

SHERWOOD NATURE RESERVE

PLAN OF MANAGEMENT

National Parks and Wildlife Service

Part of the Department of Environment and Climate Change NSW

March 2009

This plan of management was adopted by the Minister for Climate Change and the Environment on 20th March 2009.

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) 66411500.

Photograph of bangalay palm forest by Lynn Rees, NPWS. Photograph of xanthorrhoea on cliff edge by Gina Hart, NPWS.

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FOREWORD

Sherwood Nature Reserve is located approximately 40 kilometres south-east of Grafton in northern NSW and encompasses 5,904 hectares.

Sherwood Nature Reserve is part of a regionally important system of protected areas and conserves plant species and communities representative of the Kangaroo Creek sandstone geology as well as a regionally significant sub-tropical rainforest remnant and locally significant old growth forest. There are 32 plant species of conservation significance recorded in the reserve, including 11 species listed under the Threatened Species Conservation Act. The varied vegetation communities support a diverse range of resident vertebrate fauna, and provides important seasonal habitat for a number of nomadic and migratory species. More than 50 species of conservation significance are recorded or predicted to occur in the reserve.

Apart from numerous cultural sites and stories relating to ceremonial complexes, an Aboriginal Place known as Miimiga Gaungan is located within the southern portion of the reserve. The Aboriginal Place holds spiritual significance to the Gumbaynggir women and will be managed in conjunction with local Aboriginal custodians.

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 Sherwood 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 investigating options to improve water quality in the vicinity of Woolgoolga Falls, encouraging biodiversity surveys, promoting conservation of remnant vegetation adjoining the reserve, and implementation of a revegetation plan.

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

Carmel Tebbutt MP
Deputy Premier
Minister for Climate Change and the Environment

1. NATURE RESERVES IN NSW

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 *National Parks and Wildlife Regulations 2002* (NPW Regulations), 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 arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

Other legislation, international agreements and charters may also apply to management of the area. In particular, the *Environmental Planning and Assessment Act 1979* (EPA Act) requires the assessment and mitigation of environmental impacts of any works proposed in this plan. In addition, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) relates to the protection of listed threatened species and other matters of National Environmental Significance, such as listed migratory species.

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 the Sherwood Nature Reserve except in accordance with the plan. The plan will also apply to any future additions to Sherwood Nature Reserve. Where management strategies or works are proposed for Sherwood Nature 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.

Nature reserves are to be 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 are valuable refuge areas, where natural processes, phenomena and wildlife can be studied. They 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 which are managed with minimal disturbance to natural and cultural heritage.

1.3 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 (ESFM).

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

2. SHERWOOD NATURE RESERVE

2.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Sherwood Nature Reserve (referred to herein as the 'reserve') is located east of the township of Glenreagh (30°3'S, 152°59'E), approximately 40 kilometres south-east of Grafton in northern NSW (see Map, centre pages). The reserve is accessed from the west through Glenreagh, east from the Pacific Highway and south from the township of Corindi.

The reserve encompasses 5,904 hectares. Two disjunct areas of the reserve, the northern and central portions, are comprised of rugged sandstone escarpment, narrowly separated by Sherwood Creek Road. A third portion is located in the south and features coastal ridges, slopes and gullies. The northern portion of the reserve was gazetted on 16 December 1966 as Sherwood Reserve No.41 under the *Fauna Protection Act 1948*. The central portion, formerly Waihou Flora Reserve, was gazetted on 1 January 1999 under the *Forestry and National Parks Estate Act 1998* as part of the North East Regional Forests Agreement (RFA) process (refer to 1.3). The southern portion, formerly part of Conglomerate State Forest and the Woolgoolga Creek Flora Reserve, was gazetted on 1 July 2003 under the *National Parks Estate (Reservations) Act 2003* (NPE Act).

The reserve adjoins Conglomerate and Wedding Bells State Forests and rural properties (see Map, centre pages). A small residential subdivision adjoins the reserve to the south-west near Glenreagh.

The reserve, together with the adjoining Conglomerate, Wedding Bells and Lower Bucca State Forests (further to the south-east), forms a forested corridor covering over 16,600 hectares, linking the hinterland and the coast. It is also part of important regional and sub-regional wildlife corridors, extending east towards Yuraygir National Park on the coast through adjoining private forested areas and south towards Coffs Harbour through adjoining State Forest. The reserve, along with Flaggy Creek, Koukandowie, Chambigne and Tallawudjah Nature Reserves are part of a regionally important reserve system protecting areas of Kangaroo Creek sandstone and associated communities.

The reserve lies within the Clarence Valley and Coffs Harbour Local Government Areas and the boundaries of the Northern Rivers Catchment Management Authority and Grafton Rural Lands Protection Board. The reserve also falls within the boundaries of the Grafton-Ngerrie and Coffs Harbour Local Aboriginal Land Councils.

As well as Sherwood Nature Reserve, the planning area includes Ministerial roads which are vested in the Minister for the Environment on behalf of the Crown for the purposes of Part 11 of the NPW Act. These roads do not form part of the gazetted areas of Sherwood Nature Reserve and were created to ensure that the access arrangements which existed immediately before the reserve's creation (primarily for timber hauling and private property access) could continue, even if they were for purposes that did not meet the objectives of the Act. The management of these roads is subject to the provisions of this plan, the NPW Regulation and the requirements of the EPA Act. Ministerial roads in the reserve include that part of Gentle Annie (between Bark Hut Rd and Mary's Waterhole Rd) and part of Sherwood Rd (between Plum Pudding Rd and Mary's Waterhole Rd).

2.2 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 and the presence of introduced plants and animals.

The reserve forms an integral link and overlap between the dry open forest coastal habitats of the Clarence Valley and the moist and wet forest elements of the mid north coast. This overlap provides protection for a diverse array of flora and fauna occurring in the reserve itself, as well as an essential link in the network of forested corridors extending from the southern Clarence Valley and the Great Escarpment, that approaches the coast in the vicinity of Coffs Harbour (Scotts 2003).

There are numerous Aboriginal and non-Aboriginal values associated with the reserve. The central and southern parts of the reserve have been subject to small scale gravel extraction and timber cutting activities in the past. Fire is also a prominent feature of the landscape.

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.

2.3 MANAGEMENT DIRECTIONS

The following specific directions apply to the management of the reserve:

- management of the reserve as part of a regionally important system of protected areas including Flaggy Creek, Tallawudjah, Koukandowie and Chambigne Nature Reserves;
- conservation of plant species and communities representative of the Kangaroo Creek sandstone geology, including sandstone rough-barked apple (*Angophora robur*), bastard white mahogany (*Eucalyptus psammatica*) and *Homoranthus floydii*;
- conservation of a regionally significant sub-tropical rainforest remnant;
- conservation of locally significant old growth forest;
- conservation of cultural heritage values, particularly sites around cliff lines and rock shelters;
- management of Miimiga Gaungan Aboriginal Place in conjunction with local Aboriginal custodians; and
- provide opportunities for public enjoyment, appreciation and understanding of reserve values which are nature based and have minimal impact on the environment.

2.4 NATURAL AND CULTURAL HERITAGE

2.4.1 Landform, geology and soils

The topography of the reserve is extremely diverse. Steep, elevated slopes and rocky outcrops dominate the reserve to the north. The central part of the reserve comprises an elevated plateau with perched swamps and spectacular east and west facing sheer sandstone cliffs that fall 250 metres into rainforest gullies in the south west and south-east. Elevation ranges from 50 metres above sea level along the creek lines in the north and Woolgoolga Creek to 415 metres at the Waihou trig station in the central portion of the reserve.

The northern and central sections of the reserve are situated on the Grafton and Kangaroo River Sandstone geological units that form part of the Clarence Moreton Sedimentary Basin, extending in a broad U-shape across the lower Clarence Valley. The geology of these sections is mapped as Mesozoic sediments comprised largely of sandstone and sandstone derivatives. The latest extension to the reserve in the south is situated on Coramba bed formations. The slate based soil types in the southern section are quite different to the rest of the reserve. The soils throughout the majority of the reserve are relatively infertile with soil depth varying with topographic relief. The most fertile soils in the reserve occur in the moist gullies of this section supporting rainforest.

Middle Creek and Sherwood Creek form the two main watercourses that drain the plateau catchment and the upper reaches of Conglomerate State Forest respectively. Both creeks flow northwards through the reserve to join the Orara River, a major tributary of the Clarence River catchment. There are several perched swamps on the plateau and at the base of the escarpment in the south-western section of the central part of the reserve. Woolgoolga Creek drains the extreme east of the southern portion of the reserve and enters the ocean near Woolgoolga.

