

DEMON NATURE RESERVE
PLAN OF MANAGEMENT

National Parks and Wildlife Service
October 1999

This plan of management was adopted by the Minister for the Environment on 22nd October 1999.

Acknowledgments:

This plan of management was prepared by staff of the National Parks and Wildlife Service in association with the neighbours and stakeholders of Demon Nature Reserve.

The contributions of those who made submissions on the draft plan of management for Demon Nature Reserve are gratefully acknowledged.

The input of Mitchell McCotter (Environmental and Engineering Planning Consultants) and Martin Schulz and Phil Spark is also acknowledged.

Photograph of Demon Nature Reserve by Steve Toms

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FOREWORD

Demon Nature Reserve is located in northern NSW, 30 kilometres east of Tenterfield. The Reserve is situated on the western edge of the Timbarra Plateau forming the most easterly extension of the Northern Tablelands.

The Reserve covers an area of 887 hectares which includes steep rocky western escarpment slopes and narrow gullies providing extensive views of Demon Creek Valley. The topography of the narrow western plateau edge comprises undulating areas interspersed with rocky hillsides and granite tors.

Despite its small size, the varied topography of the Reserve provides habitat for a diverse range of plant communities, including escarpment communities which are poorly represented in protected areas in the region. It is also one of few conservation areas in the northern region comprising a predominantly western escarpment.

This plan of management establishes the scheme of operations for Demon Nature Reserve. In accordance with the provisions of Section 76 of the National Parks and Wildlife Act 1974, this plan of management is hereby adopted.

BOB DEBUS

Minister for the Environment

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1. THE PLANNING PROCESS

The *National Parks and Wildlife Act, 1974* (NPW Act) 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 for the next five to ten years.

The procedures for the adoption of a plan of management for a nature reserve as specified in the Act include:

- Where a plan of management has been prepared, the Director-General is required to refer the plan of management to the National Parks and Wildlife Service Advisory Council for its consideration and advice.
- The Director-General submits the plan of management together with any comments and suggestions from the Advisory Council to the Minister for the Environment.
- The Minister may adopt the plan with or without alteration, or refer the plan back to the Director-General and Advisory Council for further consideration.

Once a plan has been adopted by the Minister, no operations may be undertaken within the nature reserve except in accordance with the plan.

A draft plan of management for Demon Nature Reserve was placed on public exhibition for a period of 3 months from 23rd October 1998 until 22nd February 1999. The exhibition of the draft plan attracted 8 submissions which raised 11 issues. All submissions received were considered by the National Parks and Wildlife Advisory Council. The comments and suggestions of the Advisory Council were in turn considered by the Minister before adopting this plan of management.

The planning process leading to the development of this plan has involved the collection and use of a large amount of information, which for reasons of document size, have not been included in this plan (refer to section 5 for list of references). For additional information or enquires about Demon Nature Reserve or this plan of management, please contact the NPWS Glen Innes District, 68 Church Street, Glen Innes. Telephone (02) 6732 5133.

2. BASIS FOR MANAGEMENT

2.1 NATURE RESERVES IN NEW SOUTH WALES

The NSW National Parks and Wildlife Service (NPWS) is the agency of the New South Wales Government whose primary responsibility is the conservation of natural and cultural heritage within the State.

The *National Parks and Wildlife Act, 1974* (NPW Act), is the main legislation that defines the powers, duties and functions of the NSW NPWS relating to all areas reserved as national parks, historic sites, nature reserves, Aboriginal areas, state recreation areas and regional parks. The Act outlines the responsibilities of the service concerning nature conservation, cultural heritage management and appropriate uses of protected areas.

The purposes of a nature reserve are defined in the NPWS as:

- (a) the care, propagation, preservation and conservation of wildlife;
- (b) the care, preservation and conservation of natural environments and natural phenomena;
- (c) the study of wildlife, natural environments and natural phenomena; and
- (d) the promotion of the appreciation and enjoyment of wildlife, natural environments and natural phenomena.

Nature reserves are valuable refuge areas, where natural processes, phenomena and wildlife can be studied. They differ from national parks where a major objective of management is the provision of appropriate recreation opportunities.

2.2. VALUES OF DEMON NATURE RESERVE

2.2.1 Location, dedication and regional setting

Demon Nature Reserve (referred to as the Reserve in this plan) is situated on the Timbarra Plateau in northern NSW, approximately 30 kilometres east of Tenterfield (Figure 1, page 3). The Reserve covers an area of around 900 hectares which includes steep rocky slopes and narrow gullies providing extensive views of Demon Creek Valley to the west. Elevation within the Reserve varies from 460 metres above sea level in the valley floor to 1,060 metres on the plateau. Demon Nature Reserve was gazetted on the 22 December 1995. Most of the Reserve was formerly part of Malara State Forest which was gazetted on 2 March 1990, and the small section on the eastern side of the Timbarra Road was formerly a Camping Reserve for travelling stock managed by the Rural Lands Protection Board.

