle families who, for a period of time during the mid-1900s, lived within the area now covered by the Nature Reserve in a clearing known locally as “Apple Tree Flat” (Ellem pers. comm. 2003). These families apparently relocated regularly to follow the logging work. The abandoned house site has since burnt and become overgrown, with little evidence of the site and its former use remaining.

Enormous quantities of hoop pine were reputedly cut from the Kangaroo Creek area in the late 1800s and early 1900s, following a decrease in pine and cedar supplies closer to the Clarence. The Byrnes Scrub area was logged for hoop pine, with logs being hauled by bullock teams in the 1920s from the Byrnes Creek valley to sawmills in South Grafton (CCNDHS 1988). Native hardwood logging also occurred in the reserve’s eucalypt communities (SFNSW 1995). The extension of the North Coast Railway and the introduction of motorised transportation for logs eased the task of removing timber from these more remote and hilly areas (CCNDHS 1988; SFNSW 1995).

Most pine and hardwood logging activity within the reserve took place during the 1960s (SFNSW 2003). Logging ceased within the reserve in 1983, with the majority of the area subsequently being set aside for flora and fauna protection and

recommended for gazettal as a Flora Reserve by SFNSW (Ellem pers. comm. 2003; SFNSW 1995).

No sites of historical significance are known to exist within the reserve. The rainforest vegetation of the reserve is, however, of historic and scientific value.

### **3.5 ACCESS AND VISITOR USE**

Access to Byrnes Scrub Nature Reserve is via Burns Road, within Kangaroo River State Forest to the south of the reserve (see *Map 1*). Burns Trail is the only management trail within the reserve. This trail, which is accessible from Burns Road, has in some places become overgrown and is in poor condition, but provides a valuable north-south fire advantage that may assist in minimising impact of fires on rainforest communities. The trail is not suitable for public vehicle use and is closed to public vehicles, with access by foot and emergency services vehicles permitted.

Signage identifying the location of Byrnes Scrub Nature Reserve exists at the southern boundary of the reserve along Burns Road where it intersects with Arinya Road. There are no recreation facilities in the reserve.

Byrnes Scrub Nature Reserve forms part of a network of conservation and timber production areas that provide a range of recreational opportunities for the public. The reserve currently receives low levels of use for low-impact, self-sufficient, nature based recreation, such as bird watching and bushwalking. Recreational activities not consistent with the study of nature and natural environments are generally considered inappropriate uses of a nature reserve. Activities such as horse riding, recreational trail bike riding or four-wheel driving and camping are generally considered inconsistent with the purposes of a nature reserve under the NPW Act. Horse riding is not permitted in a nature reserve under NPWS policy.

National parks in the North Coast Region, including Chaelundi and Nymboi-Binderay National Parks to the west, provide for a complementary range of recreational activities such as camping, picnicking, canoeing, fishing, bird watching, bushwalking and four-wheel-driving. Visitor facilities and opportunities for car touring, four-wheel-driving, picnicking, cycling and the enjoyment of scenic sites, also exist in nearby State forest areas (NPWS and SFNSW 2001).

### **3.6 MANAGEMENT OPERATIONS**

The management trail within Byrnes Scrub Nature Reserve is in parts overgrown and in poor condition and is vulnerable to degradation from frequent vehicle use (refer to *Soils and hydrology* in section 3.4). Work is required on the middle section of Burns Trail, which is currently closed, to restore north-south access through the length of the reserve and maintain it to a four-wheel-drive dry weather standard. Vehicle access to the reserve will be limited to that required for management purposes only, due to the potential for disturbance to soils and vegetation (refer to Section 3.5) and the potential for further degradation of the trail. The trail will be gated to exclude public vehicle use, with public access by foot and bicycle permitted (see *Map 1*).

Arinya Road provides access to the reserve and its boundaries for NPWS management operations, particularly fire management activities. This road passes through state forest and private land to the south-east of the reserve and forms part of the south-eastern boundary of the reserve. An agreement with relevant neighbours will be sought to ensure the maintenance of this road to a standard capable of providing safe access for management purposes.

The majority of the reserve is unfenced. Inadequate fencing is likely to result in livestock from adjacent lands straying into the nature reserve (refer to section 3.7 *Introduced plants and animals*). Cooperative boundary fencing may enhance conservation values and resolve management problems within the reserve. The NPWS aims to work with reserve neighbours to prevent stock access by ensuring boundary fencing is adequate.