2.4.2 Native plants

A total of 20 vegetation communities have been identified within the reserve which fall within four major forest associations: open forest; tall open forest; tall moist open forest and non eucalypt (SFNSW 1989, SFNSW 1987). A full list of these communities, together with their dominant species and location are shown in Appendix (Table A1).

The rugged sandstone escarpments and associated vegetation that dominate the northern and central portions of the reserve have structural and floristic affinities with that of the Hawkesbury region, north of Sydney. The heathy dry open forests provide abundant cover for small ground dwelling mammals and rich nectar sources for many birds and arboreal marsupials. Grassy dry open forests provide important habitat for a suite of fauna that remains under represented in the north-east NSW reserve system (Scotts 2001). The central part of the reserve contains one of the largest needlebark stringybark (*Eucalyptus planchoniana*) communities (1,260 hectares) on the north coast (SFNSW 1995).

The reserve also supports moist and wet tall open forest communities in the more sheltered south facing slopes and wet gullies. A small area of sub-tropical rainforest is located along Rocky and Woolgoolga Creeks near the eastern boundaries of the reserve.

This provides additional habitat and food resources, which in turn are likely to support a range of wet sclerophyll and rainforest specialist fauna (Scotts 2001). Moist and wet open forests with rainforest elements are associated with Middle Creek, Sherwood Creek, and Snake Creek to the north. A large perched swamp in the central portion of the reserve is characterised by wet heath species and paperbark communities.

The former Woolgoolga Creek Flora Reserve within the southern portion contains one of the few lowland floodplain rainforest remnants remaining on the north coast of NSW. As such, it forms part of an endangered ecological community listed under the TSC Act. This subtropical rainforest remnant comprises stands of black and white booyong (*Heritiera actinophylla* / *trifoliolata*), yellow carabeen (*Sloanea woollsii*), purple cherry (*Syzygium crebrinerve*), red cedar (*Toona ciliata* var. *ciliata*), hoop pine (*Araucaria cunninghamii* var) and coachwood (*Ceratopetalum apetalum*) (Freeman 2003). Forest in old growth condition is rare in the Coffs Harbour hinterland and is a significant feature of the southern portion of the reserve.

There are 32 plant species of conservation significance recorded in the reserve (Table A2) including six species listed as endangered and five species listed as vulnerable under the TSC Act. Three of these species are also listed as nationally vulnerable and another nationally endangered under the EPBC Act.

Several of the restricted or threatened flora species recorded are endemic to the Glenreagh-Coaldale Sandstone geology in the area west of Grafton. These species include sandstone rough-barked apple (*Angophora robur*), *Homoranthus floydii* and *Callistemon linearifolius*. Other sandstone endemic species recorded in the reserve have a wider distribution, including *Callitris monticola* and red-leaved daisy bush (*Olearia stillwelliae*).

NPWS is required by the TSC Act to prepare and implement recovery plans for all listed threatened species. These are progressively being prepared and will be used to guide management of threatened species in the area. A recovery plan has been prepared for Moonee quassia (*Quassia* sp. Mooney Creek, DEC 2005).

In 2002, the Woolgoolga Creek Bush Regenerators Group was formed under a memorandum of understanding with Forests NSW. With funding from the local Rotary Club, Lions Club and Chamber of Commerce as well as input from Work for the Dole participants, the community group has undertaken extensive environmental restoration work throughout the flora reserve. The group continues to meet on a monthly basis to undertake weed control and plant locally propagated stock (refer also to 3.7 *Introduced plants and animals*).

2.4.3 Native animals

The diverse vegetation communities and associated habitats within and adjacent to the reserve also support a diverse range of resident vertebrate fauna, and provides important seasonal habitat for a number of nomadic and migratory species. More than fifty species of conservation significance are recorded or predicted to occur in the reserve (Table A3). Surveys and opportunistic sightings have identified amphibian species, including the threatened giant barred frog (*Mixophyes iteratus*) and Tyler's tree-frog (*Litoria tyleri*), a priority species of conservation significance in north-east NSW (Gilmore and Parnaby 1994).

The reserve provides habitat for a diverse range of reptile fauna including representatives of several biogeographic regions. These include a number of species

endemic to the north-east NSW and south-east Queensland, as well as species more typical of habitats west of the Great Dividing Range (Scotts 2002).

The reserve is regionally significant for birds, supporting numerous species endemic to the north-east NSW and south-east Queensland and also supports a number of species from different biogeographic zones (Scotts 2002). The reserve is able to support large birds of prey in conjunction with surrounding forested areas.

Thirteen threatened mammal species and six priority species have been recorded in the reserve (Table A3). The reserve supports a diverse range of arboreal marsupials, macropods, rodents, and microbats, as well providing an important food source for flying foxes.

Draft recovery plans have been prepared for the barking owl, koala, and the large forest owls, including the sooty, masked and powerful owls. A final recovery plan has been approved for the yellow-bellied glider and bush stone-curlew.

Dingoes (*Canis lupis dingo*) have been recorded in the reserve, however the size and genetic purity of the local population has not been determined.

There have been no formal surveys for invertebrates in the reserve.

2.4.4 Aboriginal cultural heritage

The reserve is part of a broader landscape that is home to the Gumbaynggir people. Many of the Gumbaynggir people have maintained strong cultural associations with the area. The northern and central portions of the reserve lie within the Grafton-Ngerrie Local Aboriginal Land Council (LALC) area. The southern section lies within the Coffs Harbour LALC area.

A cultural heritage assessment of the reserve and the surrounding landscape was undertaken to assist in the preparation of this plan of management. Cultural heritage values associated with the area and numerous cultural sites and cultural material were documented. Many of these values are associated with the natural landscape of the area, particularly cliff lines, rock shelters, loose rocks and boulders. Stories relating to ceremonial complexes in the north-eastern part of the reserve were also documented for the first time.

A gazetted Aboriginal Place known as Miimiga Gaungan is located within the southern portion of the reserve. The Aboriginal Place holds spiritual significance to the Gumbaynggir women. The Aboriginal Place was previously on State forest estate but now straddles both NPWS and State forest tenures. Management guidelines for the Aboriginal place have been prepared which address issues such as visitor access and signage.

Aboriginal cultural sites in the vicinity of Falls Trail, Get Lost Trail and the Trig Trail have also been impacted by vehicle access. In some cases, stone arrangements have been disturbed, while in other cases the impacts relate to visitors using an area that is regarded as culturally sacred for rock climbing or other activities.

2.4.5 History Since European Settlement

In 1970, the central part of the reserve was dedicated by the then Forestry Commission of NSW as Waihou Flora Reserve. Prior to its dedication the area was vacant Crown land where small scale sandstone quarrying and timber cutting

activities were undertaken in the 1960s. The northern part of the reserve was gazetted as a timber reserve in 1966.

The reserve incorporates the former Woolgoolga Creek Flora Reserve, originally dedicated in 1917 as part of Wedding Bells State Forest and subsequently gazetted as a flora reserve in 1971. The area was intensively logged during the early 1900s when a tramway to Woolgoolga was in operation. Rainforest logging ceased in 1917 and hardwood logging ceased in the 1940s. The eastern end of the reserve includes areas cleared for hardwood plantation during the 1960s. Flooded gum (*Eucalyptus grandis*) was the most common species planted with some trial planting of bunya pine (*Araucaria bidwillii*). This section of reserve also previously had several banana plantations, which were established in the early 1900s. The banana plantations were in operation until the late 1960s, when they were replaced with hardwood plantations.

The former flora reserve includes a picnic area previously known as Hommigan's Flat, which was the hub of forestry activities in the area in the late 1800s. The site was formerly a sawmill and later a residential cottage and stockyards for the forestry foreman. This area is now known as Woolgoolga Creek Picnic Area (refer to Map).

In 1966 a concrete weir was built on Woolgoolga Creek upstream of Woolgoolga Falls, west of Hommigans Flat (see Map 1). This was the original water supply for the town of Woolgoolga up until 1982 when Woolgoolga was connected to the Coffs Harbour main water supply. The pipeline was then decommissioned but infrastructure was left in place as a possible back up system. These items are considered to be of local historical significance and will be retained within the reserve.

A repeater tower is located in the central part of the reserve and this has been used for railway communications and telecommunications. The trigonometrical station on Trig Trail was installed in 1937 and also has historical significance.

