

**IRONBARK NATURE RESERVE AND  
BORNHARDTIA VOLUNTARY CONSERVATION AREA  
PLAN OF MANAGEMENT**

**NSW National Parks and Wildlife Service**

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

**July 2004**

**This plan of management was adopted by the Minister for the Environment on 20 July 2004.**

Inquiries about this plan of management for Ironbark Nature Reserve and Bornhardtia VCA should be directed to the Ranger at the Armidale Area Office, 85 Faulkner Street, ARMIDALE, or by telephone on 02 6776 0000.

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## FOREWORD

Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area are located on the north-western slopes of the New England Tablelands, 85 km north of Tamworth and 75 km west of Armidale.

Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area protect significant remnants of dry open forest and woodland in a landscape of substantially cleared or altered pastoral land. They are significant as a region of overlap between Tablelands and western slopes communities and species. Flora surveys in Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area have identified 30 species of regional significance and ten species of state or national significance.

Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area also support a diversity of native fauna. Surveys have identified 115 bird, 33 mammal and 44 reptile/amphibian species within Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area.

The *National Parks and Wildlife Act 1974*, requires that a plan of management be prepared for each nature reserve. A plan may be prepared for a conservation area with the consent of the owner of the property. A plan of management is a legal document that outlines how the area will be managed in the years ahead.

A draft plan of management for Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area was placed on public exhibition from 6 December 2002 until 28 February 2003. The exhibition of the plan of management attracted 3 submissions that raised 4 issues. All submissions received were carefully considered before adopting this plan of management. The owner of Bornhardtia Voluntary Conservation Area has given his consent to the adoption of this plan of management.

The primary emphasis of this plan is the conservation of the natural and cultural values of Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area. Public access to Ironbark Nature Reserve for nature appreciation will continue, however, there is no public access to Bornhardtia Voluntary Conservation Area which is private land.

This plan of management establishes the scheme of operations for Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area. In accordance with sections 76 and 78A of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

**BOB DEBUS**

**MINISTER FOR THE ENVIRONMENT**

## **1. NATURE RESERVES AND AREAS SUBJECT TO CONSERVATION AGREEMENTS IN NEW SOUTH WALES**

The management of nature reserves and areas subject to conservation agreements in NSW is in the context of the legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). The policies arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication. Other legislation, international agreements and charters may also apply to management of the area.

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

Under the Act, nature reserves are managed to:

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

Under the NPW Act, a voluntary conservation agreement for an area may be entered into with a landholder:

- (a) in relation to areas containing scenery, natural environments or natural phenomena worthy of preservation,
- (b) in relation to areas of special scientific interest,
- (c) in relation to areas that are the sites of buildings, objects, monuments or events of national significance,
- (d) in relation to areas in which relics, or Aboriginal places, of special significance are situated,
- (e) for the purpose of the study, preservation, protection, care or propagation of fauna or native plants or other flora,
- (f) for the purpose of the study, preservation, protection or care of Karst regions,
- (g) for the purpose of the conservation of critical habitat or the conservation of threatened species, populations or ecological communities, or their habitats, or
- (h) for any purpose connected with an area or purpose referred to in paragraph (a), (b), (c), (d), (e), (f) or (g).

Voluntary conservation agreements provide landholders with a way to make a practical contribution to the conservation of the State's natural and cultural heritage. The aim of an agreement is to conserve the natural, cultural and or scientific values of all or part of the land owned or managed by the landholder by agreed management. Agreements are registered on the title of the land and are binding on the owner and future owners of the land.

## **2. IRONBARK NATURE RESERVE AND BORNHARDTIA VOLUNTARY CONSERVATION AREA**

### **2.1 LOCATION, GAZETTAL AND REGIONAL SETTING**

Ironbark Nature Reserve (referred to herein as the 'nature reserve' or 'reserve') and Bornhardtia Voluntary Conservation Area (referred to herein as the 'VCA') are located on the north-western slopes of the New England Tablelands, 85 km north of Tamworth and 75 km west of Armidale. The location of the nature reserve, VCA, nearby areas managed by the NPWS, and nearby towns are shown in figure 1.