### **3.7 THREATS TO RESERVE VALUES**

#### **Fire**

Fire is a natural feature of landscape of which the reserve is part 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 could also damage cultural features, fences and threaten neighbouring land.

NPWS regards cooperative fire management as essential for the protection of life and surrounding property, as well as for protection of the natural and cultural heritage of the reserve. An important aspect of fire management for the NPWS is participation as a member of the Clarence Valley Bush Fire Management Committee and preparation of district bushfire management plans for the area covered by this committee. The reserve is included in the Clarence Valley Bush Fire Management Committee Risk Management Plan, and has been assessed as providing minor bushfire risk to community assets and major risk to environmental assets.

The NPWS is a fire authority under the *Rural Fires Act 1997* that is required to implement the provisions of district fire management plans. Management of NPWS estate is in accordance with the adopted state-wide NPWS Strategy for Fire Management (2003).

Several fires in recent decades have affected land on and surrounding the reserve. Due to its position in the landscape, the dominant vegetation type and the lack of vehicular access to much of the area, most fires move onto the reserve from adjoining property, rather than starting within the reserve.

The drier northern portion of the reserve was burnt by wildfire in 1994. Wildfire encroached on the western boundary of the reserve in 1960, before being controlled along the main north-south access track (Burns Trail). Fire burnt close to this western boundary again in 2001. Fires have also occasionally approached the reserve from the east, being controlled at the reserve's eastern ridge. These fires had little effect

on the reserve's rainforest stands, burning mainly through the drier eucalypt forests. The rainforest core of the reserve along Byrnes Creek is unburnt in living memory (Ellem pers. comm. 2003). With no existing evidence of fire impacts, this area may have remained unburnt since European settlement.

The dry rainforest of the reserve (see *Map 2*) is vulnerable to fire, particularly along rainforest margins, as most rainforest flora species are not adapted to fire (RACAC 1996). Fire in adjacent vegetation communities may also result in a reduction in size of rainforest stands.

Fauna species are also threatened by fire, particularly from too frequent, intense or extensive fires. Loss of habitat resources, such as stags, fallen logs and trees with hollows, will affect the ability of fauna populations to recolonise a burnt area and the continuing viability of populations (RACAC 1996).