Grazing lands in Demon Valley adjoin the Reserve in the west and have been almost completely cleared of vegetation. To the east on the Timbarra plateau, the Reserve adjoins forested private lands and the Malara State Forest where selective logging has been undertaken. Girard State Forest borders the Reserve to the north. Parts of Girard State Forest are dedicated over Crown grazing leases. The Timbarra gold mine is located approximately eight kilometres south-east of the Reserve along the Timbarra Road.

Other reserves within Glen Innes District in the immediate vicinity include Washpool, Capoompeta and Butterleaf National Parks to the south and Basket Swamp, Boonoo Boonoo and Bald Rock National Parks to the North. To the east, and managed by the Lismore District, are Hogarth Range and Mallanganee Nature Reserves and Richmond River National Park.

Demon Nature Reserve plays an important conservation role in the Northern Tablelands. It is the only protected area on the Timbarra Plateau and includes vegetation communities representative of the plateau. The Reserve, along with Washpool National Park, is one of few protected areas on the western edge of the escarpment. The Reserve has a good diversity of fauna species for its size and includes significant species such as the Hastings River Mouse (*Pseudmys oralis*) and Stephan's Banded Snake (*Hoplocephalus stephensi*).

Demon Nature Reserve is situated within the Tenterfield Local Government Area. The Reserve is within the Moombahlene and Tabulum Local Aboriginal Land Council Area.

2.2.2 Geology, landform and landscape

Demon Nature Reserve is situated within the granite belt of the Northern Tablelands and the Northern Escarpment which extends from Tamworth to southern Queensland. The Reserve contains an area representative of the volcanic intrusions of the New England Batholith which formed about 240 million years ago. The two types of granitic rock occurring within the Reserve are Stanthorpe and Bungulla Adamellites (NPWS, 1997).

The main landform features of the Reserve are the rugged and steep western escarpment slopes and narrow gullies, and a narrow plateau edge to the east. The plateau topography comprises undulating terrain interspersed with rocky hillsides and small scattered granite tors (Schulz and Spark, 1998).

Demon Nature Reserve borders the Demon Fault Line immediately to the west which scars a great expanse of forested ridges in a north-south direction from Ebor to Tenterfield. From the escarpment edge, Demon Nature Reserve affords extensive views of Timbarra River to the south and Demon Creek to the west.

2.2.3 Catchment protection

Dinner Creek is the main catchment within the Reserve. All tributaries flow west into Demon Creek, then into the Timbarra River and finally into the Clarence River. The Reserve forms a small part of the Timbarra River sub-catchment. Catchment protection provided by the Reserve assists in maintaining the water quality of the Timbarra and Clarence River systems.

2.2.4 Native plants

The location of Demon Nature Reserve coupled with its varied topography has resulted in 10 vegetation communities occurring in this relatively small area. The distribution of vegetation communities in Demon Nature Reserve is illustrated in Figure 2. A more detailed description of each community is provided in Table 1 (page 5).

The Reserve is particularly significant as it provides protection for vegetation communities, such as plateau sedgeland and closed shrublands. These

communities occur on Crown leasehold and freehold lands elsewhere on the Timbarra Plateau but are poorly represented within other conservation areas within the region.

Thirteen Rare or Threatened Australian Plant (ROTAP) species have been identified in the Reserve. The ROTAP species *Eucalyptus scias* ssp. *apoda* occurring in the open shrubland plateau community is significant as it is not known to be protected in any other conservation area in NSW (ERM Mitchell McCotter, 1997).

2.2.5 Native animals

The Reserve provides habitat for a diverse range of native animals including 100 bird, 32 mammal, 34 reptile and nine amphibian species. Species diversity is considered to be particularly high in the Reserve considering the small size of the area. A total of 19 species of State significance and 16 species of regional significance were recorded within the Reserve (Appendix A and B respectively).

Relatively large populations of brush-tailed rock-wallabies and glossy black-cockatoos inhabit the Reserve illustrating the important role the Reserve plays in maintaining the viability of these vulnerable species.

2.2.6 Cultural heritage

At present, no documented information is available on the Aboriginal cultural significance of Demon Nature Reserve. The Reserve, however, has been included in native title land claims, illustrating the contemporary importance of the area to its indigenous custodians.

Demon Nature Reserve was included in the declaration of the Timbarra Gold Fields in 1865, although there is very little evidence to suggest that mining activities took place within its boundaries. Records suggest that the area was used for grazing well before 1865. A number of survey trees have also been located within the Reserve.

2.2.7 Scientific values

The Reserve is particularly significant due to the diverse number of plant communities and significant plant and animal species inhabiting a relatively small area.

