MOUNT HYLAND NATURE RESERVE AND

MOUNT HYLAND STATE CONSERVATION AREA

PLAN OF MANAGEMENT

National Parks and Wildlife Service

Part of the Department of Environment and Climate Change (NSW)

May 2009

This plan of management was adopted by the Minister for Climate Change and the Environment on 19th May 2009.

Acknowledgments

This plan of management is based on a draft prepared by staff of the NPWS Dorrigo Plateau Area and North Coast Region.

Thanks are extended to all members of the community who participated in the consultation process to date.

Cover photograph by Mark Price

For additional information or inquiries on any aspect of the plan or Mount Hyland Nature Reserve, contact the NPWS Dorrigo Plateau Area at the Dorrigo Rainforest Centre, Dome Road, Dorrigo 2453 (ph: 02 6657 2309).

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FOREWORD

Mount Hyland Nature Reserve and State Conservation Area are located approximately 30 kilometres to the north-east of Dorrigo and approximately 35 kilometres south-west of Nymboida in north-eastern NSW, and have a combined area of 2812 hectares.

The parks protect 21 different plant communities and associations, including stands of old growth forests, and seven rare or threatened plants as well as 23 threatened fauna species. A section of Mount Hyland Nature Reserve is included on the World Heritage List as part of the Gondwana Rainforests of Australia World Heritage property.

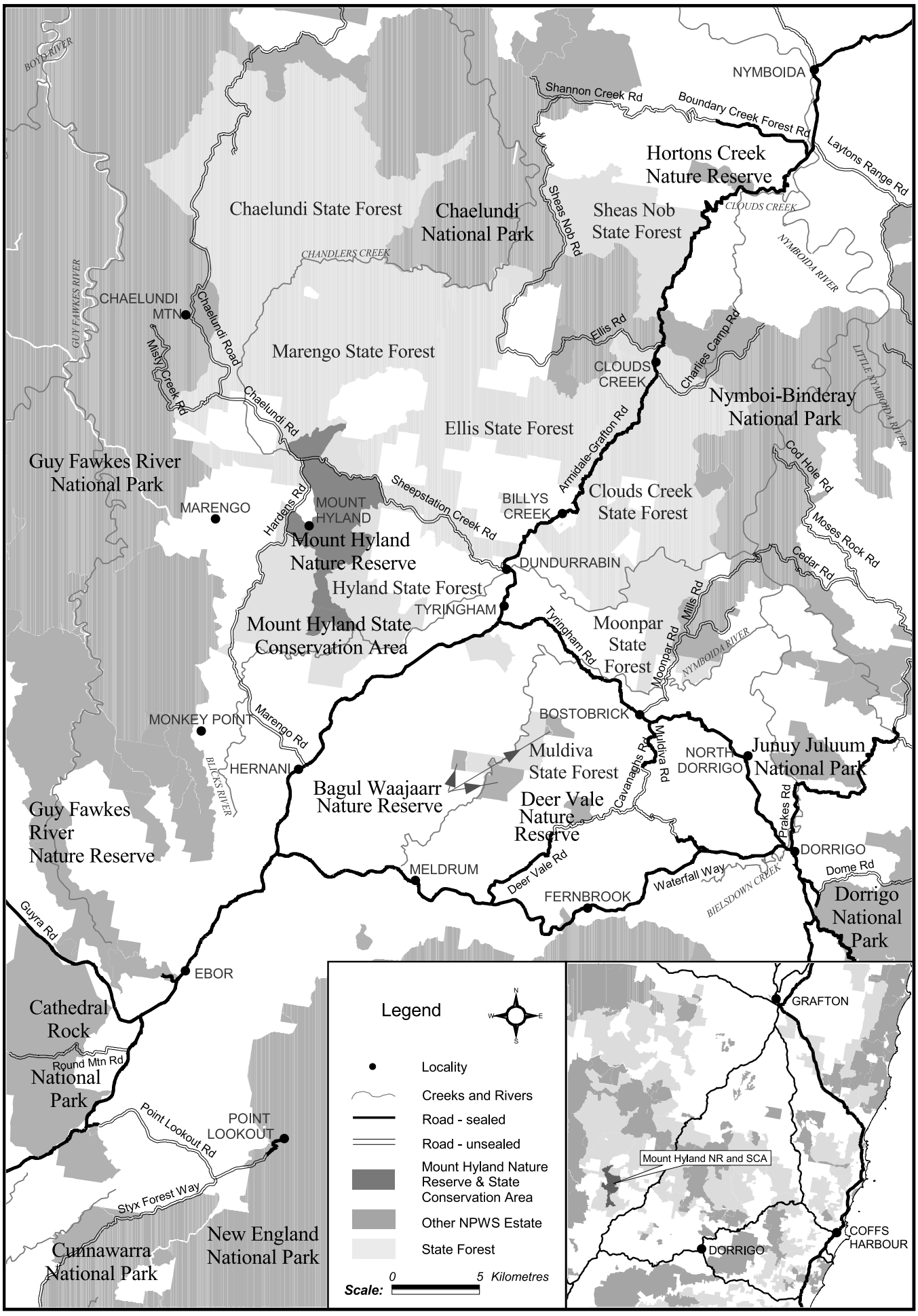
A draft plan of management for Mount Hyland Nature Reserve and State Conservation Area was on public exhibition from 5th October 2007 until 21st January 2008. The submissions were carefully considered before adopting this plan.

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 ongoing vegetation monitoring, control of pest animals and weeds, and research into threatened species. The plan also contributes to *More people using parks, sporting and recreational facilities, and participating in the arts and cultural activity* (Priority E8) by providing additional opportunities for visitors to enjoy the park, including picnic areas, lookouts and bush walking opportunities.

This plan of management establishes the scheme of operations for Mount Hyland Nature Reserve and State Conservation Area. 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

MAP 1 LOCATION OF THE PLANNING AREA



1. THE PLANNING AREA

1.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Mount Hyland Nature Reserve and the adjoining Mount Hyland State Conservation Area (hereafter referred to collectively as 'the planning area', or 'the nature reserve' and 'the SCA' respectively) are located approximately 30 kilometres to the north-west of Dorrigo (30°20.4'S, 152°42.6'E), and approximately 35 kilometres south-west of Nymboida (29°56.4'S, 152°43.8'E).

The nature reserve was originally gazetted following the Wran Government's Rainforest Decision as an area of approximately 1634 hectares under the *Forestry Revocation and National Parks Reservation Act 1984*. Along with the other major rainforest reserves in northern NSW, this area was included on the World Heritage list in 1986 as part of a property currently known as the Gondwana Rainforests of Australia. In 1999, additions to the reserve led to its current size of approximately 2519 hectares. The SCA comprises 293 hectares adjoining the southern boundary of the reserve and was gazetted in 2003.

Prior to gazettal, the nature reserve was part of Marengo, Hyland and Ellis state forests. The area that is now Mount Hyland State Conservation Area was previously part of Hyland State Forest and had been dedicated as the Blicks River Flora Reserve. The North East Regional Forest Agreement (RFA) process resulted in additions to the nature reserve and the creation of the SCA.

The planning area is located in the western uplands of the North Coast Bioregion on the edge of the Great Escarpment. The North Coast Bioregion is one of the most geologically and biologically diverse in NSW (NPWS 2003a).

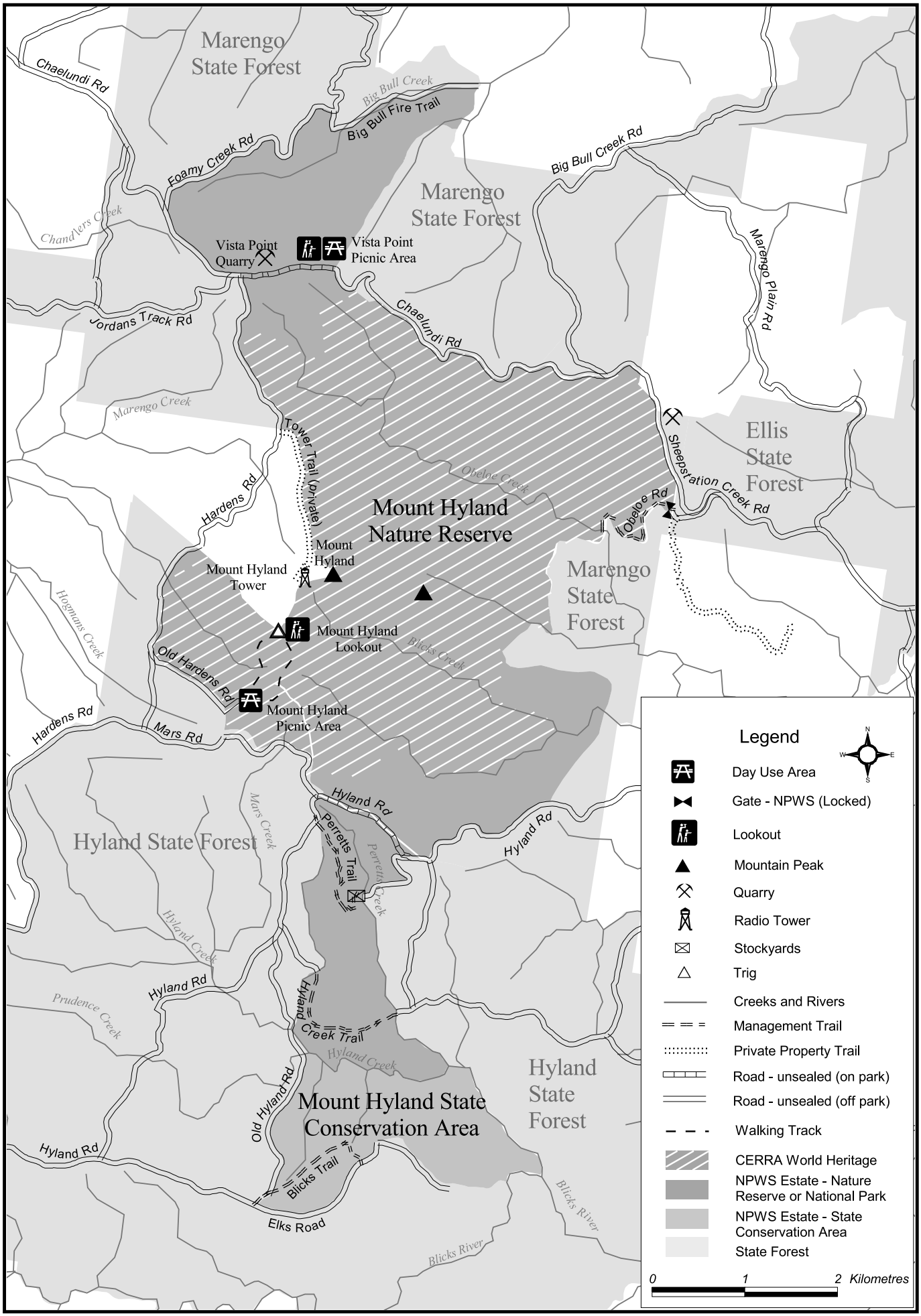
The planning area is part of the protected area system for the Dorrigo Plateau (see Map 1). Nearby parks and reserves include Guy Fawkes River National Park and State Conservation Area approximately six kilometres to the west, Chaelundi National Park and State Conservation Area approximately eight kilometres to the north east, Nymboi-Binderay National Park approximately 20 kilometres to the east, and Bagul Waajaar Nature Reserve approximately 12 kilometres to the south-east.