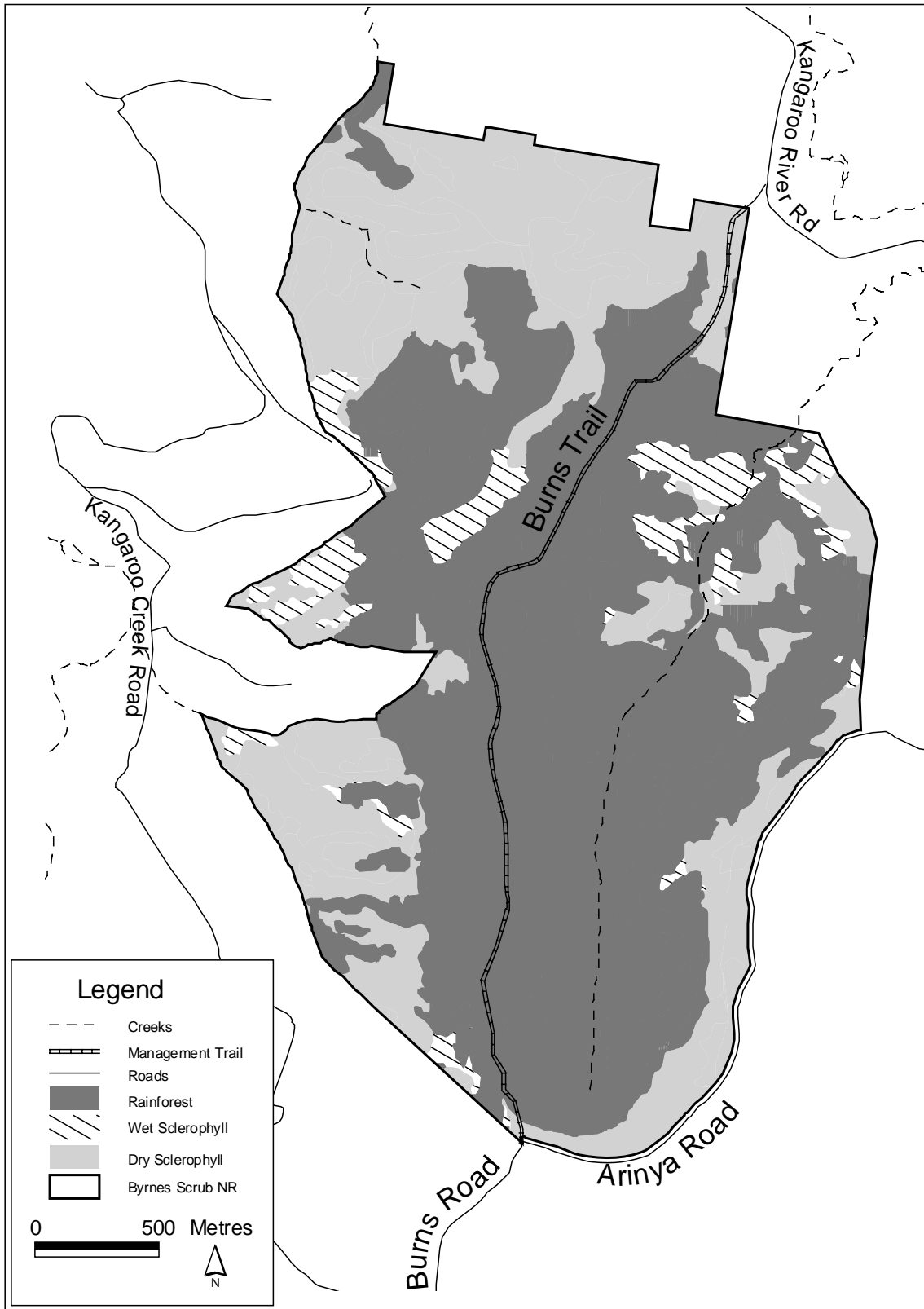
The Aboriginal cultural heritage site recorded within the reserve is unlikely to be adversely affected by fire, however, the site has the potential to be inadvertently damaged by machinery operating in the area during fire suppression activities. A management strategy for this, and any additional sites recorded, is proposed to be developed to assist in protection of these features from unsuitable disturbance (refer to section 3.4 *Aboriginal Cultural Heritage*).

There are several built assets within approximately one kilometre of the reserve, including rural dwellings, stockyards and a 66kV electricity transmission line. Assets in the vicinity of the reserve are not considered to be at significant risk from wildfire occurring within the reserve due to the protection afforded by pasture buffers, as well as the low frequency of fires occurring within the reserve. Wildfires occurring on adjoining State forest or pastured land may pose a threat, should they move into the reserve.

It is proposed to manage fire in the reserve in two Land (Heritage Area) Management Zones in accordance with the NPWS Strategy for Fire Management (2003) and the Clarence Valley Bush Fire Management Committee Risk Management Plan. Burns Trail will divide the reserve into an eastern and a western zone. Burns Trail and Arinya Road (see *Map 2* and refer to section 3.6) may be used to provide access or as breaks to control fires advancing from the east and west, thus protecting the core rainforest stand surrounding Byrnes Creek.

Kangaroo Creek Road within State forest to the west may also offer a degree of protection from fire. Burns Trail within the reserve will be restored and maintained for fire access and other management purposes. Management will aim to maintain biodiversity by restricting fires to only part of the distribution of a vegetation community at any one time, ensuring that the fire thresholds are not exceeded, and by excluding fire from rainforest.

Ecological research in fire-prone ecosystems has established some general principles about fire regimes and the conservation of biodiversity. That is, groups of plants and animals respond similarly to fire according to characteristics of their life history. Therefore it is not necessary to individually specify fire regimes for the conservation of every species.



**Map 2. Existing Vegetation Types for Fire Management Purposes in Byrnes Scrub Nature Reserve**



Requirements for most plant species can be summarised on the basis of vegetation communities and there is a threshold in fire regime variability that marks a critical change from high species diversity to low species diversity (see *Table 3*). The following fire regime guidelines have been identified for Byrnes Scrub Nature Reserve (see *Map 2*).