Table 1: Vegetation communities occurring in Demon Nature Reserve

| Vegetation community | Dominant species/associations | Conservation significance |
|--|--|---|
| Community 1: Woodland (western boundary <600m) Comprises 133 ha | <i>Eucalyptus fusiformis</i> , <i>Corymbia gummifera</i> | <i>E. fusiformis</i> (ROTAP) <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> , <i>Boerhavia dominii</i> , <i>Lasiopetalum ferrugineum</i> var. <i>cordatum</i> , <i>Lasiopetalum ferrugineum</i> var. <i>ferrugineum</i> (regionally significant) <i>Tricoryne anceps</i> ssp. <i>pteroaulon</i> (considered rare in NSW). |
| Community 2: Open shrubland (scattered communities on plateau) Comprises 7.4 ha | <i>Eucalyptus scias</i> spp. <i>apoda</i> , <i>Lomandra longifolia</i> | <i>E. scias</i> spp. <i>apoda</i> , <i>Acacia floydii</i> , <i>Prostanthera</i> sp. 5 Boonoo Boonoo, <i>Pomaderris notata</i> , <i>Acacia orites</i> , <i>Plectranthus suaveolens</i> (all ROTAPs) <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> , <i>Craspedia canens</i> (regionally significant) |
| Community 3: Woodland (isolated community on plateau) Comprises 0.4 ha | <i>Allocasuarina littoralis</i> , <i>E. scias</i> spp. <i>apoda</i> | <i>E. scias</i> spp. <i>apoda</i> , <i>A. floydii</i> , <i>E. olida</i> <i>Eriostemon myoporoides</i> spp. <i>epilosus</i> , (all ROTAPs), <i>Crassula decumbens</i> var. <i>decumbens</i> , <i>Helichrysum boormanii</i> (regionally significant) |
| Community 4: Closed shrubland (two isolated communities near Dinner Creek on plateau) Comprises 1.5 ha | <i>Epacris microphylla</i> and <i>Leptospermum arachnoides</i> | <i>Eucalyptus dorrigoensis</i> , <i>Ricinocarpos speciosus</i> (both ROTAPs), <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> , <i>Danthonia induta</i> , <i>Helichrysum boormanii</i> (regionally significant) |
| Community 5: Woodland (on plateau near Dinner Creek) Comprises 35 ha | <i>Eucalyptus campanulata</i> , <i>E. andrewsii</i> , <i>E. williamsiana</i> and <i>E. cameronii</i> | <i>Eucalyptus dorrigoensis</i> , <i>A. orites</i> (both ROTAPs) <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> , <i>Crassula decumbens</i> var. <i>decumbens</i> , <i>E. williamsiana</i> , (regionally significant) |
| Community 6: Sedgeland (isolated community on plateau near Dinner Creek) Comprises 0.4 ha | <i>Lepidosperma limicola</i> | <i>Patersonia fragilis</i> , <i>Tricostularia pauciflora</i> , <i>Danthonia induta</i> (regionally significant) |
| Community 7: Woodland (Mid slopes 600-850m) Comprises 192 ha | <i>Corymbia gummifera</i> , <i>Eucalyptus campanulata</i> , <i>E. cameronii</i> | <i>E. scias</i> spp. <i>apoda</i> , <i>A. floydii</i> , <i>A. orites</i> , <i>E. fusiformis</i> , <i>E. olida</i> (all ROTAPs), <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> , <i>Patersonia fragilis</i> (regionally significant) |
| Community 8: Open forest (located from 850m to eastern edge of Reserve boundary) Comprises 340 ha | <i>Corymbia gummifera</i> , <i>E. campanulata</i> | <i>E. scias</i> spp. <i>apoda</i> , <i>A. floydii</i> , <i>A. orites</i> , <i>Eucalyptus dunnii</i> , <i>E. olida</i> , <i>Acianthus exiguus</i> , <i>Plectranthus suaveolens</i> (all ROTAPs) <i>E. williamsiana</i> , <i>Prasophyllum patens</i> (regionally significant) <i>Sauropus</i> sp. nov. <i>Pultenaea</i> sp. nov. (potentially new species (Hunter pers. comm.)) |
| Community 9: Open forest (located along drainage lines) Comprises 111 ha | <i>E. campanulata</i> , <i>E. saligna</i> | <i>E. scias</i> spp. <i>apoda</i> , <i>A. floydii</i> , <i>A. orites</i> , <i>E. fusiformis</i> , <i>Plectranthus suaveolens</i> (all ROTAPs) <i>Prasophyllum patens</i> (regionally significant) |
| Community 10: Closed forest (occurs in wet drainage lines) Comprises 51 ha | <i>Ceratopetalum apetalum</i> , <i>Lophostemon confertus</i> | <i>E. scias</i> spp. <i>apoda</i> , <i>A. floydii</i> , <i>A. orites</i> , <i>Crassula decumbens</i> var. <i>decumbens</i> , <i>Olearia argophylla</i> (regionally significant) |

Source: ERM Mitchell McCotter (1997)

2.3 MANAGEMENT DIRECTION

Demon Nature Reserve can be described as a small, relatively isolated parcel of land providing protection for a diverse range of native plants and animals.

The Reserve has been subject to a frequent fire regime which appears to have excluded some species and reduced the abundance of others (Schulz and Spark, 1998). Management will aim to maintain the diversity and integrity of habitats within the Reserve and protect life and property from fire adjacent to the Reserve in conjunction with neighbouring landholders.

The presence of large populations of threatened species such as the brush-tailed rock-wallaby and the glossy black cockatoo is possibly attributable to the low levels of introduced species. However, populations of introduced animals in the Reserve, particularly feral cats and rabbits, have increased over the last five years and have the potential to adversely affect native plant and animal communities. Management of the Reserve will aim to control populations of introduced species in cooperation with neighbouring landholders through the construction and maintenance of boundary fencing and the implementation of pest control programs.