Dorrigo is the nearest town to the planning area. The localities of Hernani to the south, and Tyringham, Dundurrabin and Billys Creek to the east are approximately 10 kilometres from the planning area. Surrounding major land uses include cattle grazing, native and plantation forestry, and rural residential development. Land tenures adjoining the planning area include Marengo, Hyland and Ellis state forests, as well as two freehold properties abutting the nature reserve.

The planning area falls within the Clarence Valley local government area and the Grafton-Ngerrie, Dorrigo Plateau and Armidale local aboriginal land council areas. The area is also within the boundaries of the Northern Rivers Catchment Management Authority (CMA) and the Grafton Rural Lands Protection Board.

As well as the gazetted reserve, the planning area includes several Ministerial roads. These roads lie on Crown land which is vested in the Minister administering the NPW Act for the purposes of Part 11 of the Act. They were created under the *Forestry and National Parks Estate Act 1998* to ensure that the access arrangements which existed immediately before the reserve's creation (primarily for timber hauling and private property access) could continue. The management of these roads is subject to the provisions of this plan, the NPW Regulations and the requirements of the EPA Act.

MAP 2 THE PLANNING AREA



Under the *Nymboida Local Environmental Plan* 1986, parts of the planning area are zoned 8(a) Existing National Parks and Nature Reserves, however, more recent additions to the reserve system within the planning area have remained zoned, consistent with the previous tenure, as 1(f) Forests.

1.2 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 Aboriginal and non-Aboriginal land use practices, and the activities of modern day Australians continue to influence bushland through recreational use, cultural practices, the presence of introduced plants and animals and in some cases air and water pollution.

The geology, landform, climate, plant and animal communities of the area, plus its location, have determined how it has been used by humans. Aboriginal people used the planning area for gathering food and other resources. Parts of the planning area have also been subjected to logging, grazing and limited recreation use. A small area on Hyland Creek was also cleared in the past. Activities such as logging and grazing with associated burning practices, have had a marked impact on the vegetation and habitat values of some areas.

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. MANAGEMENT CONTEXT

2.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves and state conservation areas in NSW is in the context of the legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the NPW Regulation, the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). The policies are compiled 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) may require the assessment and mitigation of the environmental impacts of works proposed in this plan. Matters of National Environmental Significance, including the World Heritage values of the nature reserve, are protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A plan of management is a statutory document under the NPW Act and Section 72AA of the NPW Act lists the matters to be considered in its preparation. Once the Minister has adopted a plan, no operations may be undertaken within the planning

area except in accordance with the plan. This plan will also apply to any future additions to the planning area. Where management strategies or works are proposed for the planning area or any additions that are not consistent with the plan, an amendment to the plan will be required.

2.2 MANAGEMENT PURPOSES AND PRINCIPLES

2.2.1 Nature Reserves

Nature reserves are gazetted 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 differ from national parks in that the provision for visitor use is not a management priority.

2.2.2 State Conservation Areas

State conservation areas are gazetted under the NPW Act to protect and conserve areas: that contain significant or representative ecosystems, landforms or natural phenomena or places of cultural significance; that are capable of providing opportunities for sustainable visitor use and enjoyment, the sustainable use of buildings and structures or research; and that are capable of providing opportunities for uses permitted under other provisions of the Act.

Under the Act (section 30G), state conservation areas are managed to:

- conserve biodiversity, maintain ecosystem functions, protect natural phenomena and maintain natural landscapes;
- conserve places, objects and features of cultural value;
- provide for the undertaking of uses permitted under other provisions of the NPW Act (including uses permitted under section 47J such as mineral exploration and mining), having regard to the conservation of the natural and cultural values of the state conservation area;
- provide for sustainable visitor use and enjoyment that is compatible with conservation of the area's natural and cultural values and with uses permitted in the area;
- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of the area's natural and cultural values and with other uses permitted in the area; and
- provide for appropriate research and monitoring.

There are currently no mineral exploration licences or mining leases in or within the vicinity of the SCA. Mining and mineral exploration were excluded from Blicks River Flora Reserve on 20 July 1984 (FCNSW 1989). Exploration licences and assessment leases may be granted within SCAs without the concurrence of the Minister

administering the NPW Act. However, his/ her approval must be obtained before any rights under that lease or licence can be exercised. Likewise, the concurrence of the Minister administering the NPW Act must be obtained before any mining lease is issued. In the case of exploration licences and other prospecting titles, an access agreement under the *Mining Act 1992* will also be required between the titleholder and the NPWS in order for the titleholder to conduct prospecting operations with a state conservation area.

The Department of Primary Industries (DPI Minerals) is the lead authority for mining, mineral exploration and mine site rehabilitation. DPI (Minerals) is required under the EPA Act to undertake environmental assessments for mining and exploration activities in all SCAs. The existing Memorandum of Understanding (MOU) between NPWS and DPI (Minerals) describes the management and consultative arrangements associated with exploration and mining in SCAs.

The NPW Act requires a review of the classification of state conservation areas every 5 years in consultation with the Minister administering the *Mining Act 1992*. In the long term it is the intention of the Department of Environment and Climate Change (DECC) for Mount Hyland State Conservation Area to be added to Mount Hyland Nature Reserve. Management of the SCA will therefore also be guided by the management principles for nature reserves (refer to section 2.2.1) where possible.

2.2.3 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.

The North East RFA covers the nature reserve and state conservation area. The process leading up to the RFA provided for major additions to the reserve system, including additions to Mount Hyland Nature Reserve and the creation of Mount Hyland State Conservation Area.

2.2.4 World Heritage

A section of Mount Hyland Nature Reserve (see Map 2) is included on the World Heritage List as part of the Gondwana Rainforests of Australia World Heritage property. This property, originally listed in 1986, was extended in 1994 (under the name the Central Eastern Rainforest Reserves of Australia) to include the major rainforest reserves in north-east NSW and south-east Queensland. The Gondwana Rainforests property was inscribed on the World Heritage List because it satisfies three natural criteria of outstanding universal significance. It contains:

- outstanding examples representing the major stages of the earth's evolutionary history;
- outstanding examples representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment; and
- the most important and significant habitats where threatened species of plants and animals of outstanding universal value (from the point of view of science and conservation) still survive.

The World Heritage Convention provides a framework for international cooperation and the collective protection of cultural and natural heritage of outstanding universal value. Under this convention Australia has obligations to do all it can to ensure that effective and active measures are taken for the identification, protection, conservation and presentation of the cultural and natural heritage situated on its territory.

The Australian World Heritage management principles are established under regulations to the EPBC Act. These principles state that the primary purpose of management of a World Heritage property is to identify, protect, conserve, present and, if appropriate, rehabilitate the World Heritage values of the property so they may be transmitted to future generations. The principles also list provisions for planning and impact assessment, and require that opportunities be provided for continuing community and technical input in the management of a World Heritage property.

While these principles do not legally apply to the management of the state-managed areas within World Heritage properties, the NPWS has agreed that management of the World Heritage listed sections of the planning area will be consistent with these principles. A strategic plan for the Gondwana Rainforest World Heritage property has been prepared (CERRA 2000) and was considered in the preparation of this plan.

2.3 MANAGEMENT DIRECTIONS

Management will specifically focus on:

- protection of World Heritage values represented in that part of the planning area included in the Gondwana Rainforests World Heritage property;
- management of the planning area as part of a regionally important system of protected areas on the Dorrigo Plateau;
- recognition and protection of the Aboriginal values associated with the planning area in cooperation with representatives of the Gumbaynggirr Aboriginal Nation;
- increasing the natural values of the reserve system over time;
- conservation of threatened plants and animals in the planning area, particularly those for which the reserves support important populations;
- reducing the impacts of threatening processes, such as inappropriate fire regimes, weed and pest animal invasion; and
- provision of low-key and self-reliant nature based recreation that is consistent with the nature reserve and world heritage classification of much of the planning area.