In 1998 and 1999, parts of the southern portion of the reserve were used for several forest protest actions, which focused attention on the value of remnant old growth forest in the area.

2.5 VISITOR USE

The reserve currently receives low levels of use for low-impact, self-sufficient, nature based recreation, such as bird watching and bushwalking. NPWS Discovery activities have occasionally been undertaken in the reserve. Recreational activities, including commercial tour operations, not consistent with the study of nature and natural environments are generally considered inappropriate uses of a nature reserve. Additionally, there are a number of sites and places of Aboriginal cultural significance in the reserve, which are sensitive to visitor access (refer to *2.4.4 Aboriginal cultural heritage*). A range of recreational facilities and opportunities are provided in nearby national parks, State forests, other public land tenures and private property.

Visitor access to the northern part of the reserve is via Sherwood Creek Road. Access to the central part of the reserve is either via Sherwood Creek Road from the north (4WD dry weather only), Sherwood Road from the south, or Waihou Road from the west. The southern part of the reserve is generally accessed via Pullen Street and Woolgoolga Creek Road from Woolgoolga, and Sherwood Road from Lower

Bucca. Vehicle access through private property to the reserve is only accessible with the permission of adjoining property owners.

Public vehicle access within the reserve is to be maintained by NPWS to a 4WD standard. Sherwood Creek Road is maintained by Coffs Harbour City Council and Ministerial Roads in the planning area are maintained by Forests NSW, generally to a 2WD standard. Elsewhere in the planning area public vehicle access will be restricted due to the potential impacts on cultural values and bushwalkers, the erodibility of the dominant soil types and the steepness of the terrain.

The northern part of the reserve receives the least visitation, due to its relatively remote location and limited vehicle access. Activities include bird watching, bush walking and rock climbing.

The central part of the reserve receives a higher level of use due mainly to the 4WD access provided by Sherwood Road. Middle Creek is often used for picnicking and swimming. Rock climbing and bushwalking also occur in this section of the reserve (refer to *2.5.1 Rock climbing*). Prior to its gazettal into the reserve this area was also used for camping, trail bike riding and military training exercises.

Woolgoolga Creek picnic area in the southern part of the reserve is the most popular visitor destination in the reserve. The picnic area is frequently visited by local bird watching groups, schools and by Southern Cross University. It is also a very popular picnic spot for local visitors and is currently the only site in the reserve where there are recreational facilities. Woolgoolga Creek picnic area has a long history of use and involvement by the local community (refer to *2.4 Natural and Cultural Heritage*). This picnic area is actively promoted as a tourist attraction. Prior to its gazettal into the reserve, the site was used for camping, trail bike riding and dog exercising. These activities no longer occur as they are not consistent with its management as a nature reserve.

Facilities at Woolgoolga Creek Picnic Area (refer to Map, centre pages) include a toilet, car park, gas barbecue, picnic tables and interpretive display. A walking track follows the old pipeline access trail and logging tramway along Woolgoolga Creek, passing through rainforest and plantation flooded gum forest for approximately 1.3 kilometres to Woolgoolga Falls and a fenced area from which the Falls can be viewed. Sections of the Falls Walking Track have been upgraded to address safety issues. Some walkers however continue past the fenced viewing point at the track's end, up steep and dangerous slopes to get above the Falls.

2.5.1 Rock climbing

Recreational abseiling and rock climbing have been undertaken in the reserve on a small scale since 1986. Most of the sites are located in the central part of the reserve where climbers utilise numerous cliff faces and overhangs. Small groups of four to six people from Coffs Harbour climb most weekends and occasionally small groups from Armidale and Brisbane visit the reserve. Limited rock climbing and abseiling opportunities also exist in the adjoining Conglomerate State Forest.

A small commercial tour operator was conducting rock climbing activities in the area that was previously State Forest, but this activity has not continued since gazettal of the reserve. No licence has ever been issued for this activity, and so it does not constitute an existing commercial use under the NPW Act.

Findings and recommendations from an Aboriginal cultural heritage study and a fauna study, combined with site inspections and discussions with local rock climbers and other visitors, identified that several climbing sites were inappropriately located or required restrictions on use. The main reasons were due to their existing or potential impact on natural or cultural values.

'Fort Knox' and 'Wild Dog' are two climbing sites located along the extensive east facing escarpment at the end of Get Lost and Brushy Trails. Although impacts associated with rock climbing activities in these areas appear to be minimal, access to these sites is via five kilometres of fire management trail which require significant resources to maintain. Also, public vehicle access along management trails is not permitted.

'Godzone' is a climbing site located on the western side of the escarpment and is accessed via Sherwood Road, near the Middle Creek ford crossing. Peregrine falcons have been observed nesting during the period from July through to January in the vicinity of the climbing site and are likely to be disturbed by climbing activities. Brush-tailed rock wallabies have also been observed in this vicinity.

2.5.2 Car rallies

Local and State car rally events are staged within Conglomerate and Orara East State Forests and adjacent to the southern portion of the reserve in Wedding Bells State Forest. These events have been taking place over a period of 25 years. In the past these events have been conducted under permit from Forests NSW as they have occurred entirely within State forest.

Since gazettal of new additions to the reserve, sections of the car rally route are now adjacent to the reserve boundary, in particular near the quarry on Sherwood Road and along Gentle Annie Road. The sections of Sherwood Road and Gentle Annie Road which dissect the reserve are Ministerial roads (refer to *2.1 Location, Gazettal and Regional Setting*). Given that the remaining sections of Sherwood and Gentle Annie Roads are not part of the reserve, it is likely that the small sections of Ministerial road will not ultimately be added to the reserve.

Car rallying is not an activity considered consistent with the management purposes and principles of a nature reserve or the management directions for the reserve (refer sections 1.2 and 2.3).

Concerns have been raised about the proximity of car rallies to the reserve and in particular use of the Miimiga Gaungan Aboriginal Place as a spectator point. NPWS will liaise with interest groups, Forests NSW and rally organisers to investigate route options that may have less impact on natural and cultural values of the reserve.

2.6 OTHER USES

A telecommunications tower that provides service to NSW, Victoria and Queensland is located in the central part of the reserve along Sherwood Road (refer to Map) and is currently managed by Argus Telecommunications. The tower was originally erected in 1976 under an Occupation Permit (OP2774) issued by the then Forestry Commission. Management activities relating to this tower are subject to an Occupation Permit issued to Argus Telecommunications, which is due for renewal in 2006. The permit includes an annual commercial rental fee.

A transmission line, which is managed by Country Energy, passes from the tower through the reserve for approximately 1.5km in a westerly direction towards the Glenreagh township. The transmission line and Occupation Permit has been inherited by NPWS as an existing interest. The terms and conditions of the Occupation Permit have not been amended by NPWS to date. A transmission line also forms the eastern boundary of the reserve immediately south of the Woolgoolga Creek picnic area.

A trigonometrical station is located in the central portion of the reserve. The trig station is on a four hectare inholding which is not part of the nature reserve. Land and Property Information NSW (LPI) is responsible for ongoing management and maintenance of the trigonometrical station.

A gravel quarry exists as an inholding in the southern portion of the reserve as land vested in the Minister under Part 11 of the NPE Act (2003). Under this legislation, Government agencies have until 1 July 2008 to resolve the long-term tenure arrangements. Options for the quarry lands are to dedicate the area as part of the reserve or for it to remain as part of Conglomerate State Forest.

The quarry has a long-term operational life and is a source of road gravel for maintenance of road networks within Conglomerate and Wedding Bells State Forests, as well as the reserve to a lesser extent. Quarrying is not an activity considered to be consistent with the objectives of a nature reserve and the quarry does not have any significant conservation values. NPWS will negotiate with the relevant Government agencies, though it is expected that the quarry will not be gazetted as part of Sherwood Nature Reserve.

2.7 INTRODUCED PLANTS AND ANIMALS

2.7.1 Introduced plants

Several noxious and environmental weeds are known to occur in the reserve. The *Noxious Weeds Act 1993* requires NPWS to control noxious weeds on its estate so that they do not spread to neighbouring properties. Noxious weeds in the reserve include groundsel bush (*Baccharis halimifolia*), giant rat's tail grass (*Sporobolus pyramidalis*), crofton weed (*Ageratina adenophora*) and lantana (*Lantana camara*). Isolated infestations of groundsel occur along the northern boundary of the reserve. A heavy infestation of lantana occurs on both private land and in the reserve at Middle Creek, and lantana is common in the previously heavily logged forests and plantations in the southern section of the reserve.