The nature reserve and VCA lie in a region of overlap between the New England Tableland and Nandewar bioregions (a bioregion is an area defined by a combination of repeated biological and geographic criteria, rather than geopolitical considerations). The nature reserve is one of a number of small, isolated reserves lying in this zone of overlap.

The nature reserve is approximately 1603 ha and was dedicated in two stages in 1985 and 1988. The voluntary conservation agreement was signed by the Bornhardtia owners and Minister for the Environment in 2001. The VCA, exclusive of reserved roads and areas for dwellings, is approximately 700 ha. The nature reserve was vacant crown land prior to gazettal and the VCA is private land.

The nature reserve and VCA lie within Barraba Shire. Much of the surrounding land has been cleared and is used for grazing and other rural activities.

This plan applies both to the land currently reserved as Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area and to any future additions to the nature reserve. Where management strategies or works are proposed for the nature reserve or any additions that are not consistent with this plan, an amendment to the plan will be required.

### **2.2 LANDSCAPE CONTEXT**

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

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

## 2.3 NATURAL AND CULTURAL HERITAGE

### Landform, Geology and Soils

The nature reserve and VCA encompass an eastern spur of the Nandewar Range. Elevations range from approximately 680 to 1020 m above sea level. The nature reserve is characterised by west and south-western facing slopes ranging between 5-40%. The VCA is characterised by west and north-western facing slopes of similar degree. Drainage flows west into Long Swamp Creek, Spencers Creek and Bald Rock Swamp Creek, which are in the upper reaches of the Namoi River catchment, a sub catchment of the Murray-Darling River system.

The nature reserve and VCA lie on Bundarra granite, a geological formation that extends in a narrow band averaging 20km wide from near Bendemeer to the Queensland border, forming a distinctive north-south trending ridge across the region. These granites are characteristically coarse grained and have been classified as undifferentiated leucoadamellite (Hunter, 1999). Weathering and erosion have exposed massive granite bedrock sheets and tors that are distinct landscape features throughout the area. Ironbark Nature Reserve, Stony Batter Creek Nature Reserve, Watsons Creek Nature Reserve and Warrabah National Park are the only reserves within the bioregion that lie on this geology.

Soils within the nature reserve and VCA are characteristically coarse granite-based soils, with patches of alluvium/colluvium along Bald Rock Swamp Creek, Spencers Creek and Long Swamp Creek valleys. Some basalt-derived soils are located in a small pocket of the south-west corner of the nature reserve.

### Native Flora

The nature reserve and VCA protect significant remnants of dry open forest and woodland in a landscape of substantially cleared or altered pastoral land. They are significant as a region of overlap between Tablelands and western slopes communities and species. The nature reserve and VCA contribute to the protection of dry open forest and woodland in both the Nandewar and New England Tableland bioregions.

Since European settlement, over 60% of native vegetation within the Nandewar bioregion has been cleared (Pressey, Hager, Ryan, Schwarz, Wall, Ferrier and Creaser, 2000). Less than 2% of the vegetation within the bioregion is protected within the system of NPWS reserves. Nationally agreed criteria specify that for vegetation communities that have sustained a reduction in area of 50% or more since European settlement, 30% of the remaining area should be reserved within the conservation estate to minimise loss of biodiversity (Commonwealth of Australia, 1995 & 1997).

Within the eastern half of the Nandewar bioregion, approximately 250 000 ha of dry open forest remains. Of this, less than 1.5% (3400 ha) is protected within the conservation estate. The nature reserve and VCA form over 65% of this conserved area.

A total of 477 species of plants have been recorded in the nature reserve and the VCA (Hunter 2002). The most common species is barbed wire grass (*Cymbopogon*

*refractus*), the second most common species is a tree, black cypress (*Callitris endlicheri*) and the common cassinia (*Cassinia quinquefaria*) was the third most common species overall. Of the 28 common species of the nature reserve and VCA, 14 were herbs, seven of which were grasses and eight were shrub species.