3. VALUES OF THE PLANNING AREA

3.1 NATURAL AND CULTURAL HERITAGE

3.1.1 Landform, Geology and Soils

Located on the eastern slopes of the Great Dividing Range on the Dorrigo Plateau, the planning area falls within the upper catchment of the Clarence River, and within three sub-catchments. The majority of the planning area drains to the east, forming a large portion of the Blicks River sub-catchment. The section of Mount Hyland Nature Reserve north from Chaelundi Road is within the Boyd River sub-catchment, whilst the western-most section of the reserve drains from Mount Hyland as part of the Guy Fawkes River sub-catchment to the west.

Obeloe, Blicks and Perretts Creeks are the major drainage lines running through the nature reserve, with Hyland Creek forming part of the boundary between the nature reserve and the SCA. Numerous unnamed creeks run through the planning area. Freshwater soaks are common at the soil surface in the SCA.

The topography is variable with rugged steep slopes and gorges. Two of the three peaks of Mount Hyland are located within the nature reserve and the third just outside the reserve boundary. Mount Hyland itself is the highest peak in the area at 1434 m above sea level (about 400 m above the general plateau level), and is visually prominent from many viewpoints. Similarly, Vista Point and Mount Hyland Lookouts provide commanding views across the surrounding landscapes from within the nature reserve. Hyland Gorge and the associated Blicks River form part of the eastern boundary of the planning area.

The geology of the majority of the planning area comprises Moombil Siltstone, consisting of black massive argillite with minor sandstone and siltstone, and dating from the Carboniferous period of the Paleozoic era. A narrow band along the northern boundary of the planning area comprises the Chaelundi Complex, consisting of hornblende-biotite granodiorite dating from the Middle Triassic period of the Mesozoic era.

The Black Mountain soil landscape dominates the planning area, particularly along escarpments and ranges. It consists of well-drained yellow earths on highly silty sandstones, with soils exhibiting low fertility, strong acidity and a high to severe erosion hazard. The remainder of the nature reserve contains the Ulong soil landscape, consisting of red and yellow earths that are strongly acid soils with low fertility, low subsoil permeability and high subsoil erosion potential (Milford 1996). Soils of the SCA consist of two types, with kraznozems in the eastern section and red and yellow podzolics in the western section (FCNSW 1983).

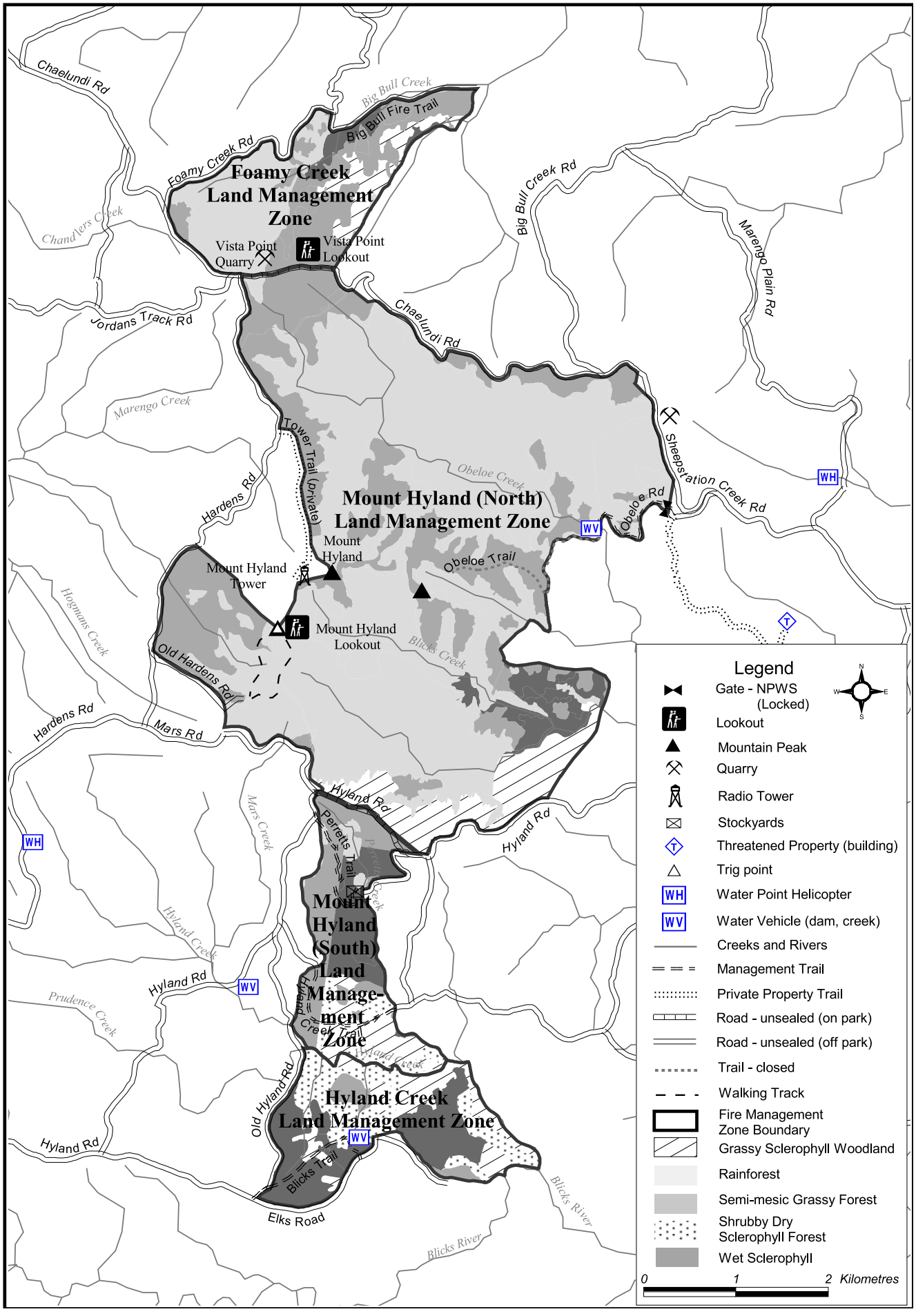
3.1.2 Native Plants

Vegetation in the planning area falls within five broad vegetation types, which can then be divided into at least 21 different plant communities or associations. The five broad vegetation types are rainforest, wet sclerophyll forest, dry sclerophyll forest, dry sclerophyll woodland and semi-mesic grassy forest (see Map 3).

Rainforest and semi-mesic grassy forest dominate the majority of the planning area. Rainforest in the nature reserve centres on the Obeloe and Blicks Creeks, with eucalypt forest tending to occur on ridgelines. A significant portion of the vegetation in the planning area is in old growth condition due to limited access to the area for logging and limited occurrence of fire within core rainforest areas. Logging activities have tended to focus on drier forest in the planning area, with minimal logging in rainforest areas.

Vegetation in the nature reserve is predominantly rainforest. This rainforest is characterised by varying structural and floristic features. In some areas rainforest is dominated by brush box (*Lophostemon confertus*) emergents, whilst in other areas it is punctuated with eucalypt emergents, and still other areas are dominated by mixed emergents. The remaining area of rainforest in the nature reserve can be broken down into seven different sub-alliances (Floyd 1990), including coachwood (*Ceratopetalum apetalum*)-sassafras (*Doryphora sassafras*), corkwood (*Caldicluvia paniculosa*)-sassafras-crabapple (*Schizomeria ovata*), myrtle (species within the

MAP 3 VEGETATION AND FIRE ZONES IN THE PLANNING AREA



Myrtaceae family), fig (*Ficus* spp.)-giant stinger (*Dendrocnide excelsa*)-myrtle, mountain walnut (*Cryptocaria foveolata*), yellow carabeen (*Sloanea woollsii*)-corkwood-sassafras-crabapple-silver sycamore (*Cryptocaria glaucescens*). The rainforest vegetation found in Mount Hyland Nature Reserve contributes to the outstanding universal values of the Gondwana Rainforests World Heritage Property.

The nature reserve contains many species typically found in cool temperate rainforest except Antarctic beech (*Nothofagus moorei*). It is notable that, while the majority of the rainforest present within the nature reserve is suitably elevated, it does not contain Antarctic beech. The only known occurrence of Antarctic beech around Mount Hyland is in Hyland Gorge within Mount Hyland State Conservation Area. The Antarctic beech at this location is significant because it represents an isolated occurrence outside the species' regional distribution (FCNSW 1983).

Semi-mesic grassy forest plant communities present in Mount Hyland Nature Reserve include New England blackbutt (*Eucalyptus campanulata*), New England blackbutt-New England peppermint (*E. nova-anglica*) and mountain gum (*E. dalrympleana*)-manna gum (*E. viminalis*). Wet sclerophyll communities include brush box, brown barrel (*Eucalyptus fastigata*)-messmate (*E. obliqua*), messmate-silvertop stringybark (*E. laevopinea*), tallowwood (*E. microcorys*)-Sydney blue gum (*E. saligna*). Dry sclerophyll woodlands and forests include snow gum (*Eucalyptus pauciflora*), silvertop stringybark-Sydney blue gum and narrow-leaved peppermint (*Eucalyptus radiata*). Mount Hyland State Conservation Area contains New England blackbutt and New England Peppermint semi-mesic forest types, featuring a predominantly grassy understorey and sparse mid-storey, and snow gum woodlands.

The planning area contains seven rare or threatened Australian plants as listed in Table 1. Of these, three are considered to be threatened.