Light isolated occurrences of whiskey grass (*Andropogon virginicus*), vasey grass (*Paspalum urvilleii*) and giant rat's tail grass occur along fire trails and the main access roads. Weed control programs have been implemented in the past to eradicate groundsel along the northern boundary in conjunction with the adjoining landowner. There are relatively few weed species within the sandstone parts (northern and central sections) of the reserve.

In the 1960s areas of rainforest adjoining Woolgoolga Creek were cleared to plant flooded gum, which was later deemed to be unsuitable due to poor draining soils. The tall open growth habit of flooded gum has left the forest floor open to invasion by lantana, smooth senna (*Senna septemtrionalis*) and crofton weed. A small trial plantation of bunya pines was also established, and is producing seedlings in the surrounding forest. Since its inception in 2002, the Woolgoolga Creek Bush

Regenerators Group has cleared heavy stands of lantana which were encroaching on the picnic area as well as broad leaved paspalum (*Paspalum wettsteinii*) which had infested the Falls walking track.

The Woolgoolga Creek Bush Regenerators Group received funding to prepare a management plan for the area of the previous Woolgoolga Creek Flora Reserve. This plan, prepared by Freeman (2003), provides strategies for future regeneration works. The NPWS will work closely with the Woolgoolga Creek Bush Regenerators Group in undertaking future regeneration works.

2.7.2 Introduced animals

No formal surveys of introduced animals have been conducted, however there have been numerous anecdotal reports of fox (*Vulpes vulpes*), cat (*Felis catus*), European rabbit (*Oryctolagus cuniculus*) and wild dogs (*Canis familiaris*) in and adjacent to the reserve. Foxes, wild dogs and cats prey on native fauna and can have a large impact on threatened ground dwelling mammals, such as the brush-tailed rock-wallaby, long-nosed potoroo and rufous bettong. Fox and feral cat predation are currently listed as key threatening processes to Australian wildlife under the TSC Act and the EPBC Act. A Threat Abatement Plan (TAP) has been prepared of the fox (NSW NPWS 2001). Although the reserve is not identified as a priority area in the state-wide TAP, fox control is considered a priority in the reserve due to the presence of several priority threatened species.

Wild dogs and/or dingoes (*Canis lupus dingo*) are known to occur in the reserve and can inflict losses or disruption to livestock on adjoining lands. A number of adjoining landowners undertake annual baiting programs on neighbouring land to combat attacks on livestock by wild dogs and possibly dingoes.

Although unprotected under Schedule 11 of the NPW Act, the dingo is a native animal and is an integral part of the reserve's natural systems. The continued survival of the dingo is endangered by cross breeding with wild dogs as well as eradication by humans.

Domestic cattle occasionally enter the reserve along the southern boundary. Fences along this boundary adjoining private property are damaged and require maintenance to prevent cattle entering the reserve.

2.8 FIRE

The NPWS regards fire as a natural phenomenon and one of the continuing physical factors influencing the Australian environment. Inappropriate fire regimes have been identified as a key threatening process affecting the biological diversity of NSW.

A variety of fire regimes are needed to maintain natural diversity. Accordingly the management of fire should aim to provide a pattern of fires of high, moderate and low intensity, frequency and extent. Many small mammals and most birds breed in spring and summer and are vulnerable to fire during this crucial period.

Prior to 1970, the central part of the reserve was regularly burnt by wildfire entering from the north and north-west. A number of smaller fires have frequently entered the reserve from adjoining properties and have been contained within the reserve. However large wildfires in 1994, 1996 and 2002 burnt the majority of the northern and central sections.

The nature of terrain and the fire history of the reserve illustrates that fires are unlikely to cause significant risk to adjoining properties except in extreme fire weather conditions. Past fire history indicates that fires have frequently entered the reserve from adjoining lands.

A recent review of fire management throughout the Northern Branch by NPWS has resulted in a modified approach to fire planning based on the level of complexity involved. In the case of Sherwood Nature Reserve, the level of complexity required the preparation of a separate map-based fire management strategy, which was approved in October 2005 and will be updated at the start of each fire season. Annual hazard reduction programs are also submitted to the Clarence Valley and/or Coffs Harbour Bush Fire Management Committees, as appropriate.

2.9 MANAGEMENT OPERATIONS

2.9.1 Roads and trails

Access within the reserve for fire management and other operational activities is along park roads and management trails (see Map, centre pages). Sherwood Road and Waihou Road will be maintained as park roads available for public use. Designated management trails in the reserve include: Middle Creek, Muddle Gully, Sherwood Creek, Conglomerate, Get Lost, Brushy, Trig, Falls, Bluff and Powerline Trails. The Falls Walking Track is also used as a management trail to the last creek crossing. In accordance with NPWS policy, management trails are only available for NPWS management vehicle use and are not available to public vehicles. Bluff Trail and Powerline Trail are maintained by Country Energy to provide access to transmission lines (refer *2.6 Other Uses*). All roads and trails in the reserve are maintained to a 4WD dry weather standard.

The section of Sherwood Road from Bluff Trail north to Sherwood Creek Road traverses steep terrain and needs regular maintenance work to control soil erosion and protect waterways.

Several small timber bridges along Waihou Road are being progressively upgraded or replaced to ensure continued public and management access.

2.9.2 Fencing

The majority of the northern portion of the reserve is fenced where it adjoins grazing properties. The NPWS aims to work with reserve neighbours to prevent stock and unauthorised vehicle access by ensuring adequate boundary fencing. 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 reserve.