**Table 3** Fire Regime Guidelines for Byrnes Scrub Nature Reserve

Vegetation type	Minimum interval	Maximum interval	Notes
Rainforest	n/a	n/a	Exclude all fire
Wet sclerophyll forest	25	60	Crown fires should be excluded in the lower end of the range
Shrubby dry sclerophyll forest	7	30	

Source: NPWS intranet, based on Auld & O'Connell (1991), Keith (2002), Keith et al (2002), Morrison et al (1995)

### Introduced plants and animals

A number of weed species have been recorded within Byrnes Scrub Nature Reserve including red lantana (*Lantana camara*), whiskey grass (*Andropogon virginicus*), giant Parramatta grass (*Sporobolus fertilis*), smooth senna (*Senna x floribunda*) and ink weed (*Phytolacca sp.*) (NPWS 2002). Red lantana is listed as a class W2 noxious weed under the *Noxious Weeds Act 1993* in the Clarence Valley local government area and must be fully and continuously suppressed and destroyed. It is considered to pose a major threat to biodiversity in the reserve, particularly within the rainforest communities, by displacing native species and increasing fire hazard. Red lantana is prevalent in areas of the reserve where logging has occurred in the past, and along roads and creek lines.

Other weed species of lesser concern also occur within the reserve, such as fireweed (*Senecio madagascariensis*), carpet grass (*Axonopus affinis*), fleabane (*Conyza sp.*), narrow leaf cotton bush (*Gomphocarpus fruticosus*) and purpletop (*Heliotropium amplexicaule*). Groundsel bush (*Baccharis halimifolia*) and blackberry (*Rubus fruticosus*) occur on neighbouring lands, but are considered to be of minor concern.

Foxes are the only pest animal species reported to occur in the reserve. However, wild dogs (*Canis familiaris*) and Indian mynahs (*Acridotheres tristis*) have been recorded on adjoining lands. Wild dogs and feral cats (*Felis cattus*) have also been recorded in Nymboi-Binderay National Park to the west (NPWS 2002). It is likely that these species also occur in Byrnes Scrub Nature Reserve.

Predation by the red fox impacts on the population sizes of a range of native wildlife, including ground nesting birds, and reptiles. Anecdotal evidence exists that bush stone-curlew once existed in the reserve but have become locally extinct most likely due to fox predation. Both bush stone-curlew and rufous bettong, which has been recorded near the reserve, are priority species for recovery under the NSW Fox Threat Abatement Plan (NPWS 2001).

The common or Indian mynah has been recorded in significant numbers on private lands adjacent to the reserve. It is likely that this species also occurs within the reserve. Mynas are listed by the World Conservation Union as one of the World's 100 Worst Invasive Species (IUCN undated). In Australia, the Indian myna is a feral bird that reduces biodiversity through predation and aggressive competition with native wildlife, particularly hollow-nesting birds and mammals. Locally effective control methods for Indian mynah have not yet been developed (Pell and Tidemann 1997).

Dingoes (*Canis lupus dingo*) have occasionally been observed within the reserve. Wild dogs, including dingoes, have been declared as pest animals under the *Rural Lands Protection Act 1998* (RLP Act) throughout NSW. Hence, the NPWS has a statutory obligation to control wild dogs on its estate. Under the RLP Act, however, public lands which are identified as significant habitat for dingoes in Schedule 2 of the wild dog control order will be managed with the dual objectives of managing wild dogs while at the same time conserving dingoes. Byrnes Scrub Nature Reserve is a Schedule 2 area, requiring public land managers, such as the NPWS, to assist in the preparation of a local wild dog management plan in accordance with the RLP Act. These plans are to identify methods for the control of wild dogs and the conservation of dingoes.

Livestock from adjacent lands 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 also covers fencing adjacent to private property, leasehold and Crown lands.

There are no licensed apiary sites within the reserve. However, the area may be within the foraging range of bees as part of apiary operations located on adjacent State forest and private lands.