Mount Hyland Nature Reserve contains an important population of the Dorrigo daisy (*Olearia flocktoniae*), which has a very restricted distribution on the northern fall of the Dorrigo Plateau. The Dorrigo daisy has been listed as endangered both in NSW and nationally. It is a pioneer species that colonises disturbed locations such as roadsides (NPWS 2002a). The disturbance regime requirements of the species are being investigated, and populations in and near the reserve are being jointly managed with Forests NSW, the University of New England and DECC. DECC, including NPWS, is assisting with ongoing collaborative research being undertaken to determine the species' requirements for optimal recovery (refer to Section 4. *Research*). A plant marker system has been developed in conjunction with Forests NSW to prevent accidental disturbance to roadside populations. A draft recovery plan for this species has been prepared (DEC 2004).

The cryptic forest twiner (*Tylophora woollsii*) has been recorded in the northern section of the nature reserve. It has been listed as endangered in NSW and nationally. Habitat for the species is moist eucalypt forest, moist sites in dry eucalypt forest and rainforest margins. Although the species has a wide geographic range, within that range it is very rare. Known populations are small in both size and spatial extent, and are vulnerable to a range of threats such as road works, cattle grazing and inappropriate fire regimes.

The broad-leaved pepperbush (*Tasmannia purpurascens*) is listed as vulnerable in NSW and nationally. Apart from a single record in rainforest in the nature reserve, this species is known only from the Barrington Tops and Ben Halls Gap to the south. The fragrant pepperbush (*T. glaucifolia*) is also listed as vulnerable in NSW and nationally. There is a single record for this species in rainforest to the west of the

planning area. Apart from this record, the species is known from the Barrington Tops, Ben Halls Gap and Point Lookout areas. Verification of these records from and near the planning area is important in determining their known range.

Several ROTAP species have been recorded in the planning area, including the following species. Mountain denhamia (*Denhamia moorei*), a rare small tree restricted to cool and warm-temperate rainforest in the Point Lookout, Dorrigo and Mount Hyland areas (Briggs & Leigh 1996; Harden 1992). Scented plectranthus (*Plectranthus suaveolens*) is a poorly known species, which grows in rocky exposed areas (Briggs & Leigh 1996; Harden 1992). Mountain laurel (*Cryptocarya nova-anglica*) is a rare plant found in cool temperate rainforest, at subalpine elevations (Briggs & Leigh 1996; Harden 2002). *Chiloglottis sphyrnoides*, a poorly known orchid associated with basalt loams in subalpine areas has also been recorded (Briggs & Leigh 1996; Harden 2002).

The nature reserve contains several plants of regional conservation significance, including rare examples of coastal banksia (*Banksia integrifolia*) occurring at high elevation. Very large mature specimens of the tree can be observed from the Mount Hyland walking track. Southern marara (*Vesselowskya rubifolia*) and black oliveberry (*Eleocarpus holopetalus)*, both species that generally occur in association with Antarctic beech (*Nothofagus moorei*), are at their northern distributional limit at Mount Hyland (Adam 1987).

Table 1. Significant flora species recorded in the planning area.

Common name	Scientific name	Legal Status[(1)]	Conservation Status[(2)]
Dorrigo daisy	*Olearia flocktoniae*	Endangered *	2ECi
cryptic forest twiner	*Tylophora woollsii*	Endangered *	2E
broad-leaved pepperbush	*Tasmannia purpurascens*	Vulnerable *	2VC-t
mountain denhamia	*Denhamia moorei*		2RC-
scented plectranthus	*Plectranthus suaveolens*		3KC-
ornate ant-orchid	*Chiloglottis sphyrnoides*		3KC-
mountain laurel	*Cryptocarya nova-anglica*		3RCa
Antarctic beech	*Nothofagus moorei*		Regionally Significant
southern marara	*Vesselowskya rubifolia*		Regionally Significant
black oliveberry	*Elaeocarpus holopetalus*		Regionally Significant

Source: NPWS Atlas of NSW Wildlife 2004

[(1)]Legal Status under the TSC Act * Denotes species also listed under the EPBC Act.

[(2)]Conservation status is as identified during the CRA or as assigned by Briggs and Leigh (1996) to Rare or Threatened Australian Plants (ROTAPs), indicated by the following codes:

- 2 = restricted distribution, with a maximum geographic range of less than 100km
- 3 = geographic range greater than 100 km
- E = endangered (at serious risk of disappearing from the wild in the next 2 decades if present land use or other causal factors continue to operate)
- V = vulnerable (not presently endangered but at risk of disappearing from the wild over a longer period (20-50 years)
- R = rare (not currently considered endangered or vulnerable but very uncommon)
- K = poorly known (suspected to be in one of the above categories but the level of knowledge is inadequate)
- C = known to be found in a national park or other reserve
- a = considered adequately reserved (>1000 plants known to occur in reserves)
- i = considered inadequately reserved (<1000 plants known to occur in reserves)
- - = population size in reserves is unknown
- t = total known population is within a conservation reserve

3.1.3 Native Animals

The planning area contains a diversity of habitat types which in turn supports a diversity of animal species. A total of 23 threatened fauna species have been recorded in the planning area, with a number of others considered likely to occur based on the habitat available and species distributions. Table 2 lists significant fauna species that have been recorded and species that are likely to occur in the planning area. Limited survey work has been completed in Mount Hyland Nature Reserve, although Forests NSW undertook considerable work in the former Blicks River Flora Reserve (now Mount Hyland State Conservation Area). There have also been extensive surveys in surrounding state forests.

A large part of the planning area has been identified as key habitat for forest fauna. The planning area has also been mapped as part of a regional corridor that forms an important link in achieving landscape connectivity (Scotts 2003). Native vegetation on adjoining State Forest estate and private lands are important in providing connectivity between vegetation communities and habitats.

Threatened bird species recorded in the planning area include many species dependant on rainforest or wet sclerophyll forest with a rainforest understorey. These include the sooty owl (*Tyto tenebricosa*) and wompoo fruit-dove (*Ptilinopus magnificus*), which depend on rainforest for roosting, feeding and nesting.

A wide range of mammals inhabits the planning area, including a number of threatened species listed in Table 2. Mount Hyland State Conservation Area contains high quality habitat for the Hastings River mouse (*Pseudomys oralis*), a species listed as endangered in NSW and nationally. It has been identified as one of 10 proposed management sites for the Hastings River mouse (DEC 2005a), which have been chosen to be the focus for the implementation of ongoing management programs and research projects aimed at the species' recovery.

The spotted-tailed quoll (*Dasyurus maculatus*) has frequently been recorded in the planning area. Records also exist for threatened macropods, such as the rufous bettong (*Aepyprymnus rufescens*), long-nosed potoroo (*Potorous tridactylus*), parma wallaby (*Macropus parma*) and red-legged pademelon (*Thylogale stigmatica*). Arboreal and flying mammals are well represented in the planning area, with many of the forest bats present (refer to Table 2), including southern and eastern forest bats (*Vespadelus regulus* and *V. pumilus*), large and little forest bats (*V. darlingtoni* and *V. vulturnus*), eastern broad-nosed bat (*Scotorepens orion*), white-striped freetail bat (*Nyctinomus australis*), chocolate wattled bat (*Chalinolobus morio*) and Gould's long-eared bat (*Nyctophilus gouldi*).

Five threatened frog species have been recorded in the planning area, most of which are reliant on thick leaf litter on the forest floor and/ or rocky areas associated with free-flowing forest streams. These include the giant barred frog (*Mixophyes iteratus*), stuttering frog (*Mixophyes balbus*), pouched frog (*Assa darlingtoni*), Booroolong frog (*Litoria booroolongensis*). The sphagnum frog (*Philoria sphagnicolus*), which has been recorded in the nature reserve is generally found in leaf litter alongside rainforest streams and bogs at higher altitude (NPWS 2002b).

Under the provisions of the TSC Act recovery plans may be prepared for threatened species. Of the threatened species listed in Table 2, a recovery plan is in place for the yellow-bellied glider (NPWS 2003b) and the Hastings River mouse (DEC 2005a); draft recovery plans have been prepared for the koala (NPWS 2003c) and the large forest owls (DEC 2005b). Also under the TSC Act, a threatened species Priorities Action Statement (PAS) must be prepared. The PAS outlines the broad strategies

and detailed priority actions in NSW to promote the recovery of threatened species, populations and ecological communities. The PAS and recovery plans will be used to guide management of threatened species in the area.

Table 2. Significant fauna species recorded or predicted to occur in the planning area.