Promotion of the Reserve will be restricted to low key scientific research and education because of the small size and relatively remote location of the Reserve, the large number of significant plant and animal species and the lack of existing visitor infrastructure, the construction of facilities, walking tracks and promotion of the Reserve will be restricted. This is compatible with conservation objectives formulated in this plan and the purposes of dedication of a nature reserve as specified in the NPW Act.

In summary, the main focus for management of Demon Nature Reserve is to provide protection of the natural and cultural values of the area. This will be achieved through the following objectives:

- To establish a fire regime which will conserve native plant and animal diversity in the Reserve as well as providing protection to life and property of neighbouring landholders.
- To control and where possible eradicate introduced species which may threaten the viability of native plants and animals.
- To encourage research into the natural and cultural values of the Reserve.
- To liaise with neighbours for the cooperative implementation of pest control programs, boundary fencing and fire management.

3. MANAGEMENT FRAMEWORK

In order to meet the objectives outlined in section 2.4, existing and potential processes or activities which may compromise the natural and/or cultural values of the Reserve need to be identified, and suitable management objectives and actions devised.

The management framework comprises a brief description of the level of knowledge on natural and cultural resources and current uses of the Reserve, identification of any existing or potential threats to these resources and proposed objectives and actions for their management.

The actions outlined in this plan of management are based on management issues raised through the community consultation process, NPWS legislative responsibilities, and anticipated availability of resources for management of the Reserve over the next five to ten years. Where not specifically provided for in this plan, management will also be in accordance with the NPW Act and the NPWS policies. Management objectives (in bold type) and associated actions (indicated by asterisks) relating to the conservation of resources and management of uses of the Reserve are outlined in the following subsections.

3.1 CONSERVATION OF NATURAL RESOURCES

3.1.1 Native and introduced plants

The small size and relatively isolated nature of Demon Nature Reserve presents some challenges in ensuring the structure and composition of the 10 vegetation communities described in Table 1 are maintained. Some of the smaller, fragmented vegetation communities have been identified as being potentially susceptible to threatening processes, such as fire, competition from weeds and grazing. Knowledge is limited on how to protect communities and rare and threatened species occurring in the Reserve from these threatening processes.

The sedgeland community and woodland (*Allocasuarina littoralis* - *Eucalyptus scias* ssp. *apoda* association) community, located on the eastern edge of the Reserve, are both poorly represented (figure 2) in the Reserve. They have been subject to past disturbance from grazing. In cooperation with neighbouring landholders, boundary fencing may reduce the threats to these communities.

The woodland community (*Eucalyptus campanulata*, *E. andrewsii*, *E. williamsiana* and *E. cameronii*) located near Dinner Creek has been subject to disturbance from logging activities (Figure 2). It is also dissected by Timbarra Road. Widening and upgrading of the Timbarra Road will be undertaken to cater for increased traffic resulting from mining operations. The road will be upgraded to dual lane access (Corkery and Co Pty Ltd, 1995). A road reserve exists either side of the trail where it traverses the Reserve (Figure 1).

The TSC Act requires that a recovery plan be prepared and implemented for all species listed as endangered or vulnerable under the Act. The purpose of a recovery plan is to promote the recovery of endangered or vulnerable species to a position of viability in nature. Where a plan exists or is developed for plant species occurring in Demon Nature Reserve, any actions from those plans relevant to the management of the Reserve will be implemented under this plan. Currently no recovery plans exist for species occurring in the Reserve.

Invasion by weed species within Demon Nature Reserve is considered to be relatively minor and the species that do occur in the Reserve are common throughout the Timbarra Plateau.

Weed species known to exist within the Reserve include *Gomphocarpus physocarpus* (balloon cottonbush), *Coryza albida* (fleabanes), *Gnaphalium americanum* (cudweed), *Bidens pilosa* (farmers friend), *Centaurium erythraea* (common centuary) and *Hypochaeris radicata* (flatweed). *Hypochaeris radicata* is the most commonly occurring weed within the Reserve. None of these weed species are listed as noxious in NSW under the *Noxious Weeds Act, 1993*.

It is expected that minor ground disturbance may occur as a result of clearing for boundary fencing around the Reserve boundary. The area disturbed will be minimised to reduce the potential infestation of weeds and appropriate sediment control measures taken.

Management Objectives and Actions

To conserve the diversity and integrity of native vegetation within the Reserve with priority given to species of State and regional significance.

- * Fencing will be constructed and maintained along the reserve boundaries, except along the steep sections of the northern and southern boundaries, in cooperation with neighbouring landowners. Priority will be given to fencing the eastern boundary (refer to section 3.5).
- * Prescriptions to manage fire for sensitive and dependent plant species will be developed and incorporated into the Reserve fire management plan (refer to section 3.2).
- * Information on native plants will be entered into the NPWS Wildlife Atlas database.
- * Research into the distribution and habitat requirements of rare and threatened species will be encouraged.
- * Recovery plans for threatened species existing within the Reserve will be implemented.