#### 4. BYRNES SCRUB NATURE RESERVE–MANAGEMENT ISSUES AND STRATEGIES

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Soil and water conservation</b></p> <p>Soils in the reserve are prone to a range of erosion hazard levels. The majority of soils in the reserve have a moderate to high potential hazard for erosion.</p> <p>Disturbed areas and exposed soils exist within the reserve, as a result of past logging and grazing activities. Erosion on a steep slope to the west of Burns Trail may cause instability and sedimentation of Byrnes Creek. This area requires assessment and stabilisation works.</p>	<ul style="list-style-type: none"> <li>• There is no evidence of increased soil erosion from reserve management activities and visitor use.</li> <li>• There is no reduction in the water quality and health of watercourses in the reserve.</li> <li>• Natural flow regimes are maintained.</li> <li>• Management trails are protected from damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake all works, such as trail maintenance and fire management, in a manner that minimises erosion and water pollution.</li> <li>• Assess the condition of the exposed slope adjacent to Burns Trail and identify possible options for stabilisation. Undertake appropriate stabilisation works as required.</li> <li>• Promote the regeneration of native vegetation in disturbed areas to reduce erosion potential and sedimentation of streams.</li> </ul>	<p><b>Ongoing</b></p> <p><b>High</b></p> <p><b>Medium</b></p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Native plants and animals</b></p> <p>Two threatened fauna species and one ROTAP are known to occur in the reserve with additional threatened flora and fauna species likely to occur.</p> <p>Further surveys are required to identify significant species and/or communities within the reserve.</p> <p>Dry rainforest occupying a significant portion of the reserve is of high conservation value and is sensitive to fire.</p> <p>Vegetated areas on adjacent private land are important in providing connectivity between vegetation communities and habitats.</p>	<ul style="list-style-type: none"> <li>• There is no reduction in the diversity of native plants, animals or populations in the reserve, particularly significant species.</li> <li>• There is an increased understanding and knowledge of the ecological needs and characteristics of plants and animals in the reserve.</li> <li>• Conservation and corridor values of the reserve are enhanced by retention of vegetated areas on adjacent private land.</li> <li>• Cleared and disturbed areas in the reserve that are not required for management purposes are rehabilitated.</li> <li>• Structural diversity and habitat values are restored in areas subject to past logging.</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage systematic flora survey and other appropriate research that increases knowledge of native plants within the reserve, their populations, distribution and ecological needs (refer to <i>Fire management research</i> and <i>Introduced species</i>).</li> <li>• Undertake systematic fauna survey and other appropriate research that increases knowledge of native and priority introduced fauna species in the reserve, their populations and ecological management requirements.</li> <li>• Work with neighbours, local Landcare groups and vegetation management committees to promote, support and encourage the protection of high conservation value vegetation adjacent to the reserve through appropriate conservation mechanisms, particularly in those areas identified as forming corridors or containing key habitat for fauna (NPWS 2001).</li> <li>• Promote the natural regeneration of native vegetation in disturbed or degraded areas.</li> </ul>	<p><b>Medium</b></p> <p><b>Medium</b></p> <p><b>Ongoing</b></p> <p><b>Medium</b></p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Cultural heritage</b></p> <p>No comprehensive surveys have been undertaken within the reserve for sites of Aboriginal or non-Aboriginal cultural significance.</p> <p>One Aboriginal site has been recorded within the reserve. No non-Aboriginal cultural sites have been recorded.</p> <p>Several Aboriginal cultural sites have been recorded nearby on surrounding lands.</p> <p>The Burns family had an association with the area surrounding the reserve. The spelling of Byrnes Scrub Nature Reserve does not accurately reflect its European settlement history.</p> <p>It is important that the local Aboriginal community is involved in the protection of cultural values in the reserves.</p>	<ul style="list-style-type: none"> <li>• Cultural heritage features are identified, conserved and managed in accordance with their significance.</li> <li>• Aboriginal heritage values are protected in partnership with the local Aboriginal community.</li> </ul>	<ul style="list-style-type: none"> <li>• Work with the local Aboriginal community, relevant Local Aboriginal Land Councils and knowledge holders to identify and manage Aboriginal cultural heritage sites, places and values.</li> <li>• Undertake or encourage appropriate Aboriginal cultural heritage surveys within the reserve to identify Aboriginal cultural sites and values (refer to <i>Research</i>).</li> <li>• Encourage appropriate research into non-Aboriginal cultural heritage values in the reserve (refer to <i>Research</i>).</li> <li>• Develop and implement appropriate management strategies for the protection of the bora ring/ceremonial and other cultural heritage sites from unsuitable disturbance, natural processes and fire (refer to <i>Fire Management</i>).</li> <li>• Review the name of the reserve and initiate renaming action as appropriate.</li> </ul>	<p><b>High</b></p> <p><b>Medium</b></p> <p><b>Medium</b></p> <p><b>High</b></p> <p><b>Low</b></p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Fire management</b></p> <p>Parts of the reserve's dry sclerophyll forests have burnt in recent decades (refer to section 3.7). These fires did not significantly affect the dry rainforests of the reserve. Core rainforest surrounding Byrnes Creek has remained unburnt in living memory.</p> <p>Rainforest vegetation is sensitive to fire, and requires protection. Fauna habitat trees within old growth forested areas may also require protection from wildfire.</p> <p>Fires within the reserve are unlikely to threaten neighbouring land. Fires originating from neighbouring lands may affect the reserve and threaten the viability of the rainforests, if not adequately contained.</p> <p>Burns Trail and Arinya Road act as breaks to control fires from the east and west. Kangaroo Creek Road within SFNSW estate to the west may also provide protection from fire.</p>	<ul style="list-style-type: none"> <li>• Life, property and natural and cultural values in and adjacent to the reserve are protected from bushfire.</li> <li>• Fire regimes are appropriate for the conservation and enhancement of native flora and fauna communities.</li> <li>• The potential for spread of bushfires on, from, or into the reserve is reduced.