Common Name	Scientific Name	Legal Status [(1)]	Occurrence
Amphibians			
Booroolong frog	*Litoria booroolongensis*	Endangered	predicted
giant barred frog	*Mixophyes iteratus*	Endangered*	recorded
stuttering frog	*Mixophyes balbus*	Endangered*	recorded
New England tree frog	*Litoria subglandulosa*	Vulnerable	recorded
pouched frog	*Assa darlingtoni*	Vulnerable	recorded
sphagnum frog	*Philoria sphagnicolus*	Vulnerable	recorded
Reptiles			
border thick-tailed gecko	*Underwoodisaurus sphryrurus*	Vulnerable	predicted
pale headed snake	*Hoplocephalus bitorquatis*	Vulnerable	predicted
Stephens banded snake	*Hoplocephalus stephensi*	Vulnerable	predicted
Birds			
bush stone-curlew	*Burhinus grallarius*	Endangered	predicted
black-chinned honeyeater	*Melithreptus gularis gularis*	Vulnerable	predicted
rose-crowned fruit-dove	*Ptilinopus regina*	Vulnerable	predicted
superb fruit-dove	*Ptilinopus superbus*	Vulnerable	predicted
glossy black-cockatoo	*Calyptorhynchus lathami*	Vulnerable	recorded
masked owl	*Tyto novaehollandiae*	Vulnerable	recorded
powerful owl	*Ninox strenua*	Vulnerable	recorded
sooty owl	*Tyto tenebricosa*	Vulnerable	recorded
wompoo fruit-dove	*Ptilinopus magnificus*	Vulnerable	recorded
Mammals			
Hastings River mouse	*Pseudomys oralis*	Endangered*	recorded
eastern bent-wing bat	*Miniopterus schreibersii*	Vulnerable	predicted
common planigale	*Planigale maculata*	Vulnerable	predicted
eastern forest bat	*Vespadelus pumilus*	Vulnerable	predicted
grey-headed flying fox	*Pteropus poliocephalus*	Vulnerable*	predicted
golden-tipped bat	*Kerivoula papuensis*	Vulnerable	predicted
large-footed myotis	*Myotis adversus*	Vulnerable	predicted
little bent-wing bat	*Miniopterus australis*	Vulnerable	predicted
brush-tailed phascogale	*Phascogale tapoatafa*	Vulnerable	recorded
eastern false pipistrelle	*Falsistrellus tasmaniensis*	Vulnerable	recorded
greater broad-nosed bat	*Scoteanax rueppellii*	Vulnerable	recorded
hoary wattled bat	*Chalinolobus nigrogriseus*	Vulnerable	recorded
koala	*Phascolarctos cinereus*	Vulnerable	recorded
long-nosed potoroo	*Potorous tridactylus*	Vulnerable	recorded
parma wallaby	*Macropus parma*	Vulnerable	recorded
red-legged pademelon	*Thylogale stigmatica*	Vulnerable	recorded
rufous bettong	*Aepyprymnus rufescens*	Vulnerable	recorded
spotted-tailed quoll	*Dasyurus maculatus*	Vulnerable*	recorded
squirrel glider	*Petaurus norfolcensis*	Vulnerable	recorded
yellow-bellied glider	*Petaurus australis*	Vulnerable	recorded

Source: NPWS Atlas of NSW Wildlife, 2004. NPWS fauna modelling database.
[(1)] Legal Status under the TSC Act * Denotes species also listed under the EPBC Act.

3.1.4 Aboriginal Heritage

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

The planning area is part of a landscape of traditional and contemporary cultural significance to the Gumbaynggirr Aboriginal nation, and falls within the boundaries of the Grafton-Ngerrie, Dorrigo Plateau and Armidale Local Aboriginal Land Councils.

Forested areas have traditionally been a source of food and other resources for the Aboriginal community. The use of forests has continued since European arrival as a source of food and traditional medicines (Hall & Lomax 1993). Forests are also traditionally places of religious and spiritual value to Aboriginal people, both in terms of tracts of country and specific sites (Hall & Lomax 1993).

Aboriginal sites have not been recorded in the planning area, however, a number of sites including artworks, artefacts and ceremonial and dreaming sites have been recorded nearby. No formal Aboriginal cultural heritage surveys have been carried out in the planning area.

Whilst the NPWS has a legal responsibility for management of Aboriginal sites and objects under the NPW Act, the NPWS recognises the right of the Aboriginal community to be included in decisions about their own heritage. In this regard, the NPWS adopts a collaborative approach to the management of Aboriginal cultural values associated with the planning area, through ongoing consultation with the Aboriginal community.

3.1.5 Historic Heritage

It is reported that Mount Hyland was named after an early settler who squatted on the foothills to the south of the mountain, later establishing a cattle station on Hyland Creek (Fahey 1984). Hyland did not stay in the area for long and neighbouring squatters took ownership of the area, using it for grazing cattle.

The cremated remains of a former owner of the area Jessie Cotmore have been scattered in the nature reserve. The site is marked by a planted white cedar tree (*Melia azedarach* var. *australasica*), protected by a small fence.

Timber harvesting was the dominant land use in the area prior to the creation of the nature reserve and state conservation area, with State Forests dedicated in 1918 and in the 1930s. Logging of rainforest stands within the Obeloe Creek catchment commenced during the Second World War, primarily to supply coachwood timber for the aircraft plywood industry. Logging operations subsequently moved to the hardwood stands adjacent to rainforest areas, particularly with the construction of Big Bull Road in 1958 and Chaelundi Road in 1963.

The Mount Hyland trig station was installed in the early 1940s by surveyors of the area (Fahey 1984). From records held by Forests NSW, a dam in the south-western section of Mount Hyland State Conservation Area was constructed in 1971 for stock and fire fighting purposes.

The planning area and surrounding forested lands have a long history of grazing dating from the 1840s, with almost all of the area held under grazing permits and occupational licences in the early 1900s. The Forestry Commission assumed responsibility for administration of these permits following dedication of large areas of Crown lands as state forest. Occupation permits for grazing on lands that are now within the planning area were not renewed following gazettal of these lands under the NPW Act.

Timber stockyards formerly used in the management of cattle in the planning area are located on the eastern boundary of the nature reserve (refer to Map 2). The yards are not considered to have any historical significance and will be photographed, disengaged and allowed to deteriorate.

3.2 VISITOR USE

The extensive road network servicing the area surrounding the planning area provides opportunities for a wide range of recreational activities. Bushwalking, camping, whitewater rafting, picnicking and vehicle-based recreation including four-wheel driving and touring are all undertaken in the Dorrigo area, however the major focus of these activities is Nymboi- Binderay National Park to the east and Guy Fawkes River National Park to the west of Mount Hyland.

Mount Hyland Nature Reserve features two lookouts, which are a key attraction for visitors to the reserve. The Vista Point Lookout is accessed from the Chaelundi Road and provides extensive views to Chaelundi, Nymboi-Binderay, Guy Fawkes River, Ramornie, Barool and Gibraltar Range national parks. The Clarence Valley, Fortis Creek National Park and Banyabba Nature Reserve are also visible. Vista Point Lookout was originally cleared by Forests NSW as a fire observation point and picnic area. Since inclusion in the reserve, basic interpretive signage has been installed to provide visitors with information on the history and significant values of the reserve. Vista Point Lookout receives the highest level of visitation in the planning area.

The second lookout is Mount Hyland Lookout which is accessed from the Mount Hyland Picnic Area, located at the end of an unnamed road adjoining Hardens Road (see Map 2). The lookout is only accessible by foot via the Mount Hyland Walking Track. The track is a formed circuit of approximately three kilometres, passing through cool temperate rainforest and snow grass at the summit. Interpretive signage and track markers were installed along the track, but have deteriorated over time. The lookout features a trig station and visitors' book, which have been in place for many years.

Mount Hyland Picnic Area contains a wood-burning barbecue, a picnic table, a parking area and basic interpretive signage describing the Mount Hyland Walking Track and natural values of the area. The picnic area receives fewer visitors than Vista Point Lookout.

4. MANAGEMENT OPERATIONS AND OTHER USES

4.1 ACCESS

The planning area contains a network of roads and management trails that provide for a range of access purposes and that are maintained by various authorities.

Most of Chaelundi Road lies within State Forest. The short section through the nature reserve is classified as a Ministerial Road for the purposes of maintaining access through the nature reserve for forestry activities. A Memorandum of Understanding between the NPWS and Forests NSW provides for the joint maintenance of this and other sections of road in the planning area that are used by Forests NSW. In practice, this section of road is maintained by Forests NSW whilst logging activities are being undertaken. When the road is not in use for hauling purposes, maintenance is jointly undertaken by the Forests NSW and the NPWS. The road is maintained to a standard suitable for heavy vehicles to continue to provide hauling access.

That part of Hyland Road that passes through the planning area is also classified as a Ministerial Road and was not gazetted as part of the nature reserve. Hyland Road is generally available for public vehicles and is primarily used and maintained by the Forests NSW for forestry purposes.

Hardens Road provides access to Marengo and Hyland state forests as well as to Guy Fawkes River National Park. The section of Hardens Road that passes along the western boundary of the nature reserve is primarily maintained by NPWS. During forestry operations, maintenance for the road is undertaken by Forests NSW.

Foamy Creek Road is within State forest and is also jointly maintained by NPWS and Forests NSW, based on required use of the road during logging operations. That section of Foamy Creek Road along the northern boundary of the nature reserve is not available for public vehicle access.

Obeloe Road, Old Hyland Road, Mars Road and Elks Road are outside the planning area and are maintained by Forests NSW. Tower Trail extending from Hardens Road is on private property and provides access to the Mount Hyland Radio Tower.

Basic road access exists from Harden Road to the Mount Hyland Picnic Area. The road is currently suitable for four-wheel drive vehicles only. This road provides public vehicle access to the picnic area and will require resheeting to upgrade access to dry-weather two-wheel drive standard.

The boundary of the SCA was fenced to a stock-proof condition when the area was Blicks River Flora Reserve. The condition of fences varies, with some areas in need of repair. Priority areas for fencing include the eastern and western boundaries of the southern-most part of the nature reserve where stock enter the planning area (refer to 3.7 *Threats*). Fencing these sections of the boundary may be difficult to complete with minimal environmental impact due to the presence of creeks along the boundaries.

Several dams exist in the planning area. One dam located in the SCA is in good condition and is accessible by vehicle or helicopter. This will be retained for fire management purposes. The others are in disrepair and will be decommissioned and allowed to regenerate. One dam that will be decommissioned is located adjacent to Perretts Trail and is currently used by stray cattle.

4.2 OTHER USES

A medium-sized quarry exists within the nature reserve on the northern side of Chaelundi Road near Vista Point. Spoil from the quarry was mainly used by Forests NSW for maintaining haul roads in the nearby state forests. Quarrying is not a use consistent with gazettal of a nature reserve and the quarry is no longer in use. The site will be managed for risk in accordance with legislative requirements. After existing gravel stockpiles are removed, the site will be allowed to revegetate.