To control and where possible eradicate introduced plant species within the Reserve.

- * A pest species control plan will be prepared for the Reserve.

3.1.2 Native and introduced animals

A fauna survey undertaken by Schulz and Spark (1998) was limited to determining the abundance and habitat preferences of native fauna occurring within the Reserve. Due to the timing of the survey, it was not possible to collect information on winter and passage migrants occurring within the Reserve, bird species that breed in the area and habitat preference and distribution of cryptic species, such as the New England tree frog and the stuttering frog.

The TSC Act requires that a recovery plan be prepared and implemented for all species listed as endangered or vulnerable under the Act. Where a plan exists or is developed for animal species occurring in Demon Nature Reserve, any actions from

those plans relevant to the management of the Reserve will be implemented under this plan.

Introduced species recorded in the Reserve include the wild dog, black rat and the brown hare. Populations of these species are thought to be low. Rabbits and feral pigs occur on private land to the west of the Reserve (Schulz and Spark, 1998) and an increase in feral cat numbers inhabiting the plateau has been observed over the past five years (Martin, 1997).

A relatively large population of brush-tailed rock-wallabies, the presence of the rufous bettong and a high diversity of macropods recorded in the Reserve are all likely to be the result of low numbers of introduced species (Schulz and Spark, 1998). Any increase in populations of introduced predators, such as black rats which prey on frogs, and feral cats which prey on juvenile rock-wallabies, the Hastings River mouse and other ground dwelling fauna will have an adverse effect on native animals in the Reserve.

Recent evidence of cattle activity in the Reserve has been observed (Schulz and Spark, 1998). Cattle watering may have an effect on breeding sites of the stuttering frog through trampling as well as reduction and simplification of ground cover through grazing. Boundary fencing, particularly along the eastern boundary will assist in restricting cattle from entering the Reserve (refer to section 3.5).

The management of wild dogs (includes dingos, feral dogs or hybrids) was identified as a concern by neighbouring landholders. Although the dingo is listed as unprotected under Schedule 11 of the NPW Act, it is not a declared noxious species under the *Rural Lands Protection Act, 1989* as long as it remains on Service estate. The NPWS recognises, however, that wild dogs can enter private land from the NPWS estate and sometimes impact on livestock. In these cases, dingos are not considered any differently to other wild dogs and will be controlled accordingly.

Management Objectives and Actions

To conserve native animal communities by maintaining the diversity and integrity of existing habitats.

- * Recovery plans for species existing within the Reserve will be implemented.
- * Information on native animals recorded within the Reserve will be entered into the NPWS Wildlife Atlas database.

To control and where possible eradicate introduced animals within the Reserve. Priority will be given to those species likely to threaten native fauna.

- * A pest species control plan will be prepared for the Reserve. In the meantime, appropriate pest management strategies will be implemented if densities increase.
- * Pest species control programs will be implemented in conjunction with neighbours and the Rural Lands Protection Board.
- * Monitoring programs will be established to determine population trends of threatened species such as the brush-tailed rock-wallaby, glossy black-cockatoo, rufous bettong, the stuttering frog and the New England tree frog.

3.2 FIRE MANAGEMENT

The NPWS recognises that fire is a natural feature of Demon Nature Reserve. The frequency of fire, its intensity, and the season in which it occurs are some of the major factors influencing the distribution of flora and fauna species and communities within the Reserve. These interactive processes are complex and not fully understood, but are known to have considerable impact on the natural values of the Reserve. Inappropriate fire management practices have the potential to cause localised extinction of many flora and fauna species occurring within the Reserve.

A frequent patchy burning regime has resulted in a mosaic of age classes in vegetation communities throughout the Reserve. For example the sedgeland community was burnt two years ago while the margins of the tall open forest and closed forest communities have not been burnt for at least 10 years (ERM Mitchell McCotter, 1997). A wildfire in 1994/95 only affected the eastern boundary of the Reserve, while wildfires between 1988-91 extended through the mid section of the Reserve (SFNSW, 1995).

Traditionally fire has spread from the western boundary of the Reserve up the escarpment and onto the plateau. Prevailing westerly winds in the drier months increase the threat of high intensity fires.

Evidence of fire was commonly found in the closed forest community within sheltered gullies which is susceptible to fire (Figure 2). This may explain the absence of some rainforest-restricted fauna species and the rarity of moist sclerophyll species such as the Wonga Pigeon, Brown Cuckoo-Dove and the Lewin's Honeyeater (Schulz and Sparks, 1998). Management will aim to exclude fire from this community which will be addressed in more detail in the Reserve fire management plan.

The Timbarra Road provides the only fire management access route to the Reserve. The provision of additional vehicular access trails along the southern or northern boundaries of the Reserve would be inappropriate due to the steepness of the escarpment. The eastern edge of the Reserve holds opportunities to combine a fence line with a Reserve boundary trail making hazard reduction burning, both on and off the Reserve, more feasible with defined control lines. The implementation of an eastern boundary trail would also provide protection for both the Reserve and adjacent landowners in the event of wildfire.