Across the nature reserve and the VCA, the understorey, in terms of grasses, is characterised by barbed wire grass (*Cymbopogon refractus*), silvertop wallaby grass (*Joycea pallida*), threeawn speargrass (*Aristida vagans*) and shorthair plumegrass (*Dichelachne micrantha*). The overstorey is characterised by the dominance of black cypress (*Callitris endlicheri*) with a subordinate mix of *Eucalyptus macrorhyncha*, *E. prava*, *Angophora floribunda*, and *E. cayleyi*. The shrub layer generally was characterised by common cassinia (*Cassinia quinquefaria*), beard heath (*Leucopogon muticus*), guinea flower (*Hibbertia obtusifolia*) and bush pea (*Pultanaea* sp. G).

Flora surveys in the nature reserve and VCA have identified 30 species of regional significance and ten species of state or national significance, including the endangered *Homoranthus bornhardtensis* and *Monotaxus macrophylla* and the vulnerable *Goodenia macbarronii* listed under the TSC Act (Hunter, 2002 & Hunter, 2003 pers com.). In total 39 species (9%) of the species in the area were found to be of conservation significance.

White box (*E. albens*), yellow box (*E. melliodora*) and Blakely's red gum (*E. blakelyi*) woodland with a grassy understorey, which occurs throughout the nature reserve and VCA, is listed as an endangered ecological community under the TSC Act. In addition, grassy white box woodland is listed as endangered under the Commonwealth *Environmental Planning and Biodiversity Conservation Act 1999*.

## **Native Fauna**

The forest, woodland and riparian ecosystems of the nature reserve and VCA support a diverse vertebrate fauna. Surveys have identified 115 bird, 33 mammal and 44 reptile/amphibian species within the nature reserve and VCA (NPWS, undated and NPWS, 2001a).

The nature reserve and VCA have importance for a suite of vertebrate species, both in isolation and as part of the broader landscape. The extensive stands of mugga ironbark (*Eucalyptus sideroxylon*) and Caley's ironbark (*Eucalyptus caleyi* subsp. *caleyi*) within the nature reserve and VCA provide habitat and nectar resources for a suite of declining woodland bird species. The exfoliating granite outcrops provide habitat for many endemic reptile species such as the border thick-tailed gecko (*Underwoodisaurus sphyrurus*). The nature reserve and VCA are large enough to support sustainable populations of a diverse range of terrestrial and arboreal mammals, and to provide habitat resources to sustain larger mammals in conjunction with surrounding forested areas. Many of the vertebrate species recorded within the nature reserve and VCA have disappeared from large areas of the western New England Tablelands.

The endangered regent honeyeater (*Xanthomyza phrygia*) has recently been recorded on the VCA and could be expected to utilise the nature reserve. The nature reserve and VCA are within a recognised core breeding area of this species.

There are records within the nature reserve and VCA for 12 vulnerable species, including 5 birds, 6 mammals and 1 reptile. The nature reserve and VCA appear to hold

a significant population of the border thick-tailed gecko (*Underwoodisaurus sphyrurus*) (NPWS, 2001). The squirrel glider (*Petaurus norfolcensis*) has recently been recorded on the VCA. This record is highly significant as it represents a new locality for this vulnerable species. Neighbours to the nature reserve have also reported sightings of the koala (*Phascolarctos cinereus*) which is also a vulnerable animal.

A new species of snail, *Camaenidae* NE 24, has also recently been discovered on the VCA (NPWS, 2001a).

Other declining or significant species recorded in the nature reserve and VCA include Verreaux's skink (*Anomalopus verreauxii*), the yellow-tufted honeyeater (*Lichenostomus melanops*), striped honeyeater (*Plectorhyncha lanceolata*), spotted quail-thrush (*Cinclosoma punctatum*), brown toadlet (*Pseudophryne bibronii*) and the thick-tailed gecko (*Underwoodisaurus millii*), which is close to the easternmost limit of this species.