A trigonometric (trig) station is located adjacent to the Mount Hyland Lookout. This facility predates gazettal of the nature reserve. Although the site has not been maintained since the reserve was established, vegetation had previously been cleared around the site to create a clear line of sight to other stations in the vicinity. Over time, this vegetation has regenerated, reducing visibility. Under the terms of an agreement between NPWS and the then Central Mapping Authority (now Land and Property Information), any maintenance of the trig station will require an assessment of impacts and be subject to restrictions on the extent of vegetation trimming, access to the site and timing of activities.

A radio tower serviced by an access trail is located on private property to the immediate west of the nature reserve (see Map 2). The radio tower is positioned on the third peak of Mount Hyland and provides a strategic fire detection advantage. Its access trail can be used as a fire advantage and control line.

5. THREATS

5.1 INTRODUCED PLANTS AND ANIMALS

A number of weed species have been recorded in the planning area including Parramatta grass (*Sporobolus fertilis*), blackberry (*Rubus fruticosus*), wild tobacco bush (*Solanum mauritianum*) and herbaceous weeds such as fireweed (*Senecio madagascariensis*). Weeds can impact on natural areas in various ways, such as displacing native plant species, increasing bushfire fuel loads and harbouring feral animals. Weed infestations in the planning area have been assessed as a minor management issue within the NPWS North Coast Region's Pest Management Strategy (DECC 2008).

Pest animal species recorded in the planning area include the red fox (*Vulpes vulpes*), wild pig (*Sus scrofa*), wild dog and feral cat (*Felis catus*). Foxes, feral dogs and pigs pose a minor threat in the planning area. Cats have been recorded in higher numbers and over a greater range. The European rabbit (*Oryctolagus cuniculus*) and house mouse (*Mus musculus*) have also been recorded in Mount Hyland State Conservation Area. Fallow deer (*Dama dama*) have been present in Marengo State Forest for a number of years, with records from Jordans Track Road to the west of the nature reserve.

As part of the NSW Fox Threat Abatement Plan (Fox TAP), the Marengo area was identified as a control site to assess fox abundance in the absence of baiting. NPWS and Forests NSW undertook a joint monitoring program along boundary roads and trails in the planning area between 2002 and 2004. This program, which involved sand pad monitoring, has now ceased due to very low fox detection rates.

Cat records however were obtained as part of the Fox TAP sand pad monitoring and have confirmed the presence of cats in the planning area. While the cat population

size is unknown, it is considered that feral cats in the area may be having a major impact on populations of small to medium sized mammals, ground nesting birds and small reptiles. Predation of native fauna by cats has been listed as a key threatening process under schedule 3 of the TSC Act.

Wild pigs wallow and root in swamps and wetland areas, causing major disturbance to soils and wetland areas. Wild pigs spread weed seeds, create optimum conditions for weed invasion and have been known to uproot threatened ground orchids (DECC 2008).

Wild dogs, including dingoes (*Canis lupis dingo*), have been declared as pest animals under the *Rural Lands Protection Act 1998* (RLP Act) throughout NSW. Hence, the NPWS has a statutory obligation to control wild dogs on its estate. Under the RLP Act, however, public lands considered to contain high quality dingo habitat have been listed under Schedule 2 of the Wild Dog Control Order. Mount Hyland Nature Reserve is listed as one of these 'dingo management areas'. The RLP Act requires public land managers, such as the NPWS, to assist in the preparation of a wild dog management plan for dingo management areas. The wild dog management plan will identify methods for the control of wild dogs and the conservation of dingoes, and is to be developed in cooperation with the Grafton Rural Lands Protection Board (RLPB). Feral dogs (*Canis lupis familiaris*) have also been recorded in the planning area. Through interbreeding, feral dogs threaten the survival of native dingo populations (DECC 2008).

Occupational Permits for grazing have been granted over state forests surrounding the planning area (FCNSW 1992). Cattle occasionally enter the nature reserve, particularly in the southern section, as there are no boundary fences in place. The boundary of Mount Hyland State Conservation Area was fenced to exclude livestock during the period that the land was managed as the Blicks River Flora Reserve. Parts of the existing fence are currently in poor condition and require restoration. Although not bound by legislation to provide for fencing of NPWS estate, the NPWS recognises that appropriate boundary fencing may enhance conservation values as well as resolving other management problems within planning area, and so may contribute to the construction of fences along priority sections of the boundary.

5.2 FIRE MANAGEMENT

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

Intervals between fires that are too short can result in the disruption of life cycle processes in plants and animals, as well as losses to vegetation structure and composition. While Meek (2002) has found that in nearby Marengo State Forest, the Hastings River mouse was able to breed successfully in habitat that is burnt regularly (< 8 year cycles), the interim management guidelines recommend an average fire interval of 20+ years (DEC 2005a). Fire regimes of fixed intensity, frequency and extent without variation can lead to biodiversity decline.

Fire history of the planning area has been recorded since the late 1970s by both Forests NSW and later by NPWS. The threat of unplanned fire is considered most likely to be from fires occurring on lands to the west and north of the planning area. Wild fires have therefore generally only affected the drier ridgelines on the northern

and western sides of Mount Hyland Nature Reserve. The spread of larger scale fires through the planning area has been prevented by a large proportion of the area being rainforest, which has acted as a natural barrier to fire.

Graziers in the surrounding forests frequently use fire as a management tool to encourage grass suitable for stock, and so the southern areas of the nature reserve and the SCA have seen more frequent fire. Grazing associated with frequent burning was considered to be causing considerable damage to the values within the former Blicks River Flora Reserve at the time of its gazettal (FCNSW 1983).

There are several built assets within approximately one kilometre of the planning area, including a radio tower, fences, stockyards and one rural dwelling. A native hardwood plantation owned by Forests NSW is located several kilometres east of the planning area on Sheepstation Creek Road. Assets in the vicinity are not considered to be at significant risk from fire within the planning area due to the protection afforded by the topography and vegetation types.

The planning area contains several assets that may be impacted by fires, such as picnic facilities and interpretive signage located at Vista Point Lookout and Hyland track, as well as reserve signage located on boundaries of the planning area. These items are generally located away from fire prone areas and are considered to be at low risk.

The primary fire management objectives of the NPWS are to protect life, property and community assets from the adverse impacts of fire, whilst managing fire regimes to maintain and protect biodiversity and cultural heritage (NPWS 2005).

The NPWS approach to fire management planning is based on the level of complexity and risk to the planning area. In regard to the planning area, fire management strategies are included in this plan of management.

The NPWS uses a zoning system for bushfire management. This zoning system is consistent with that used in District Bush Fire Management Committee (BFMC) bushfire risk management plans.

NPWS has assessed the planning area for fire management planning purposes and has zoned the planning area as a series of Land Management Zones (LMZ). The primary fire management objective for a LMZ is to manage fire to conserve biodiversity and protect cultural heritage, through the application of prescribed fire consistent with fire thresholds. The planning area has been designated as LMZ because of the significance of the rainforest vegetation, its sensitivity to fire and low risk to surrounding assets. The focus of management in LMZ is to undertake actions appropriate to conserve biodiversity and cultural heritage.

Requirements for most plant species can be summarised on the basis of vegetation communities and there is a threshold in fire regime variability, which marks a critical change from a high species diversity to low species diversity. Section 3.3.2 describes the vegetation communities for the planning area. Regime guidelines for the reserve are given in Table 3.

Table 3. Fire regime guidelines for the planning area.

Vegetation type	Minimum interval	Maximum interval	Notes
Rainforest	N/A	N/A	Exclude all fire
Wet sclerophyll forest	25	60	Crown fires should be excluded
Semi-mesic grassy forest	10	50	
Shrubby dry sclerophyll forest	7	30	
Grassy sclerophyll woodland	5	40	

Source: Bradstock *et al.* (2003).

NPWS maintains cooperative arrangements with local Rural Fire Service brigades and surrounding landholders and is actively involved in the Clarence Valley BFMC.

Fire management will aim to maintain biodiversity principally by excluding fire from rainforest vegetation. Further, in adapted vegetation types the aim will be to encourage a pattern of mixed high, moderate and low intensity, frequency and extent of fire.

Chaelundi, Hardens, Mars, Foamy Creek and Hyland roads provide strategic fire breaks affording protection from fires entering the planning area from the north and west and will form the key fire advantages and access during fire incidents. Secondary management trails such as Perretts Trail, Old Hyland Road and Obeloe Road may also provide strategic fire breaks and access to vehicle water points during wildfire events.

Fire advantages that may assist in protection of the planning area from wildfire are listed in Table 4 and shown in Map 3.

Vista Point Lookout is currently maintained through hand clearing of vegetation combined with herbicide application. This lookout is an important fire spotting advantage that is part of a regional detection network incorporating Blackhole and Clouds Creek Fire Towers on nearby peaks. A viewing platform is planned for the Vista Point site to improve the function of the lookout for fire management purposes.

Table 4. Fire advantages for the planning area.

Feature	Fire advantage description	Function
Foamy Creek Road	Along north-western boundary of the nature reserve.	Constructed trail adjacent to natural barrier of rainforest that prevents fire entering the reserve from the northwest under most conditions.
Chaelundi Road	All weather Cat 1 suitable road along northern boundary and divides Foamy Creek addition from main reserve. Primary control line.	Main access road for the reserve and other reserves in the area, as well as Forests NSW operations. Main control line option for the northern boundaries of the planning area.