3. MANAGEMENT ISSUES AND STRATEGIES—SHERWOOD NATURE RESERVE

Current Situation	Desired Outcomes	Actions	Priority
<p><i>Soil and water conservation</i></p> <p>Soils in the reserve are highly erodible and this is exacerbated by the steep slopes in some areas.</p> <p>The extensive network of roads and trails in the reserve requires rationalisation in regard to requirements for maintenance and to minimise erosion.</p> <p>Sherwood Road near Middle Creek is particularly subject to erosion. This is likely to impact on the water quality of Sherwood Creek, and is a potential hazard for public and management access.</p> <p>Although decommissioned, the weir above Woolgoolga Falls can trap floating vegetation, creating a dam that periodically impacts on downstream water quality through the release of a large quantity of de-oxygenated water.</p>	<ul style="list-style-type: none"> • No evidence of increased soil erosion as a result of management activities. • Water quality of Woolgoolga, Sherwood and Middle Creeks is maintained, or improved. • Minimise road and trail surface area exposed to erosional processes. 	<ul style="list-style-type: none"> • Undertake all works with the potential to disturb the soil, such as trail maintenance or hazard reduction, in a manner that minimises erosion and water pollution. • Maintain park roads and management trails shown on the Map (centre pages) to 4WD dry weather standard. Close all other roads and trails (refer also <i>Visitor use and Management operations</i>). • Undertake erosion control measures on the northern section of Sherwood Road as a priority. Monitor the condition of the northern section of Sherwood Road during wet weather and temporarily close the road as required to minimise erosion. • Investigate options to manage the accumulation of vegetation and other measures to minimise the impacts of the decommissioned weir above Woolgoolga Falls on the downstream environment. 	<p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>MEDIUM</p>
<p><i>Native plant and animal conservation</i></p> <p>A diverse range of plant and animal species are known and predicted to occur in the reserve, including a number of threatened species.</p> <p>Further information on the distribution and abundance of threatened species, their ecological requirements and potential threats within the reserve would assist in their management.</p> <p>There is limited information available to adjoining</p>	<ul style="list-style-type: none"> • No reduction in the diversity of native plants or animals in the reserve. • Knowledge of native plants and animals in the reserve and their potential threats is 	<ul style="list-style-type: none"> • Systematically undertake and/or encourage biodiversity surveys of specific habitats of concern on a priority basis to enhance knowledge of plant and animal occurrences in the reserve and to identify threats (refer to <i>Research</i>). • Work with neighbours, local Landcare groups and the Northern Rivers Catchment Management Authority to promote conservation of remnant native vegetation adjoining the reserve through the establishment of 	<p>HIGH</p> <p>LOW</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>landowners on the importance of conserving vegetation on neighbouring lands.</p> <p>Dingoes have been recorded in the reserve, though the density and genetic purity of the local population has not been determined.</p> <p>Woolgoolga Creek Bush Regenerators Group has been undertaking weed control and planting of locally sourced plants in the former flora reserve, in order to restore the integrity of the sub-tropical rainforest remnant.</p>	<p>enhanced.</p> <ul style="list-style-type: none"> • Neighbour awareness of the importance of vegetated areas on their land is raised. • The integrity of the Woolgoolga Creek sub-tropical rainforest remnant is enhanced. 	<p>appropriate conservation mechanisms such as wildlife refuges or voluntary conservation agreements.</p> <ul style="list-style-type: none"> • Work with neighbours and the RLPB to encourage research to determine the density and genetic purity of local dingo populations. • Use prescribed fire in accordance with the proposed fire management strategies to maintain biodiversity (refer to Fire Management). • Continue to support the Woolgoolga Creek Bush Regenerators Group through on ground assistance and seeking external grants for additional bush regeneration. • Support a program to monitor the health and population structure of the Moonee quassia in the reserve. If monitoring shows a decline in population health or numbers, implement amelioration or control of the threatening processes. 	<p>LOW</p> <p>MEDIUM</p> <p>MEDIUM</p> <p>HIGH</p>
<p>Cultural heritage</p> <p>An Aboriginal cultural heritage assessment has been undertaken. This assessment documents the cultural significance of the reserve to Aboriginal people. A number of ceremonial areas as well as occupation sites have been recorded.</p> <p>Aboriginal cultural sites in the vicinity of Falls Trail, Get Lost Trail and the Trig Trail have been impacted by vehicle access to these areas. Rock climbing near the Falls Trail may also damage sites. In some cases, stone arrangements have been disturbed, while in other cases the impacts</p>	<ul style="list-style-type: none"> • Aboriginal cultural heritage is conserved and managed in conjunction with local Aboriginal communities. • Cultural heritage values are not diminished. 	<ul style="list-style-type: none"> • Consult and involve the Grafton-Ngerrie and Coffs Harbour Local Aboriginal Land Councils and traditional knowledge holders in all aspects of management of Aboriginal cultural heritage, including its use in interpretation programs. • Close Trig Trail, Get Lost Trail and Falls Trail to public vehicle use due to impacts on cultural values. • Prohibit rock climbing near the Falls Trail due to potential damage to cultural material and disturbance to an environmentally sensitive area. 	<p>HIGH</p> <p>HIGH</p> <p>HIGH</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>relate to inappropriate visitor use of an area that is regarded as culturally sacred.</p> <p>Miimiga Gaungan Aboriginal Place is located in the reserve and in Wedding Bells State Forest.</p> <p>In the past, the location of Miimiga Gaungan Aboriginal Place was marked by roadside signage, installed when the area was state forest. The sign has since been removed at the request of the local Aboriginal community to reduce inappropriate visitation to the place.</p> <p>Outdated and inappropriate signage is located adjacent to the access road leading to Miimiga Gaungan Aboriginal Place. The sign attracts visitors to the site, which may impact on cultural values.</p> <p>Several items considered to be of local historic significance exist within the reserve and will be retained <i>in situ</i>. These include the trig station on Trig Trail installed in 1937, a weir and Woolgoolga town water supply pipeline installed in 1966 on Woolgoolga Creek.</p> <p>Various parts of the reserve have been subject to logging operations and several areas were trialed as timber plantation areas. Logging protests were also held in the reserve at various times.</p> <p>The Woolgoolga Creek picnic area, formerly known as Hommigan's Flat, is a site of recreational significance to the local community and has a long history of community use and management (refer to <i>Visitor use</i>).</p>	<ul style="list-style-type: none"> • Knowledge of post-contact (European) use of the reserve is increased. • Management directions for Miimiga Gaungan Aboriginal Place are clearly established and visitation is appropriate to the site. • Further cultural heritage studies are undertaken and any values, objects or sites are appropriately recorded and protected. 	<ul style="list-style-type: none"> • Implement the management guidelines for Miimiga Gaungan Aboriginal Place in consultation with the Aboriginal community and Forests NSW. • Install a pipe gate and bollards at the vehicle access points to Miimiga Gaungan Aboriginal Place to prevent public vehicle access. • There will be no signage at Miimiga Gaungan Aboriginal Place in accordance with the management guidelines for the Aboriginal Place. Install interpretative signage elsewhere in the reserve to raise awareness of the significance of the reserve to Aboriginal people. • Undertake or encourage research into the post-contact (European) use of the reserve. • Add items considered to be of historic significance to the North Coast Region Cultural Heritage Strategy to be assessed and prioritised for any protection works that may be required. • Promote the history of the area, such as logging history, protests and significance of Woolgoolga Creek picnic area through interpretation material (refer to <i>Visitor Use</i>). 	<p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>MEDIUM</p> <p>LOW</p> <p>LOW</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>Introduced species</p> <p>There is currently limited knowledge of vertebrate pests in the reserve, however there have been reports of fox, cat, rabbit and wild dogs in and adjacent to the reserve.</p> <p>Noxious weeds in the reserve include groundsel bush, giant rats tail grass, crofton weed and red flowering lantana. Light isolated occurrences of whiskey grass and vasey grass can be found along fire trails and the main access roads.</p> <p>Regular programs are undertaken to control groundsel infestations along the northern boundary.</p> <p>Neighbours currently undertake wild dog baiting on adjoining land.</p> <p>A small trial plantation of bunya pines along Woolgoolga Creek is producing wildings in the surrounding forest. Within the plantation itself, no natural regeneration is occurring. There are also extensive areas of failed flooded gum plantation along the creek with an understorey of lantana.</p> <p>The Woolgoolga Creek Bush Regenerators Group undertakes regular weed control in accordance with the Woolgoolga Creek Flora Reserve Management Plan (Freeman 2003).</p> <p>Fences along the southern boundary adjoining private property are damaged and require maintenance to prevent cattle entering the reserve.</p>	<ul style="list-style-type: none"> • The impact of introduced species on native species and neighbouring lands is minimised. • Community run regeneration and weed control work will continue with assistance and support from the NPWS. 	<ul style="list-style-type: none"> • Monitor, control, and where possible eradicate, introduced pest plant and animal species in accordance with the Regional Pest Management Strategy, with an emphasis on threatening processes, noxious or significant environmental weeds, or those with a high invasive potential. • Continue to control groundsel bush along the northern boundary of the reserve as a priority. • Seek the cooperation of other authorities and neighbours in implementing pest control programs. Where practical, develop cooperative arrangements with neighbours, Grafton RLPB, Clarence Valley Council, Coffs Harbour City Council and other relevant bodies. • Seek external funding opportunities to supplement and support regeneration work undertaken by local community groups such as Woolgoolga Creek Bush Regenerators Group (refer <i>Native plant and animal conservation</i>). • Remove the bunya pine plantation and associated wildings, and rehabilitate to a natural forest condition. • In accordance with the revegetation plan (Freeman 2003), progressively remove or kill the planted flooded gums as rainforest restoration works replace lantana with an understorey of native species. • Liaise with neighbours about maintenance of effective fencing of boundaries with grazing properties to prevent domestic stock entering the reserve. Provide fencing assistance where appropriate in accordance with NPWS Boundary Fencing Policy. 	<p>HIGH</p> <p>MEDIUM</p> <p>MEDIUM</p> <p>MEDIUM</p> <p>HIGH</p> <p>MEDIUM</p> <p>MEDIUM</p>