### **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 nature reserve and VCA lie within the territory of the Gamilaroi people. The Gamilaroi people are associated with land west of the Great Dividing Range roughly between Murrurundi and the Queensland border (Tindale 1974). It is believed that the Gamilaroi were culturally associated with the Wiradjeri group who occupied the plains country east of the Darling River (Allen, undated).

There is evidence of Aboriginal occupation both within and adjacent to the nature reserve and VCA. An extensive stone arrangement and a habitation site have been recorded in the nature reserve, and anecdotal evidence suggests that there may be more unrecorded sites within the nature reserve (NPWS, 1996). Two other habitation sites have also been located, one within, and one immediately adjacent to, the eastern boundary of the VCA.

A rock shelter with art has also been recorded within 1 km of the eastern boundary of the nature reserve. There is contemporary Aboriginal interest in the VCA with the location being used for the filming of the movie "The Chant of Jimmy Blacksmith".

The nature reserve and VCA fall within the area of the Tamworth Local Aboriginal Land Council.

### **History since European Occupation**

The first European to visit the New England region in 1818 was John Oxley. European squatters began to occupy land within the next 20 years, which included the area in the vicinity of the nature reserve. Permanent stock runs were established in the area by the mid 1830s (Harris, 1982).

Prior to gazettal in 1985 and 1988, the nature reserve was vacant crown land and had been used for grazing under lease. Whilst some minor timber extraction has occurred in the nature reserve no major logging operations are known. Remains of stockyards and fences have been noted within the nature reserve, but not formally recorded.

The VCA was used for grazing and light timber extraction, but grazing is no longer permitted within the VCA as part of the terms of the agreement. Remains of a sheep pen and race are located near the eastern boundary gate.

## **2.4 RESEARCH AND EDUCATION**

Research can provide information to assist reserve management by the NPWS. John Hunter (owner of the VCA) has recently completed an extensive flora study on the nature reserve and VCA titled 'Vegetation and floristics of Ironbark Nature Reserve and Bornhardtia Voluntary Conservation Area' (August 2002). Further to this research, the nature reserve provides opportunities for local tertiary institutions.

The owners of the VCA have also established a scholarship to assist and encourage research within the VCA.

## **2.5 VISITOR USE**

There are no visitor facilities in the nature reserve. There is evidence of a low level of visitation and anecdotal evidence of illegal activity including hunting within the nature reserve. Access to the nature reserve is largely restricted by private land. A public road (Linton Rd) adjoins the north-eastern boundary of the nature reserve, providing limited public access to a small part of the nature reserve at this point. A reserve identification sign is located within the nature reserve immediately adjacent to Linton Road.

Extensive visitor facilities are located within 80 kms of the nature reserve in Oxley Wild Rivers National Park at Dangars Falls and Gara Gorge, and within 60 kms in Warrabah National Park.

The VCA is private property and as such, public access is prohibited without prior consent of the owners. Vehicles entering the VCA must remain on formed management trails. Horse riding is not permitted in the VCA.

## **2.6 THREATS TO RESERVE VALUES**

### **Introduced Plants**

A total of 41 weed species have been identified within the nature reserve and VCA (Hunter, 2002), with the following four considered to be notable or potential problems: blackberry (*Rubus fruticosus*), sweet briar (*Rosa rubiginosa*), prickly pear (*Opuntia spp.*) and tiger pear (*Opuntia aurantiaca*). Annual control programs have decreased the distribution and occurrence of these weeds within the nature reserve and VCA. The proximity of the nature reserve and VCA to areas with introduced plants allows weed species the opportunity for ongoing and recurrent invasion.

The largest potential threat to the native grasses in the nature reserve and VCA is the possibility for the introduction of coolatai grass (*Hyparrhenia hirta*). This is a highly invasive introduced grass with the potential to replace all native grasses and ground

cover plants within the invasive introduced grass with the potential to replace all native grasses and ground cover plants within the nature reserve and VCA. This grass is currently found along road verges 10 kms north of the nature reserve. The major activities which increases the general distribution of this grass is road construction and maintenance, and the movement of cars, cattle and sheep which have inadvertently picked up seed from the edges of roads where the grass is located.