Management of fire is an important and complex issue. It must aim to achieve both long term conservation of natural communities and ongoing protection of life and property within and adjacent to the Reserve.

Under the *Rural Fires Act, 1997* the NPWS has a responsibility as a fire authority for controlling fires within the Reserve and ensuring they do not damage life or property. The NPWS can act to suppress fires up to eight kilometres from the Reserve in cooperation with local brigades, neighbours and other fire fighting authorities.

The NPWS is an active member of the Tenterfield Bush Fire Management Committee which was set up under the *Rural Fires Act* to coordinate and monitor fire management and fire control on a district basis. The *Rural Fires Act* and NPWS policies provide for the preparation of a fire management plan covering both operational and risk management planning for the Tenterfield Shire. It is expected that a fire management plan will be prepared for Demon Nature Reserve and form part of the NPWS input into the Shire plan.

Until the fire management plan for the Reserve is completed the fire management for Demon Nature Reserve will operate under the priorities identified in the *Rural Fires Act* and NPWS policies. Priority for fire management within the Reserve will be given to the protection of life and property; suppression of wildfire; conservation of vegetation communities and plant and animal species which require specific fire regimes; and maintenance of species and habitat diversity.

Management Objectives and Actions

To effectively manage fire for the protection of life and property and the conservation of natural values of the Reserve. Priorities will include:

- **protection of brush-tailed rock-wallaby populations;**
 - **maintenance of mature seed-bearing *Allocasuarina* species critical in the protection of glossy black-cockatoo populations; and**
 - **exclusion of fire from closed forest and moist gully communities.**
- * A fire management plan will be prepared for the Reserve.
 - * Research will continue into fire behaviour, hazard and risk assessment and vegetation and animal responses to fire for input into the fire management plan.
 - * Data on fire occurrence, frequency, season and intensity will be recorded to maintain an up to date GIS database.
 - * Prescribed burning and other fuel management programs will be reviewed prior to each fire season in accordance with the objectives and policies outlined in this plan of management and the Reserve fire management plan once it is prepared.
 - * The assessment and implementation of an eastern boundary trail will be given priority to assist in protecting the Reserve's eastern plateau area from wildfire events.
 - * A suitable fire break will be constructed, after approval of an environmental assessment, along the western boundary of the Reserve for the purpose of protecting the Reserve from fire running up the escarpment.

To facilitate cooperative fire management practices with Reserve neighbours and other authorities to reduce the risk of fire spreading into and out of Service estate.

- * The NPWS will maintain a high level of involvement with the Tenterfield Bushfire Management Committee to facilitate cooperative fire management activities within the Tenterfield Shire.
- * Neighbours will be consulted, and cooperative management arrangements pursued, on matters relating to fire breaks and prescribed burns. Subject to negotiations with neighbours, preference will be given to providing fire breaks on neighbouring lands where environmental values are less than on the Reserve.

3.3 CONSERVATION OF CULTURAL RESOURCES

3.3.1 Aboriginal and European heritage

No formal Aboriginal or European cultural heritage surveys have been undertaken in the Reserve. The Reserve lies within the jurisdiction of the Moombahlene and Tabulum Local Aboriginal Land Councils. The Reserve has been included in several land claims lodged with the National Native Title Tribunal. It is imperative that the Land Councils be involved in any Aboriginal cultural heritage surveys conducted within the Reserve and subsequent management of cultural values.

European use of the area has included grazing, fencing, camping reserves for travelling stock, timber getting, exploratory mining and recreation. The area was last logged in the 1980s. Some of the families who are neighbours to Demon Nature Reserve have been in the area for over 100 years. Evidence of past use of the Reserve includes a fenceline, survey trees and stumps of logged trees.

Management Objectives and Actions

To enhance the level of knowledge on cultural values associated with the Reserve.

- * A cultural heritage study will be conducted within the Reserve.
- * The Moombahlene and Tabulum Local Land Councils, elders and other relevant Aboriginal organisations will be invited to be involved in all aspects of identification, management and interpretation of Aboriginal cultural values in the Reserve.
- * Any historic sites found will be entered into the NPWS Historic Sites Database and the Aboriginal Sites Database.
- * In accordance with accepted Service practice in areas with low public use, historic evidence on the reserve will be retained in situ and allowed to weather.

3.4 USE OF DEMON NATURE RESERVE

3.4.1 Interpretation and public access

The NPWS will manage public use of the Reserve for nature conservation, research and education. Use of the Reserve including activities for management purposes, will conform with the management objectives of this plan, and will be subject to access limitations.

No camping, picnic facilities or walking tracks exist in Demon Nature Reserve. Due to the small size of the Reserve, its remote location on the edge of a steep escarpment, and the presence of significant plant and animal communities, the construction of public facilities, walking tracks or extensive promotion of the Reserve would not be compatible with conservation objectives. Alternative recreational facilities are provided at both Bald Rock and Boonoo Boonoo National Parks north of Tenterfield.

Interpretation will be directed towards promoting the natural values of the Reserve and the role of the NPWS in the management of these values. Emphasis will be placed on providing on-site signage and ongoing liaison with neighbours.