Current Situation	Desired Outcomes	Actions	Priority
<p><i>Fire management</i></p> <p>The steep terrain around the reserve supports the up slope movement of fire, with hazard reduction burns occasionally escaping from neighbouring areas into the reserve.</p> <p>Too frequent fire regimes can cause the loss of some plant and animal species or communities found in the reserve. Rainforest is particularly vulnerable to fire.</p> <p>Large wildfires in 1994, 1996 and 2002, have burnt the majority of the northern and central sections.</p> <p>Separate fire management strategies are currently being prepared for the reserve.</p> <p>A network of roads and trails assists with fire management in the reserve.</p> <p>Fire could also damage some cultural features, assets such as picnic facilities and fences, as well as threaten neighbouring land.</p>	<ul style="list-style-type: none"> • Life and adjoining property are protected from fire. • Fire management strategies are completed for the reserve. • Threat to life and property is minimised. • The potential for unplanned fires to enter into or exit from the reserve is restricted. • Fire regimes are appropriate for conservation of the reserve's plant and animal communities. • Identified cultural heritage features are protected from fire and fire suppression activities. 	<ul style="list-style-type: none"> • Implement the fire management strategy for the reserve, and maintain its currency at the start of each fire season. • Maintain cooperation with local Rural Fire Service brigades, Clarence Valley Zone Bushfire Management Committee, the Coffs Harbour Bush Fire Management Committee, relevant fire control officers and neighbours with regard to fuel management and fire suppression on the reserve and adjoining properties. • Restrict the use of heavy machinery and vehicles for fire management purposes to trails shown on the reserve map. In emergency situations, former trails (e.g. logging trails or former management trails) may be reopened if essential to protect natural or cultural values in or off the reserve. No new machine trails are to be constructed anywhere in the reserve. • Encourage research into the ecological effects of fire in the reserve, particularly the fire response of significant plant species and the fire requirements of the various plant communities (refer to <i>Research</i>). • Maintain management trails (refer to Map, centre pages) to 4WD dry weather standard. • Prohibit open recreational fires in the reserve (refer to <i>Visitor use</i>). • Undertake bushfire suppression and management activities in a manner that minimises adverse impacts on known cultural heritage sites and threatened native plants and animals. 	<p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>MEDIUM</p> <p>HIGH</p> <p>HIGH</p> <p>HIGH</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>Visitor use</p> <p>The reserve receives low visitor numbers for activities such as bird watching, bushwalking and rock climbing.</p> <p>In the past unrestricted vehicle access through the central part of the reserve has increased erosion, damaged trails and vegetation, and impacted on cultural values.</p> <p>Prior to gazettal some areas were also used for trail bike riding, 4WD, rally car driving, camping, dog exercising, army and cadet training. These activities are not generally consistent with the purposes of a nature reserve. Opportunities for some of these activities exist nearby on other land tenure.</p> <p>No recreational facilities are currently provided by NPWS in the northern and central sections of the reserve. Several informal fire rings have been formed at Middle Creek by reserve visitors. Middle Creek receives occasional visitation by local residents for swimming and picnicking in summer and development of low key picnic facilities are considered appropriate at this site.</p> <p>Visitor facilities at the Woolgoolga Creek picnic area include a pit toilet, car park, gas BBQ, picnic tables, walking track and interpretative display. Sections of the walking track to Woolgoolga Falls require upgrading to address public safety issues.</p> <p>Woolgoolga Chamber of Commerce and the Woolgoolga Flora Reserve Community Group</p>	<ul style="list-style-type: none"> • Impacts on natural and cultural values of the reserve resulting from public vehicle access is minimised. • Visitor use is nature based and ecologically sustainable. • The local community is aware of the values of the reserve and of management programs in place to protect these values. • No increased development of visitor facilities at Woolgoolga Creek day use area. • All recreational activities are undertaken in a safe manner. 	<ul style="list-style-type: none"> • Maintain park roads shown on the map for public vehicle use generally to dry-weather 2WD standard, except for the northern section of Sherwood Rd which will be maintained to a 4WD standard. Under the terms of a memorandum of understanding, Forests NSW will continue to maintain Gentle Annie Road and the southern part of Sherwood Road to dry-weather 2WD standard. • Promote nature-based visitor use such as bushwalking, bird watching and nature appreciation. • Promote community understanding and appreciation of the conservation values of the reserve through contact with neighbours, community organisations, NPWS Discovery activities, the provision of literature on the reserve and the installation of interpretive and regulatory signage at strategic locations in the reserve, including Woolgoolga Creek Picnic Area. • Prohibit off-road vehicle use, horse riding, dog exercising, camping, wood fires, army and cadet training in the reserve. • Install a picnic table and remove the informal fire places at Middle Creek. ▪ Maintain Woolgoolga Creek Picnic Area as a day use visitor precinct (in conjunction with the Woolgoolga Chamber of Commerce and the Woolgoolga Flora Reserve Community Group). Upgrade and maintain existing facilities consistent with NPWS standards and guidelines. 	<p>HIGH</p> <p>HIGH</p> <p>LOW</p> <p>HIGH</p> <p>LOW</p> <p>HIGH</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>have a strong involvement in the management of the area. However, the area experiences a high level of vandalism and antisocial behaviour.</p> <p>Car rallies Car rallies are conducted on adjacent State forest and along Ministerial roads that dissect the reserve. There are concerns about use of the Miimiga Gaungan Aboriginal Place as a spectator vantage point during rallies.</p> <p>Rock climbing Several climbing sites have impacted or have the potential to impact on natural or cultural values.</p> <p>Pedestrian access to <i>Fort Knox</i> and <i>Wild Dog</i> climbing sites is via Get Lost and Brushy management trails. These trails require significant resources to maintain and are not available to public vehicles (refer to <i>Soil and water conservation</i>).</p> <p>Brush-tailed rock wallabies and peregrine falcons have been observed in the vicinity of <i>Godzone</i> climbing site. These species are likely to be disturbed by climbing or abseiling activities.</p> <p>In the past permanent bolts have been installed by rock climbers at most climbing sites.</p> <p>While rock climbing bolts provide a range of climbing opportunities in the reserve, there is an inherent risk to participants undertaking rock climbing, including the use of these bolts. It is not practical for NPWS to carry out certification or maintenance of bolts. Rock climbers should</p>		<ul style="list-style-type: none"> ▪ Work with the police and local schools to address vandalism and antisocial behaviour at the Woolgoolga Creek Picnic Area and in the vicinity of the Falls Walking Track. Close Woolgoolga Creek Picnic Area between sunset and sunrise, and consider gating the access if antisocial behaviour continues after dark. ▪ Investigate the need for speed humps in the car park of the Woolgoolga Creek Picnic Area and install if necessary. • Maintain and, where necessary, upgrade the Falls viewing area, walking track and creek crossings along the Falls walking track to adequately address public safety issues. Maintain the barrier at the viewing area at the end of the Falls Walking Track to restrict walkers venturing past this point. • Liaise with Coffs Harbour City Council regarding the installation and maintenance of appropriate directional signage to Woolgoolga Creek Picnic Area. • Prohibit use of Miimiga Aboriginal Place as a spectator vantage point during car rallies. • In consultation with Forests NSW and car rally organisers, encourage the use of alternative car rally routes that avoid Miimiga Gaungan Aboriginal Place. • Rally organisers must obtain consent to conduct car rallies on Ministerial Roads passing through the reserve. Rallies will not be permitted in the gazetted reserve. ▪ Commercial rock climbing will not be permitted. 	<p>MEDIUM</p> <p>MEDIUM</p> <p>HIGH</p> <p>MEDIUM</p> <p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>HIGH</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>continue to be responsible for their own safety and must ensure the safety of fixed anchor points prior to use.</p> <p>One commercial tour operator has conducted rock climbing activities in the reserve in the past but has not been licensed under the NPW Act.</p>		<ul style="list-style-type: none"> • Develop a rock climbing permit system and code of conduct in conjunction with local rock climbing and bush walking groups. • Gate Conglomerate Trail to restrict public vehicle access along Get Lost Trail and Brushy Trail (see map). Access to the climb sites, <i>Fort Knox</i> and <i>Wild Dog</i>, will be by walk in only or with permission from adjoining landholders at the base of the escarpment. • Close the <i>Godzone</i> climbing site (near Middle Creek crossing) during peregrine falcon nesting season (1 July to 31 December) each year. • Issue a permit to rock climbers for a period of up to 12 months detailing designated climbing sites, access restrictions, code of conduct and environmental and safety considerations. All rock climbers will require a permit to climb in the reserve. • Limit rock climbing group sizes to four people at any one time on any climbing site, to limit associated vehicle numbers and environmental impacts. • Prohibit the establishment of any new climbing routes in the reserve. • Prohibit the installation of additional climbing bolts in the reserve, except where the NPWS Regional Manager approves the replacement of existing bolts and the method by which they will be replaced. • Undertake ongoing monitoring of the impacts of rock climbing and conflicts with other user groups. Policies and restrictions may be modified if unacceptable impacts occur. 	<p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>MEDIUM</p> <p>HIGH</p> <p>HIGH</p> <p>HIGH</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>Research</p> <p>Limited plant and animal surveys have been undertaken in the reserve. Further scientific study will improve understanding of the reserve's natural and cultural values, the processes that affect them and the requirements for management of particular species.</p> <p>The following areas have been identified as priorities for future research:</p> <ul style="list-style-type: none"> • Systematic fauna surveys targeting the density and distribution of priority threatened species ie. brush-tailed rock wallaby, long-nosed potoroo, and cave roosting bats. • Fauna surveys targeting vegetation types not previously surveyed ie. rainforest communities, perched swamps and cave/escarpment habitats. • Invertebrate fauna. • Distribution and density of vertebrate pests utilising the reserve. • Historical accounts of post European contact relating to the reserve. 	<ul style="list-style-type: none"> • Research enhances the information base and assists management of the reserve. • Research has minimal environmental impact. 	<ul style="list-style-type: none"> • Undertake and/or encourage appropriate research to improve knowledge and management of the reserve's natural and cultural heritage, as well as visitor use (refer to <i>Native plant and animal conservation, Fire management, Cultural heritage</i>). • Liaise with research bodies about research within the reserve and protocols for access and sharing of research information. 	<p>MEDIUM</p> <p>LOW</p>
<p>Management operations and Non-NPWS use</p> <p>A network of management trails (in addition to park roads) in the reserve provide access for fire and other operational activities. Some timber bridges along Waihou Road require upgrading or replacement to ensure continued public and management access.</p> <p>The telecommunications tower is administered under an Occupational Permit between NPWS and</p>	<ul style="list-style-type: none"> • Roads and trails required for management purposes are maintained to 4WD dry weather standard. • Existing non- 	<ul style="list-style-type: none"> • Maintain a system of management trails in addition to park roads for fire and other management purposes to a 4WD standard (see Map). Trails will be gated, locked and signposted as necessary. All other trails will be closed. • Repair or replace timber bridges on Waihou Road. • Ensure all alien uses are licensed or easements 	<p>MEDIUM</p> <p>MEDIUM</p> <p>LOW</p>