Feature	Fire advantage description	Function
Hardens Road	Along western boundary of the nature reserve.	Main access road for the reserve and others in the area. Main control option for western boundary of the planning area.
Mars Road	Link road between Hardens Road and Hyland Roads.	Prevents fire moving into the planning area from the south, along with Hyland Road forms main southern control line.
Hyland Road	Access road to southern parts of the planning area.	Provides access to southern parts of the planning area and forms southern control line.
Obeloe Road	Access road for private property and to the north eastern corner of the nature reserve.	Provides access to water point for vehicles at Obeloe Creek crossing (trail not maintained past this point)
Old Hyland Road	Runs north-south adjacent to the western boundary, outside the southern section of the planning area.	Provides access to southern areas of nature reserve and the SCA and provides a control line along western boundary of these areas.
Elks Road	Southern boundary trail for the SCA running east-west.	Access road to the SCA. Provides a southern control line to the SCA.
Hyland Creek	Forms natural boundary between the nature reserve and the SCA.	Vehicle water points at the crossing of Hyland Creek on both Hyland Road and Old Hyland Road.
Tower Trail and Mount Hyland Radio Tower	Private access road to the Hyland radio tower off Hardens Road.	Fire spotting location adjacent to tower.
Perretts trail	Internal management trail crossing southern section of Mount Hyland	Provides vehicle water point where trail crosses Perretts Creek. May be used as control line for low intensity wildfires or prescribed burns.
Hyland Creek Trail	Access road from Hyland Road down the eastern boundary of the southern section of the nature reserve.	Access to water point at Perretts Creek crossing and potential eastern control line for wildfires.
Blicks Trail	Internal trail providing access to the SCA and the dam.	Access within the SCA and a vehicle watering point.
Vista Point Lookout	Lookout point and day use area in the north of the planning area.	Provides a fire-spotting location for northern sections of the planning area and for the broader region in conjunction with Blackhole and Clouds Creek Fire Towers.
Mount Hyland SCA Dam	Dam located inside the SCA.	Provides vehicle water point for the SCA.
Rainforest vegetation	Large percentage of Mount Hyland Nature Reserve	Natural fire control lines limiting fire spread.

6. MANAGEMENT ISSUES AND STRATEGIES

Current Situation	Desired Outcomes	Strategies	Priority
6.1 SOIL AND WATER CONSERVATION Soils in the planning area are generally classed as having a moderate to high potential hazard for erosion. Disturbed areas include a disused quarry and occasional pig wallows. Soil disturbance regimes play an important role in the lifecycle of the endangered Dorrigo daisy. Water quality in streams within the planning area is very high. Several dams in the planning area are in poor condition. One dam which is in good condition is suitable for use in fire management	There is no evidence of increased soil erosion from visitor use and management activities. Soil disturbance regimes associated with road and trail maintenance are favourable to endangered species such as the Dorrigo daisy. There is no reduction in the water quality and health of watercourses in the planning area.	6.1.1 Undertake all works, such as trail maintenance and fire management, in a manner that minimises erosion and water pollution. 6.1.2 Carry out controlled soil disturbance along roadsides and other locations where the Dorrigo daisy occurs to intentionally favour regeneration of the species (refer to *Native plants and animals* and *Management operations*). 6.1.3 Promote the regeneration of native vegetation in disturbed areas to reduce erosion potential and sedimentation of waterways. 6.1.4 Prepare and implement a site rehabilitation plan for the quarry located on Chaelundi Road to minimise erosion (refer to *Management Operations and Other Uses*).	High High Medium Medium

Current Situation	Desired Outcomes	Strategies	Priority
6.2 NATIVE PLANT AND ANIMAL CONSERVATION There have been limited surveys in the planning area. The majority of the survey work has been undertaken in Mount Hyland SCA. Three threatened plant species and 23 threatened fauna species have been recorded. The NPWS and other DECC divisions are assisting with ongoing collaborative research to determine requirements for optimal recovery of the Dorrigo daisy (DEC 2004). Part of the planning area has been identified as one of the 10 proposed management sites for the Hastings River mouse (DEC 2005a).	There is no reduction in the diversity of native plants, animals or populations in the planning area, particularly significant species. There is an increased understanding and knowledge of the ecological needs and characteristics of plants and animals in the planning area. Conservation and corridor values of the planning area are enhanced by retention of vegetated areas on adjacent public and private land. Disturbed areas in the planning area, which are not required for management purposes, are rehabilitated.	6.2.1 Encourage or undertake plant and animal surveys and other research that increases knowledge of native plants and animals within the planning area, including their population dynamics, distribution and ecological needs (refer to *Fire management* and *Research and Monitoring*).	High
		6.2.2 Undertake targeted surveys for threatened plant species, particularly pepperbush (*Tasmannia* spp.), in the planning area to verify existing records.	Medium
		6.2.3 Continue to implement the Dorrigo daisy plant marker system and monitor the species recovery in conjunction with the University of New England and Forests NSW.	High
		6.2.4 Continue to assist in collaborative research to determine optimal disturbance regimes and management requirements for Dorrigo daisy and implement the findings of this research in management of the species.	High
		6.2.5 Survey and record the occurrence of cryptic forest twiner in the planning area to determine the population response to a bushfire that passed through the area in 2002.	High
		6.2.6 Mark roadside populations of cryptic forest twiner to assist in protecting the species from routine maintenance activities.	High
		6.2.7 Implement recommended management guidelines and assist in the implementation of monitoring protocols for the Hastings River mouse in accordance with the recovery plan.	High
		6.2.8 Implement relevant measures for other threatened species in accordance with the Priorities Action Statement and approved recovery plans.	High
		6.2.9 Work with Forests NSW, neighbours and the CMA to promote, support and encourage conservation of native vegetation.	Medium

Current Situation	Desired Outcomes	Strategies	Priority
6.3 INTRODUCED SPECIES A number of weed species have been recorded in the planning area, including Parramatta grass, blackberry, tobacco bush and fireweed. Weed infestations in the planning area have been assessed as a minor management issue. Pest animal species that have been recorded in the planning area include the red fox, wild pig, feral dog and feral cat. The reserve is listed under the RLP Act as a dingo management area. Sand pad monitoring was undertaken cooperatively with Forests NSW in accordance with the Fox TAP between 2002 and 2004. Cattle occasionally enter the planning area, particularly in the southern section of the nature reserve where there are no boundary fences in place or the fences are in poor condition.	Pest species are controlled and, where possible, eradicated. The impact of introduced species on native species and other planning area values is minimised. Control of introduced species has minimal impact on native species. Stray cattle do not enter the planning area.	6.3.1 Manage pest plants and animals in accordance with the Regional Pest Management Strategy. 6.3.2 Control introduced animal species. Priority fauna species include cats, foxes, pigs, feral dogs and cattle. 6.3.3 Use the findings from the sand pad monitoring to develop and implement a vertebrate pest control program for the planning area. 6.3.4 Undertake control programs in consultation with Forests NSW and neighbours. 6.3.5 Undertake an on-going weed control program for blackberry, Parramatta grass and fireweed. 6.3.6 Monitor the occurrence of noxious and significant environmental weeds in the planning area. Treat any outbreaks if they occur. 6.3.7 Liaise with Forests NSW to ensure that cattle running on adjoining land under Occupation Permits are prevented from entering the planning area. This may involve negotiating fencing agreements for relevant boundaries, modifications to conditions placed on Occupation Permits, or joint enforcement action. 6.3.8 Remove cattle from planning area and liaise with neighbours on exclusion options as required. 6.3.9 Assist in the preparation and implementation of a wild dog management plan in accordance with the RLP Act.	High High High High Medium Medium High Medium High

Current Situation	Desired Outcomes	Strategies	Priority
6.4 FIRE MANAGEMENT Records show that wildfires have generally only affected the drier ridgelines on the northern and western sides of Mount Hyland Nature Reserve. The southern parts of the planning area have seen more frequent fire due to the use of fire for grazing management prior to gazettal. Areas of rainforest have prevented the spread of larger scale fires through the planning area. The threat of unplanned fire is considered most likely to be from fires occurring on lands to the west and north of the planning area. Habitat for the Hastings River mouse is believed to be susceptible to impacts from inappropriate fire regimes (DEC 2005a). A viewing platform is planned for the Vista Point site to improve the function of the lookout for fire management purposes.	Life and property are protected from bushfire. Fire regimes are appropriate for conservation of plant and animal communities. Cultural features are protected from damage by fire.	6.4.1 Implement fire management strategies for the planning area. Where possible, exclude fire from the fire-sensitive communities and populations such as rainforest, cultural features and recently burnt areas. 6.4.2 Use prescribed fire to achieve a variety of fire regimes in appropriate vegetation types and maintain habitat suitable for species with specific requirements, such as the Hastings River mouse. 6.4.3 Undertake maintenance works on management trails and other fire trails as necessary to provide adequate access for fire management purposes (refer to Map 3 and *Management Operations*). 6.4.4 Continue to manage Vista Point Lookout as a joint purpose visitor facility and fire advantage, ensuring vegetation around the viewing area is kept clear for fire-spotting purposes. 6.4.5 Construct a viewing platform at Vista Point Lookout, which can be used for locating fire incidents. The platform design will allow for both public use and fire management operations. 6.4.6 Continue to participate in Clarence Valley Bush Fire Management Committee. Maintain coordination and cooperation with the Rural Fire Service's brigades and fire control officers, as well as neighbours with regard to fuel management and fire suppression. 6.4.7 Undertake or encourage appropriate research into the response of the Hastings River mouse population to wildfire in the planning area.	High High High High Medium High High