The only public vehicle access to Demon Nature Reserve is via the Timbarra Road which touches the eastern boundary of the Reserve.

Management Objectives and Actions

To protect the natural and cultural values of the Reserve through appropriate use.

- * Brochures will be updated to provide information on the values of the Reserve and to outline appropriate self reliant activities permissible in the Reserve such as bushwalking, bird watching and nature studies.
- * Signage identifying the Reserve will be erected.
- * No public facilities or walking tracks will be provided.
- * Public access will be confined to the Timbarra Road.
- * Camping will not be permitted in the reserve.

3.4.2 Research

Research into the Reserve's natural and cultural values and their conservation requirements is important in the development of appropriate management practices. Priority will be given to information gaps identified in this plan of management such as:

- Monitoring brush-tailed rock-wallaby, rufous bettong and glossy black cockatoo populations.
- Determining the status, distribution, habitat preferences and breeding sites for the stuttering frog and New England tree frog.

Management Objectives and Actions

To encourage appropriate research within the Reserve.

- * Research proposals will be subject to NPWS policy and procedures for scientific permits.
- * All researchers will be required to liaise closely with district staff to ensure that relevant information is readily available for park management purposes.

3.5 MANAGEMENT OPERATIONS

Effectively no management infrastructure exists in the Reserve, except for a number of redundant boundary fences in poor repair. Boundary fencing will be undertaken with the cooperation of neighbouring landholders. Signage identifying the Reserve will be erected. No other infrastructure will be provided (refer to section 3.4.1).

Several short trails exist from previous land uses along the eastern boundary of the Reserve. These trails have no management purpose and will be closed and left to naturally regenerate. No internal management trails are considered necessary due to the small size of the Reserve. However, a boundary trail is proposed in association with the construction of eastern and possibly western boundary fencing.

Management Objectives and Actions

To undertake appropriate management works.

- * Neighbours will be consulted in relation to any management works where appropriate.
- * Boundary fencing will be undertaken on a shared basis with neighbouring landholders. Priority will be given to fencing the eastern boundary.
- * Boundary trails are proposed on the accessible boundaries of the Reserve, however no additional management trails will be constructed within the Reserve.

4. PLAN IMPLEMENTATION

This plan of management is part of a framework of management developed by the NPWS. The framework also includes the *National Parks and Wildlife Act 1974*, the NPWS Corporate Plan, field management policies, established conservation and recreation philosophies, and strategic planning at corporate, regional and district levels.

The implementation of this plan of management will be undertaken within the annual programs of the NPWS Glen Innes District. Priorities, determined in the context of district and regional strategic planning, will be subject to the availability of necessary staff and funds, and to any specific requirements of the Director-General or Minister for the Environment.

District programs are subject to ongoing review, within which works and other activities carried out in Demon Nature Reserve will be evaluated in relation to objectives laid out in this plan.

The environmental impact of all development proposals will continue to be assessed at all stages of the development, and any necessary investigations undertaken in accordance with established environmental assessment procedures.

Section 81 of the *NPW Act* requires that this plan be carried out and given effect to, and that no operations shall be undertaken in relation to the Nature Reserve unless they are in accordance with the plan. However, if after adequate investigation, operations not included in the plan are found to be justified, this plan may be amended in accordance with Section 76(6) of the Act.

As a guide to the orderly implementation of this plan, actions identified in this plan are prioritised under the following categories:

HIGH Actions which are imperative to the achievement of the management objectives set out in this plan and or which need to be implemented in the near future on the basis that to not undertake the work will result in unacceptable degradation of natural and cultural resources, add significantly to the costs associated with rehabilitation, or present an unacceptable risk to public safety.

MEDIUM Actions that are necessary to achieve the management objectives set out in this plan, but will be undertaken as resources become available since the time frame for their implementation is not so critical.

LOW Actions which are desirable to achieving the management objectives set out in this plan, but can wait until resources are available.

Table 2: Summary of key management actions

| HIGH PRIORITY | Plan Ref. |
|---|----------------------|
| Boundary fencing will be undertaken on a shared basis with neighbouring landholders. | 3.5 |
| Prepare a fire management plan for the Reserve. | 3.2 |
| Assess and if feasible construct an eastern boundary trail. | 3.2 |
| Review prescribed burning and other fuel management programs prior to each fire season. | 3.2 |
| Implement recovery plans for species within the Reserve. | 3.1.1, 3.1.2 |
| Encourage research into the distribution and habitat requirements of rare and threatened species and associated fire ecology. | 3.1.1, 3.1.2, 3.2 |
| Prepare and implement a pest species control plan for the Reserve. | 3.1.2, 3.1.1 |
| Erect signage within the Reserve. | 3.4.1 |
| MEDIUM PRIORITY | |
| Update brochures on the Reserve | 3.4.1 |
| Established monitoring programs for threatened species such as the brush-tailed rock-wallaby, glossy black cockatoo and the rufous bettong. | 3.1.1, 3.1.2 |
| Assess and if feasible construct a western boundary trail. | 3.2 |
| LOW PRIORITY | |
| Conduct a cultural heritage study within the Reserve. | 3.3 |