Current Situation	Desired Outcomes	Actions	Priority
<p>Argus Communications and is due for renewal in 2006.</p> <p>The electricity transmission line is administered by NPWS under an existing Occupational Permit between Forests NSW and Country Energy. There is no easement granted under the NPW Act.</p> <p>A small inholding of approximately 4 hectares exists around a trig station located in the south-western portion of the reserve. LPI is responsible for ongoing management and maintenance of the trig and associated inholding. The trig station has been damaged by vandals.</p> <p>A gravel quarry vested with the Minister exists as an inholding to the southern portion of the reserve, near Sherwood Road (refer to section 2.6). The quarry is a valuable source of gravel for road works within adjoining State forests and to a lesser extent the reserve. The quarry has no significant conservation values.</p> <p>Isolated dumping of rubbish has occurred along numerous trails. A few car bodies have been dumped in the reserve.</p>	<p>NPWS uses are managed in accordance with formal agreements.</p> <ul style="list-style-type: none"> • No new non-NPWS uses or infrastructure are developed within the reserve. • The quarry is not gazetted as part of the nature reserve. • Rubbish and dumped cars are removed from the reserve and illegal dumping ceases. • Management facilities adequately serve management needs and have an acceptable impact on the values of the reserve. 	<p>granted as appropriate under the NPW Act, and proper commercial returns are obtained where possible. All occupation permits will be reviewed before their expiry.</p> <ul style="list-style-type: none"> • Gate the Trig Trail in order to prevent damage to the site and liaise with LPI regarding their continued access to the trig. • Non-NPWS uses or infrastructure within the reserve will not be permitted unless for purposes consistent with the NPW Act. • Negotiate with Forests NSW prior to July 2008 to resolve the land tenure and subsequent management of the quarry. • Remove dumped rubbish and cars from the reserve and gate management trails as required to limit future occurrences. 	<p>HIGH</p> <p>HIGH</p> <p>HIGH</p> <p>HIGH</p>

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

Table A1 Vegetation communities in Sherwood Nature Reserve

Forest Association	Dominant species	Location
Open Forest		
Angophora	<i>Angophora robur</i>	Between riparian forests and rocky ridges
Angophora/Stringybark	<i>A. robur</i> , <i>E. baileyana</i>	Uncommon, abutting swamps and lower slopes
Stringybark/Red Bloodwood/Bastard Mahogany/Angophora	<i>E. planchoniana</i> , <i>E. baileyana</i> , <i>E. gummifera</i> , <i>E. psammatica</i> , <i>A. robur</i>	Dominant on rocky ridges and on deep yellow sands northern part of Reserve
Blackbutt/Stringybark/Red Bloodwood/Bastard Mahogany/Angophora	<i>E. pyrocarpa/pilularis</i> , <i>E. planchoniana</i> , <i>E. baileyana</i> , <i>E. psammatica</i> , <i>A. robur</i>	Rocky scarps, ridges and on deep sand northern part of Reserve.
Large-fruited Blackbutt	<i>E. pyrocarpa</i> (limited distribution)	More protected rocky scarps and side slopes.
Scribbly Gum	<i>E. signata</i>	On large flat areas in deep yellow sand.
Tall Open Forest		
Red Gum/Pink Bloodwood/Red Mahogany/Angophora	<i>E. tereticornis</i> , <i>E. intermedia</i> , <i>E. resinifera</i> , <i>A. robur</i>	Uncommon on alluvial terraces.
Pink Bloodwood/Red Mahogany/Stringybark/Angophora	<i>E. intermedia</i> , <i>E. resinifera</i> , <i>E. baileyana</i> , <i>A. robur</i>	Colluvial zone between rocky ridges and riparian forests.
Stringybark/Red Mahogany/Angophora/Turpentine	<i>E. baileyana</i> , <i>E. resinifera</i> , <i>A. robur</i> , <i>Syncarpia glomulifera</i>	Along drier drainage lines and open protected slopes.
Tall Open Forest (Moist)		
Tallowood/Red Mahogany/Swamp Box/Turpentine/Angophora	<i>E. microcorys</i> , <i>E. resinifera</i> , <i>S. glomulifera</i> , <i>Lophostemon suavelons</i> , <i>A. robur</i>	Colluvial and alluvial zones on protected slopes.
Flooded Gum	<i>E. grandis</i>	Alluvial terraces along Sherwood Creek, south-eastern corner of reserve
Moist Blackbutt	<i>E. pyrocarpa</i>	Lower slopes south-eastern corner of reserve
Dry Blackbutt	<i>E. pyrocarpa</i>	Ridges south-eastern corner of reserve
Blackbutt/Spotted Gum	<i>E. pyrocarpa</i> , <i>E. maculata</i>	Ridges south-eastern corner of reserve
Swamp mahogany	<i>E. robusta</i>	Within waterlogged areas
Brushbox, Red Cedar with rainforest understorey	<i>Lophostemon confertus</i> , <i>E. saligna</i> , <i>Toona australis</i>	Base of escarpment southern part of reserve
Non Eucalypt		
Gully rainforest	<i>Ceratopetalum apetalum</i> , <i>Caldcluvia paniculosa</i> , <i>Archontophoenix cunninghamiana</i>	Area on Rocky Creek below Hutleys Knob and along Sherwood Creek.
Dry/sub-tropical rainforest alliance	<i>Araucaria cunninghamii</i> , <i>Backhousia myrtifolia</i> , <i>Acronychia wilcoxiana</i> , <i>Heritiera actiniphylla</i> , <i>Heritiera trifoliota</i>	South eastern corner of reserve (formerly Woolgoolga FR)
Heathland/sedgeland	<i>Banksia oblongifolia</i> , <i>Restio</i> sp., <i>Gahnia</i> sp.	Swamps/ heath at northern end of Reserve.
Fernland	<i>Gleichenia dicarpa</i>	Natural swamp/ drainage line in northern end of Reserve.

Source: NPWS NRAC 1994; SFNSW, 1987, 1989.