### **Introduced Animals**

Foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), pigs (*Sus scrofa*), goats (*Capra hircus*) and deer have been recorded in the nature reserve and VCA. Other vertebrate pests such as hares (*Lepus capensis*) and feral cats (*Felis catus*) may occur within the nature reserve and VCA. These species can prey on native fauna and competitively exclude native wildlife. There have been reports from surrounding landholders of losses of stock from wild dog attacks.

### **Fire**

The effects of fire on the biota of the nature reserve and VCA remain unclear. An inappropriate burning regime or wildfire may contribute to a loss of biodiversity within the nature reserve. Fire could also damage fences and threaten neighbouring land. Fires do occur through natural causes such as lightning, and may spread into the nature reserve and VCA from neighbouring land.

The fire history of the nature reserve prior to gazettal is unknown. However, the presence of fire sensitive species such as cypress pine (*Callitris endlicheri*), and a lack of evidence of fire suggests that most of the nature reserve and VCA have experienced a low fire frequency. The presence of blady grass (*Imperata cylindrica*) along flatter areas adjacent to major creeks suggests that fire had been used as a pasture management tool prior to the area becoming a nature reserve.

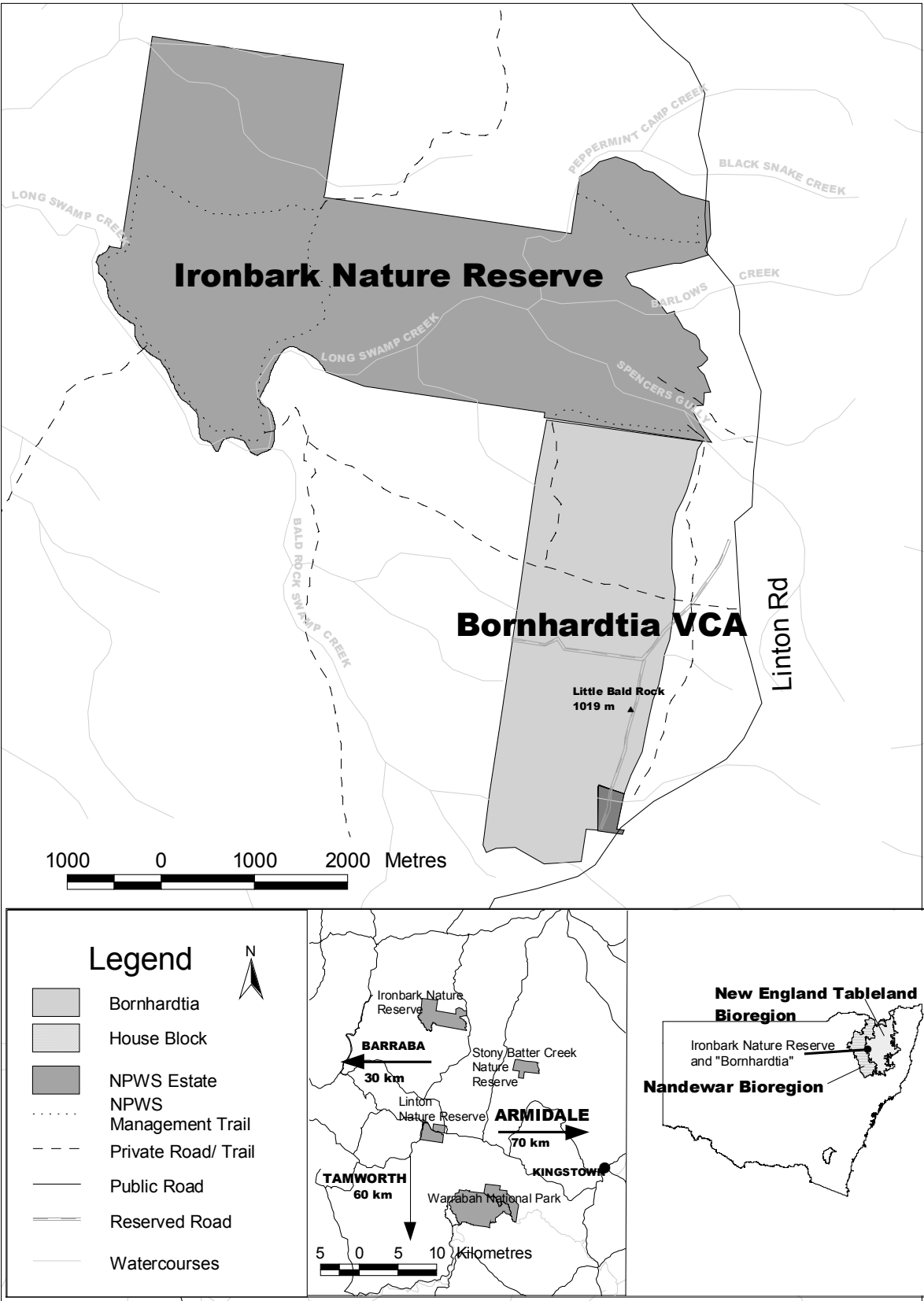
Since gazettal there have been six fires within the nature reserve, three of which had origins on adjoining land. In May 2002, a fire burned 180 ha of the north-west section of the nature reserve adjacent to the western boundary. In September 2001, a fire burned 120 ha of the north section on the western side of the nature reserve. A fire burned 50 ha of the north-eastern section of the nature reserve in August 1999. Two fires occurred on the north-western boundary in 1989 and 1997, each burning less than 20 ha and both believed to be caused by lightning strikes. The central area of the nature reserve was subject to a small fire in 1994, also believed to be caused by lightning.