</li> <li>• Neighbours and nearby communities appreciate the requirements for, and cooperate in applying, fire management objectives and prescriptions for the reserve.</li> </ul>	<ul style="list-style-type: none"> <li>• Implement fire management strategies for the reserve (refer to section 3.7). Where possible, exclude wildfire from fire-sensitive communities and populations, cultural features and recently burnt areas.</li> <li>• Continue to participate in the Clarence Valley Bush Fire Management Committee. Maintain coordinated and cooperative arrangements with the Rural Fire Service Brigades, Clarence Valley Council, SFNSW and other neighbours with regard to fuel management, fire protection measures and fire suppression.</li> <li>• Use prescribed fire to achieve a variety of fire regimes in appropriate vegetation types and maintain habitat suitable for species with specific requirements (<i>refer to Native plants and animals and section 3.7.</i>)</li> <li>• Undertake maintenance works on management trails and other fire trails as necessary to allow adequate access for management purposes (<i>see Map 2; refer to Management operations and Soils and hydrology.</i>)</li> <li>• Monitor the impacts of fire on ecosystems within the reserve (<i>refer to Native plants and animals and Research.</i>)</li> </ul>	<p><b>High</b></p> <p><b>Ongoing</b></p> <p><b>Ongoing</b></p> <p><b>Medium</b></p> <p><b>Ongoing</b></p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Introduced plants and animals</b></p> <p>A targeted survey has been undertaken for pest species within the reserves.</p> <p>A number of pest plant species including red lantana and smooth senna have been recorded in the reserve (refer to section 3.7). Pest animal species likely to occur in or around the reserve include wild dogs and foxes.</p> <p>The reserve has been identified as significant habitat for dingoes (refer to section 3.7).</p> <p>A draft Pest Management Strategy (NPWS 2002) has been developed for the region as a whole. This strategy identifies pest populations, priorities for control and suggested control methods.</p> <p>Red lantana may pose a threat to neighbouring properties if not adequately controlled.</p> <p>Appropriate fencing is important to minimise the likelihood of stock entering the reserve.</p>	<ul style="list-style-type: none"> <li>• Pest species are controlled and, where possible, eradicated.</li> <li>• The impact of introduced species on native species, reserve values and neighbouring lands is minimised.</li> <li>• Distribution of lantana and other weed species does not expand beyond the current extent.</li> <li>• Control of introduced species has minimal impact on native species.</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor, control and, where possible, eradicate introduced pest plant and animal species found in the reserve, in accordance with the Regional Pest Management Strategy. Control of noxious and environmental weeds will be a priority in the reserve.</li> <li>• Control red lantana adjacent to grazing land within approx 200m of reserve boundary to reduce its potential for spreading from the reserve onto private land.</li> <li>• Undertake annual sand pad monitoring to detect fox activity within the reserve. Implement a cooperative strategic fox baiting program based on the results of the monitoring in conjunction with reserve neighbours.</li> <li>• Seek the cooperation of neighbours in implementing pest plant and animal control programs. Undertake control in cooperation with the Grafton Rural Lands Protection Board, Clarence Valley Council, the Clarence Valley Weeds Authority and other stakeholders.</li> <li>• Develop and implement a local wild dog management plan in consultation with neighbouring landholders.</li> <li>• Undertake and encourage research into the distribution and impact of pest species within the reserve and appropriate control measures (refer to <i>Research</i>).</li> <li>• Use weed control techniques that minimise soil exposure and undertake works to encourage native revegetation following weed control.</li> <li>• Exclude public vehicles from the reserve to reduce the introduction and spread of weeds.</li> <li>• Where necessary, negotiate fencing agreements with neighbours to exclude livestock from the reserve, in accordance with the NPWS Boundary Fencing Policy.</li> </ul>	<p><b>High</b></p> <p><b>Medium</b></p> <p><b>High</b></p> <p><b>Medium</b></p> <p><b>Medium</b></p> <p><b>Medium</b></p> <p><b>Ongoing</b></p> <p><b>Medium</b></p> <p><b>Medium</b></p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Access and visitor use</b></p> <p>Access to the reserve is via Burns Road, at the southern boundary, within Kangaroo River State Forest (see <i>map 1</i>).</p> <p>The reserve experiences a low level of recreational use for bushwalking and educational inquiry. There are no visitor facilities or interpretive signs within the reserve. No information brochures have been produced for the reserve.</p> <p>Public vehicle use is considered inappropriate within the reserve, due to the potential for soil erosion and disturbance to rainforest plants. Activities such as horse riding, trail bike riding and four-wheel driving have the potential to impact upon reserve values and conflict with other users.</p> <p>Promotion of community understanding and appreciation of the conservation values of the reserve will be important for minimising damaging activities and maximising visitor enjoyment.</p>	<ul style="list-style-type: none"> <li>• Visitor use is low key, self-reliant and ecologically sustainable.</li> <li>• The local community and visitors understand the values of the reserve and support management programs.</li> <li>• Educational opportunities are provided, consistent with reserve values.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide basic interpretive and minimal impact use information at the entrance to the reserve, off Burns Road. In particular, provide information on the role of nature reserves, the significance of the rainforest vegetation and threatened species occurring within the reserve, their management requirements and potential threats.</li> <li>• Allow low-impact, nature based recreational activities such as bushwalking, bird watching and cycling along established trails within the reserve.</li> <li>• Camping, horse riding, trail bike riding and 4-wheel-driving will not be permitted within the reserve. No visitor facilities will be provided.</li> <li>• Group educational activities that are consistent with the values of the reserve may be permitted, subject to conditions on group size, activities and location to protect reserve values and minimise conflict with other users.</li> <li>• Regularly inspect the reserve to detect any impacts from visitor use and undertake measures to reduce impacts where they are found to be unacceptable.</li> </ul>	<p><b>Medium</b></p> <p><b>Medium</b></p> <p><b>Ongoing</b></p> <p><b>Low</b></p> <p><b>Low</b></p>



Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Research</b></p> <p>Limited survey of the rainforest flora of the reserve has been undertaken.</p> <p>Further scientific study is needed to improve understanding of the reserve's natural and cultural heritage, the processes that affect them and the requirements for management of particular species, sites or values.</p>	<ul style="list-style-type: none"> <li>• Research that enhances the management information base and has minimal environmental impact is undertaken.</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake and encourage appropriate research to improve knowledge and management of natural and cultural heritage, as identified within this plan (refer to <i>Native plants and animals, Introduced plants and animals, Cultural heritage and Fire management</i>).</li> </ul>	<p><b>Medium</b></p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Management operations and non-NPWS use</b></p> <p>One management trail exists within the reserve (Burns Trail). This trail is in poor condition, overgrown with weeds in some places, and is only suitable for use in dry weather.</p> <p>It is desirable that Arinya Road be maintained so as to provide safe access for management operations, particularly wildfire suppression.</p> <p>Boundary fencing is insufficient in places, resulting in occasional stock incursions (refer to Introduced plants and animals).</p> <p>Reserve boundaries are unclear in some areas, which may result in inappropriate activities within the reserve.</p> <p>No non-NPWS uses or infrastructure currently occur in the reserve.</p>	<ul style="list-style-type: none"> <li>• Management trails adequately serve management needs and have minimal impact on the natural and cultural values of the reserve.</li> <li>• Management trails are maintained to an appropriate standard for use by the NPWS and other fire authorities.</li> <li>• Boundaries are clearly defined and fences are maintained where appropriate to prevent incursions from livestock.</li> <li>• Development of infrastructure and non-NPWS uses does not occur in the reserve unless consistent with the NPW Act.</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake repair works on Burns Trail as necessary to allow adequate access for management purposes.</li> <li>• Maintain Burns Trail (see <i>map 1</i>) to a four-wheel-drive dry weather standard for management purposes only (refer to <i>Soil and water conservation</i> and <i>Native plant and animal conservation</i>).</li> <li>• Gate Burns Trail at the reserve boundaries to exclude public vehicle access, to protect native vegetation and minimise soil erosion.</li> <li>• Negotiate and develop a formal agreement with relevant neighbours regarding the maintenance of Arinya Road for fire management and access purposes.</li> <li>• Clarify the location of reserve boundaries and notify neighbours to discourage activities that are considered incompatible with the values of the reserve.</li> <li>• Negotiate fencing agreements with relevant neighbours to exclude stock from the reserve.</li> <li>• Any proposed infrastructure or non-NPWS uses within the reserves will not be permitted unless the development is for purposes consistent with the NPW Act.</li> </ul>	<p><b>High</b></p> <p><b>Ongoing</b></p> <p><b>Medium</b></p> <p><b>Ongoing</b></p> <p><b>Medium</b></p> <p><b>Medium</b></p> <p><b>Ongoing</b></p>