Current Situation	Desired Outcomes	Strategies	Priority
6.5 CULTURAL HERITAGE No comprehensive surveys have been undertaken within the planning area for sites of Aboriginal or non-Aboriginal cultural significance. Whilst no Aboriginal sites have been recorded in the planning area, a number of sites have been recorded on land nearby. The cremated remains of a former owner of the area, Jessie Cotmore, have been scattered in the reserve. The site is marked by a fenced white cedar tree.	Cultural features are conserved and managed in accordance with their significance. Aboriginal heritage values are protected in partnership with the local Aboriginal community.	6.5.1 Work with the local Aboriginal community, the relevant Local Aboriginal Land Councils and knowledge holders to identify and manage Aboriginal cultural heritage sites, places and values. 6.5.2 Develop and implement management strategies for the protection of any significant cultural and historic heritage values recorded in the planning area in consultation with stakeholders. 6.5.3 Undertake or encourage appropriate research into historic heritage values in the planning area (refer to *Research and Monitoring*). 6.5.4 Retain the white cedar tree and fence marking the site of the scattered remains of a former Mount Hyland resident within the reserve. Do not permit any further memorial trees.	High Medium Low Medium

Current Situation	Desired Outcomes	Strategies	Priority
6.6 VISITOR ACCESS AND USE Public vehicle access to the planning area is by Chaelundi and Sheepstation Creek Roads in the north, or from Hardens and Hyland Roads in the south (see Map 2). Public vehicle access is restricted within the planning area due to the potential for soil erosion and damage to plants and animal habitat. Activities such as horse riding, trail bike riding and four-wheel driving have the potential to impact upon the values in the planning area and conflict with other users. The nature reserve receives low levels of visitation, with visitor nodes at the Mount Hyland Picnic Area and Walking Track, and at Vista Point Lookout and Picnic Area. There is low key interpretive signage in these areas and a visitors' book at Mount Hyland. Use of the planning area must be carefully managed since it contains relatively small areas of habitat important for threatened species. Part of the planning area is included in the Gondwana Rainforests World Heritage property and this status is promoted to visitors through interpretive signage, under the property's previous name of the Central Eastern Rainforest Reserves of Australia. There are currently no commercial tour operations within the planning area.	The local community and visitors understand the values of the planning area and support management programs. Visitor use is low-key, self-reliant and ecologically sustainable. Educational opportunities are provided, consistent with the values of the planning area. Promotion of community understanding and appreciation of the conservation values of the planning area minimises damaging activities and maximises visitor enjoyment. Visitor facilities and recreational activities are managed to minimise environmental damage.	6.6.1 Allow low-impact, nature-based activities such as bushwalking, nature appreciation and cycling along established management trails within the planning area. 6.6.2 Restrict public vehicle access from the management trail system. 6.6.3 Install reserve identification signage at the boundary on Hardens Road. Install regulatory and reserve boundary signage at Old Hyland Road and Elks Road and where Obeloe Road enters the planning area (see Map 2). 6.6.4 Permit organised group visits, subject to limits on numbers and other conditions if necessary to minimise impacts. Limit group sizes to 10 persons. 6.6.5 Prohibit camping and horse riding in the planning area. 6.6.6 Maintain the picnic facilities and interpretive signage at Mount Hyland Picnic Area and Vista Point Lookout to the current level. Additional facilities will not be provided. 6.6.7 Maintain the interpretive signage and visitors book on Mount Hyland Walking Track and replace as required. 6.6.8 Update World Heritage interpretive signage at Vista Point Lookout, to reflect the change in property name and also if additions are made to the property. 6.6.9 Regularly inspect the planning area to detect any impacts from visitor use and implement measures to reduce any unacceptable impacts. 6.6.10 Commercial tour operations will not be permitted in the planning area with the exception of groups at Vista Point Lookout. Tours will be subject to conditions on group size, and will be managed to protect reserve values and minimise conflict with other users.	Medium High Medium Medium High Medium Medium Medium Medium High

Current Situation	Desired Outcomes	Strategies	Priority
6.7 RESEARCH AND MONITORING Vegetation community surveys and a number of targeted surveys for threatened species have been undertaken in the planning area. The majority of fauna survey work in the planning area has been undertaken in the SCA. Research being undertaken in or proposed for the planning area includes: • ongoing studies into the management requirements of Dorrigo daisy (DEC 2004); • fox population monitoring associated with the NSW Fox Threat Abatement Plan; and • Hastings River mouse surveys and habitat assessment (DEC 2005a). The Priorities Action Statement includes other monitoring activities for threatened species.	Research enhances the management information base and has minimal environmental impact. Scientific study improves understanding of the natural and cultural heritage values of the planning area, the processes that affect them and the requirements for management of particular species.	6.7.1 Undertake or encourage appropriate research to improve knowledge and management of natural and cultural heritage (refer to *Native plants and animals*, *Cultural heritage*, *Introduced species* and *Fire management*). 6.7.2 Continue monitoring feral cats, wild dogs and foxes and incorporate results into strategic control programs. 6.7.3 Continue surveys and monitoring of threatened plants and animals in the planning area and surrounding landscape to assist in their management. 6.7.4 Monitor the response of species and vegetation communities to fire events within the planning area to gain a better understanding of the impacts of fire.	Medium High Medium Low
6.8 MANAGEMENT OPERATIONS AND OTHER USES A number of management trails and park roads provide access within the planning area. Vista Point Lookout is a fire observation post which is also popular as a visitor	Management facilities adequately serve management needs and have acceptable impact.	6.8.1 Maintain roads and trails to be retained for management purposes (see Maps 1 and 2). Close and rehabilitate all other roads and trails. 6.8.2 Gate management trails where they enter the planning area to prevent unauthorised vehicle access and prevent domestic livestock entering the planning area (see Map 2). 6.8.3 Maintain Mount Hyland Walking Track to Class 3 standard (Standards Australia 2001). This may involve tree and branch	High Medium Medium

Current Situation	Desired Outcomes	Strategies	Priority
lookout. An environmental impact assessment has been completed for development of a fire viewing platform facility at the existing lookout. The proposed platform will function as both a fire observation platform for land managers and a viewing platform for park visitors. A trig station predating gazettal of the reserve is located on the southernmost peak of Mount Hyland and is accessed from the Mount Hyland Walking Track. The trig station has not been maintained for a number of years. A disused quarry exists in the northern section of the reserve. The majority of the planning area's boundary is fenced to a stock-proof standard with the exception of the southern portion of the nature reserve. Occasionally, stock from adjoining land enter the planning area. The boundary in this area follows a tributary of Hyland Creek and would be difficult to fence. Disused cattle stockyards are located on the eastern boundary of the reserve. The tenure of state conservation area allows for mining activity, although there are no current mineral exploration licences or mining interests in the area.		removal/ trimming; cutting and filling to restore and maintain the natural track surface; removal and replacement of outdated or damaged trackside interpretive signage; and maintaining the visitor book. 6.8.4 Construct a fire observation platform at Vista Point Lookout. 6.8.5 Maintain the road to Mount Hyland Picnic Area to unsealed two-wheel drive dry-weather standard. 6.8.6 Replace bollards demarking the parking area at Mount Hyland Picnic Area. 6.8.7 Permit maintenance of the Mount Hyland trig station site (see Map 2) in accordance with any environmental protection conditions imposed in relation to site access and vegetation removal. 6.8.8 Remove existing stockpiles of gravel and close public vehicle access to the quarry on Chaelundi Road. 6.8.9 Prepare and implement a quarry rehabilitation plan for the Chaelundi Road quarry site (refer to *Soil and water conservation*). 6.8.10 Maintain a photographic record of and disengage the stockyards on the eastern boundary of the nature reserve, and allow the timber yards to deteriorate naturally. 6.8.11 Applications for mining or mineral exploration in the state conservation area will be subject to environmental assessment in accordance with the Memorandum of Understanding between NPWS and DPI Minerals.	 Medium Medium Low Medium Medium Medium Low High

Current Situation	Desired Outcomes	Strategies	Priority
6.9 CONSERVATION STATUS, ZONING AND GAZETTAL Part of the planning area is world heritage listed. Gazetted additions to Mount Hyland Nature Reserve contain rainforest vegetation that may make these areas suitable for nomination as an addition to the existing Gondwana Rainforests World Heritage Property. Most of the reserve is zoned 8(a) Existing National Parks and Nature Reserves. However, additions to the reserve system within the planning area have not yet been rezoned to reflect the gazetted land tenure. Mining and mineral exploration were excluded from the former Blicks River Flora Reserve in 1984. Its subsequent gazettal as the SCA has potentially re-opened the area for mineral exploration. An unformed Crown public road links Hyland Road with Mount Hyland Picnic Area. The road reserve is excluded from the nature reserve, but has not been cleared and is in a relatively natural state. The road reserve is not needed for access and is unlikely to be required for any other purpose.	Additions to the reserve are assessed for World Heritage values and appropriately classified. The planning area is appropriately zoned under the relevant Local Environmental Plan and given the appropriate classification under the NPW Act. Surplus Crown road reserves excluded from the planning area are added to the planning area if not required for another purpose.	6.9.1 Work with the Commonwealth Government to nominate recent additions to the nature reserve for formal inclusion in the Gondwana Rainforests World Heritage Property. 6.9.2 Liaise with Clarence Valley Council to ensure the planning area is zoned appropriately in the revised LEP. 6.9.3 Seek the agreement of the Department of Primary Industries (Minerals) to add the SCA to the nature reserve. 6.9.4 Negotiate with the NSW Department of Lands to add the unformed road reserve leading from Hyland Road to Mount Hyland Picnic Area to the nature reserve.	Medium Medium Medium Low

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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