Table A2 Plants of conservation significance recorded in the reserve

Scientific Name	Common Name	TSC Act	EPBC Act	Significance
<i>Alloxylon pinnatum</i>	Dorrigo waratah			Rare (3RCa)
<i>Amorphospermum whitei</i>	rusty plum	V		Rare (3RCa)
<i>Angophora robur</i>	sandstone rough-barked apple	V	V	Threatened
<i>Austrobuxus swainii</i>	pink cherry			Rare (3RCa)
<i>Blechnum ambiguum</i>				Disjunct
<i>Boronia hapalophylla</i>	Shannon Creek boronia	E1		Threatened
<i>Boronia umbellata</i>	Orara boronia	V	V	Threatened
<i>Callistemon acuminatus</i>	tapering-leaved bottlebrush			Rare (3RC-)
<i>Callistemon linearifolius</i>	netted bottlebrush	V		Rare (2RCi)
<i>Callitris monticola</i>				Rare (3RC-)
<i>Eucalyptus psammitica</i>	bastard white mahogany			Poorly known (3K)
<i>Eucalyptus rummeryi</i>	steel box			Rare (3RC-)
<i>Grammitis stenophylla</i>	narrow-leaf finger fern	E1		Threatened
<i>Helicia bauerlenii</i>				Disjunct
<i>Hibbertia acuminata</i>				At distributional limit
<i>Homoranthus floydii</i>				Rare (2RC-)
<i>Lastreopsis marginans</i>	bordered shield fern			Disjunct
<i>Leucopogon recurvisepalus</i>				Poorly known (3KC-)
<i>Lindsaea incisa</i>	slender screw fern	E1		Threatened
<i>Marsdenia liisae</i>	large-flowered milk vine			Rare (3RC-)
<i>Marsdenia longiloba</i>	slender marsdenia	E1	V	Threatened
<i>Olearia stilwelliae</i>	red-leaved daisy bush			Rare (3RCa)
<i>Parsonsia dorrigoensis</i>	milky silkpod	V		Threatened
<i>Philothea myoporoides</i> spp. <i>conduplica</i>				Rare (3RC)
<i>Philothea papillata</i>				Endemic, believed to be threatened (2ECit)
<i>Philothea</i> sp. Sherwood NR				Endemic
<i>Prostanthera</i> sp. aff. <i>linearis</i> (syn. <i>Prostanthera</i> Sherwood NR)				Limited distribution
<i>Pultenaea</i> sp. 'robusta' (syn. <i>Pultenaea</i> sp. J)				Disjunct
<i>Quassia</i> sp. Mooney Creek	Moonee quassia	E1	E	Threatened
<i>Schizaea rupestris</i>				Disjunct
<i>Senna acclinis</i>	rainforest cassia	E1		Threatened
<i>Thelymitra cyanae</i>				Disjunct

Source: SFNSW (1995,1989, 1987); NPWS NRAC 1994; NPWS Wildlife Atlas

Key: **TSC Act** (V = Vulnerable; E1 = Endangered species); **EPBC Act** (V = Vulnerable; E= Endangered)

ROTAP (Rare or Threatened Australian Plants) codes described in Briggs and Leigh (1995):
 2 Geographic range <100km; 3 Geographic range >100km; E Endangered; R Rare (not threatened); K Poorly known but suspected to be rare or threatened; C Species known to occur in a conservation reserve; a Adequately reserved; i Inadequately reserved; - Adequacy of reservation unknown; t Total population reserved.

Table A3 Native animals of conservation significance recorded or predicted to occur in Sherwood Nature Reserve

Common Name	Scientific Name	TSC Act	EPBC Act
Amphibians			
green-thighed frog	<i>Litoria brevipalmata</i>	V	
Freycinet's frog	<i>Litoria freycineti</i>		
Tyler's frog	<i>Litoria tyleri</i>		
giant-barred frog	<i>Mixophyes iteratus</i>	E	E
Reptiles			
Common death adder	<i>Acanthophis antarcticus</i>		
dwarf crowned snake	<i>Cacophis krefftii</i>		
red-tailed calyptotis	<i>Calyptotis ruficauda</i>		
McPhee's skink	<i>Egernia mcphoei</i>		
barred-sided skink	<i>Eulamprus martini</i>		
Stephens' banded snake	<i>Hoplocephalus stephensii</i>	V	
angle-headed dragon *	<i>Hypsilurus spinipes</i>		
friendly sun-skink	<i>Lampropholis amicula</i>		
carpet python	<i>Morelia spilota mcdowelli</i>		
short-limbed snake skink	<i>Ophioscincus truncatus</i>		
three-toed skink	<i>Saiphos equalis</i>		
leaf-tailed gecko	<i>Saltuarius swaini</i>		
shadeskink	<i>Saproscincus</i> sp. (probably <i>S. galli</i>)		
coral snake	<i>Simoselaps australis</i>		
rough-scaled snake	<i>Tropedechis carinatus</i>		
Birds			
Pacific baza	<i>Aviceda subcristata</i>		
bush stone-curlew	<i>Burhinus grallarius</i>	E	
glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	V	
brown treecreeper	<i>Climacteris picumnus</i>	V	
little shrike-thrush	<i>Colluricincla megarhyncha</i>		
barred cuckoo-shrike	<i>Coracina lineata</i>	V	
peregrine falcon	<i>Falco peregrinus</i>		
crested shrike-tit	<i>Falcunculus frontatus</i>		
musk lorikeet	<i>Glossopsitta concinna</i>		
chestnut-rumped heathwren	<i>Hylacola pyrrhopygia</i>		
varied triller	<i>Lalage leucomela</i>		
swift parrot	<i>Lathamus discolor</i>	E	E
yellow-tufted honeyeater *	<i>Lichenostomus melanops</i>		
square-tailed kite *	<i>Lophoictinia isura</i>	V	
hooded robin	<i>Melanodryas cucullatus</i>	V	
white-eared monarch	<i>Monarcha leucotis</i>	V	
spectacled monarch	<i>Monarcha trivirgatus</i>		

Common Name	Scientific Name	TSC Act	EPBC Act
barking owl *	<i>Ninox connivens</i>	V	
powerful owl	<i>Ninox strenua</i>	V	
grey-crowned babbler	<i>Pomostomas temporalis</i>	V	
paradise riflebird *	<i>Ptiloris paradiseus</i>		
wompoo fruit-dove	<i>Ptilinopus magnificus</i>	V	
rose-crowned fruit-dove	<i>Ptilinopus regina</i>	V	
superb fruit-dove	<i>Ptilinopus superbus</i>	V	
regent bowerbird	<i>Sericulus chrysocephalus</i>		
forest kingfisher	<i>Todiramphus macleayii</i>		
pale yellow robin	<i>Tregellasia capito</i>		
masked owl	<i>Tyto novaehollandiae</i>	V	
sooty owl	<i>Tyto tenebricosa</i>	V	
regent honeyeater	<i>Xanthomyza phrygia</i>	E	E
russet-tailed thrush	<i>Zoothera heinei</i>		
Mammals			
rufous bettong	<i>Aepyprymnus rufescens</i>	V	
large-eared pied bat	<i>Chalinolobus dwyeri</i>	V	V
hoary bat*	<i>Chalinolobus nigrogriseus</i>	V	
spotted-tailed quoll *	<i>Dasyurus maculatus</i>	V	E
golden-tipped bat	<i>Kerivoula papuensis</i>	V	
whiptail wallaby *	<i>Macropus parryi</i>		
little bentwing bat	<i>Miniopterus australis</i>	V	
eastern bent-wing bat	<i>Miniopterus schreibersii oceanensis</i>	V	
east-coast freetail bat*	<i>Mormopteris norfolkensis</i>	V	
unnamed freetail bat	<i>Mormopteris sp.1</i>		
large-footed myotis *	<i>Myotis adversus</i>	V	
white-striped freetail bat	<i>Nyctinomus australis</i>		
greater glider	<i>Petauroides volans</i>		
yellow-bellied glider	<i>Petaurus australis</i>	V	
squirrel glider	<i>Petaurus norfolcensis</i>	V	
brush-tailed rock-wallaby	<i>Petrogale penicillata</i>	E	V
brush-tailed phascogale *	<i>Phascogale tapoatafa</i>	V	
koala	<i>Phascolarctos cinereus</i>	V	
common planigale *	<i>Planigale maculata</i>	V	
long-nosed potoroo	<i>Potorous tridactylus</i>	V	V
eastern chestnut mouse *	<i>Pseudomys gracilicaudatus</i>	V	
grey-headed flying-fox	<i>Pteropus poliocephalus</i>	V	V
pale field rat	<i>Rattus tunneyi</i>		
eastern horseshoe-bat	<i>Rhinolophus megaphyllus</i>		
yellow-bellied sheath-tail-bat *	<i>Saccolaimus flaviventris</i>	V	
greater broad-nosed bat	<i>Scoteanax rueppellii</i>	V	

Common Name	Scientific Name	TSC Act	EPBC Act
broad-nosed bat	<i>Scotorepens sp.1</i>		
eastern blossom bat	<i>Syconycteris australis</i>	V	
eastern forest bat	<i>Vespadelus pumilus</i>		
eastern cave bat	<i>Vespadelus trouhntoni</i>	V	

Codes: V: vulnerable, E: endangered, * : denotes species predicted to occur.

Non-threatened species are listed as fauna of conservation significance of Upper North East Forests by Gilmore and Parnaby (1994).