5. REFERENCES

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6. APPENDICES

Appendix A: Fauna species of State significance recorded in Demon Nature Reserve

| Common Name | Scientific name | Conservation Status (TSC Act 1995) |
|--------------------------------|-----------------------------------|------------------------------------|
| stuttering frog | <i>Mixophyes balbus</i> | Vulnerable |
| New England tree frog | <i>Litoria subglandulosa</i> | Vulnerable |
| Stephen's banded snake | <i>Hoplocephalus stephensii</i> | Vulnerable |
| glossy black-cockatoo | <i>Calyptorhynchus lathami</i> | Vulnerable |
| powerful owl | <i>Ninox strenua</i> | Vulnerable |
| masked owl | <i>Tyto novaehollandiae</i> | Vulnerable |
| sooty owl | <i>Tyto tenebricosa</i> | Vulnerable |
| brush-tailed rock-wallaby | <i>Petrogale penicillata</i> | Vulnerable |
| Hastings River mouse | <i>Pseudmys oralis</i> | Endangered |
| spotted tail quoll | <i>Dasyurus maculatus</i> | Vulnerable |
| rufous bettong | <i>Aepyprymnus rufescens</i> | Vulnerable |
| southern myotis | <i>Myotis cf. macropus</i> | Vulnerable |
| koala | <i>Phascolarctos cinereus</i> | Vulnerable |
| eastern chestnut mouse | <i>Pseudomys gracilicaudatus</i> | Vulnerable |
| golden-tipped bat | <i>Kerivoula papuensis</i> | Vulnerable |
| eastern false pipistrelle | <i>Falsistrellus tasmaniensis</i> | Vulnerable |
| common bentwing bat | <i>Miniopterus schreibersii</i> | Vulnerable |
| yellow-bellied sheath-tail bat | <i>Saccolaimus flaviventris</i> | Vulnerable |
| greater broad-nosed bat | <i>Scoteanax rueppellii</i> | Vulnerable |

Source: Schulz and Spark (1998)

Appendix B: Fauna species of regional significance* recorded in Demon Nature Reserve

| Common Name | Scientific Name |
|----------------------------|----------------------------------|
| skink | <i>Calyptotis scutirostrum</i> |
| skink | <i>Egernia mcphreei</i> |
| land mullet | <i>Egernia major</i> |
| skink | <i>Saproscincus rosei</i> |
| leaf-tailed gecko | <i>Saltuarius</i> spp. |
| barred-sided skink | <i>Eulamprus tenuis</i> |
| skink | <i>Eulamprus martini</i> |
| grey goshawk | <i>Accipiter novaehollandiae</i> |
| musk lorikeet | <i>Glossopsitta concinna</i> |
| chestnut-rumped heathwren | <i>Hylacola pyrrhopygia</i> |
| superb lyrebird | <i>Menura novaehollandiae</i> |
| greater glider | <i>Petauroides volans</i> |
| whiptail wallaby | <i>Macropus parryi</i> |
| eastern horseshoe bat | <i>Rhinolophus megaphyllus</i> |
| white-striped freetail-bat | <i>Nyctinomus australis</i> |
| broad-nosed bat | <i>Scotorepens</i> sp. 1 |

Source: Schulz and Spark (1998)

*Regional significance status is based on the North-eastern New South Wales Priority Species List for Upper North-eastern New South Wales (NSW NPWS, 1997b).

Appendix C: ROTAP* (Rare or Threatened Australian Plants) species found in Demon Nature Reserve

| Common Name | Scientific Name | ROTAP* coding |
|----------------------------|--|---------------|
| | <i>Acacia floydii</i> | 2RC- |
| Mountain Wattle | <i>Acacia orites</i> | 2RC- |
| | <i>Acianthus exiguus</i> | 3RC- |
| | <i>Eriostemon myoporoides</i> ssp. <i>epilosus</i> | 3RC- |
| Dorrigo White Gum | <i>Eucalyptus dorrigoensis</i> | 3KC- |
| Dunn's White Gum | <i>Eucalyptus dunnii</i> | 3RCa |
| Grey Ironbark | <i>Eucalyptus fusiformis</i> | 2RC- |
| | <i>Eucalyptus olida</i> | 2RCa |
| Large-fruited Red Mahogany | <i>Eucalyptus scias</i> ssp. <i>apoda</i> | 3K |
| | <i>Plectranthus suaveolens</i> | 3KC- |
| | <i>Pomaderris notata</i> | 2RC-t |
| | <i>Prostanthera</i> sp. 5 (Boonoo Boonoo) | 2RC- |
| | <i>Ricinocarpus speciosus</i> | 3RCi |

Source: ERM Mitchell McCotter (1997)

Key: 2 = Geographic range <100km.

3 = Geographic range >100km.

R = Rare.

C = Reserved within conservation area.

K = Poorly known taxa.

- = Reserved population size not accurately known.

a = 1000 plants or more are known to occur in conserved lands.

i = less than a 1000 plants are known to occur in conserved lands

t = Total known population conserved within conservation lands

* ROTAP status and coding obtained from Briggs & Leigh (1996) Rare or Threatened Australian Plants.