### Key to implementation priorities:

**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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## APPENDIX A: KEY HABITAT AND CORRIDOR PRIORITY FAUNA ASSEMBLAGES

**Table A1: Fauna species assemblages for key habitat within Byrnes Scrub Nature Reserve**

Common name	Scientific name
<b>Moist Escarpment – Foothills assemblage</b>	
glossy black-cockatoo	<i>Calyptorhynchus lathami</i>
powerful owl	<i>Ninox strenua</i>
masked owl	<i>Tyto novaehollandiae</i>
spotted-tail quoll	<i>Dasyurus maculatus</i>
koala	<i>Phascolarctos cinereus</i>
greater glider	<i>Petauroides volans</i>
yellow-bellied glider	<i>Petaurus australis</i>
rufous bettong	<i>Aepyprymnus rufescens</i>
grey-headed flying-fox	<i>Pteropus poliocephalus</i>
white-striped mastiff-bat	<i>Nyctinomus australis</i>
little bentwing-bat	<i>Miniopterus australis</i>
common bentwing-bat	<i>Miniopterus schreibersii</i>
little vespadelus	<i>Vespadelus pumilus</i>
<b>Wet Escarpment – Foothills assemblage</b>	
pouched frog	<i>Assa darlingtoni</i>
	<i>Mixophyes fleayi</i>
leaf-tailed gecko	<i>Saltuarius swaini</i>
southern angle-headed dragon	<i>Hypsilurus spinipes</i>
	<i>Ophioscincus truncatus</i>
	<i>Saproscincus challengeri</i>
Stephens' banded snake	<i>Hoplocephalus stephensii</i>
rose-crowned fruit-dove	<i>Ptilinopus regina</i>
superb fruit-dove	<i>Ptilinopus superbus</i>
wompoo fruit-dove	<i>Ptilinopus magnificus</i>
marbled frogmouth	<i>Podargus ocellatus</i>
Albert's lyrebird	<i>Menura alberti</i>
pale-yellow robin	<i>Tregallasio capito</i>
little shrike thrush	<i>Colluricincla megarhyncha</i>
white-eared monarch	<i>Monarcha leucotis</i>
barred cuckoo-shrike	<i>Coracina lineata</i>
dusky antechinus	<i>Antechinus swainsonii</i>
red-legged pademelon	<i>Thylogale stigmatica</i>
Queensland tube-nosed bat	<i>Nyctimene robinsoni</i>
<b>Wet Escarpment assemblage</b>	
giant barred frog	<i>Mixophyes iteratus</i>
Murray's skink	<i>Eulamprus murrayi</i>
barred-sided skink	<i>Eulamprus tenuis</i>
sooty owl	<i>Tyto tenebricosa</i>
paradise riflebird	<i>Ptiloris paradiseus</i>
eastern pygmy possum	<i>Cercartetus nanus</i>
long-nosed potoroo	<i>Potorous tridactylus</i>
eastern horseshoe bat	<i>Rhinolophus megaphyllus</i>
eastern little mastiff-bat	<i>Mormopterus norfolkensis</i>
large pied bat	<i>Chalinolobus dwyeri</i>
greater broad-nosed bat	<i>Scoteanax ruepellii</i>

Source: NPWS 2001