### **Isolation and Fragmentation**

Clearing of vegetation within the bioregion has resulted in a high loss of biodiversity and fragmentation of habitat. Long term conservation of biodiversity both within the bioregion, the nature reserve and VCA depends upon the protection, enhancement and connection of remaining habitat across the landscape, involving vegetation remnants on both public and private lands.

The nature reserve and VCA together are small in size compared to the unreserved surrounding area. It is important therefore to consider the nature reserve and VCA in the context of surrounding remnant vegetation. Nearby vegetated areas consolidate the habitat values of the nature reserve and provide ecological corridors to other surrounding forested areas.

Figure 1: Ironbark Nature Reserve and Bornhardtia VCA



### 3. MANAGEMENT ISSUES AND STRATEGIES

Current Situation	Desired Outcomes	Strategies	Priority
Soil conservation			
The soils of the nature reserve and VCA are easily eroded when disturbed.	<ul style="list-style-type: none"> <li>Soil erosion is minimised.</li> </ul>	<ul style="list-style-type: none"> <li>Management trails in the nature reserve will be maintained to appropriate standards (refer to <i>Management Operations</i> below).</li> <li>Ensure any ground disturbance works are undertaken in a manner that minimises erosion and water pollution.</li> <li>Monitor gully erosion along ephemeral creeks and instigate control measures if necessary.</li> </ul>	High
Management trails and ephemeral creeks are specific areas where soil erosion can be a problem.			High
			Medium
Native plant and animal conservation			
The nature reserve and VCA together is one of the few conserved areas on the New England Tablelands that provide resources and habitat for woodland fauna species in a landscape of substantially cleared grazing land.	<ul style="list-style-type: none"> <li>All native plant and animal species and communities are conserved and enhanced where possible.</li> </ul>	<ul style="list-style-type: none"> <li>Work with relevant neighbours, Landcare groups, local Citizens' Wildlife Corridors groups, vegetation management committees and others to encourage conservation of remnant native vegetation in the vicinity of the reserve and VCA and to identify potential wildlife/ habitat corridors to link to other remnant native vegetation areas.</li> <li>Encourage and assist the development of voluntary conservation agreements where appropriate for protection of conservation values on adjacent lands.</li> <li>Continue to work with the local community to preserve and protect regent honeyeaters.</li> <li>Encourage and undertake surveys for rare, threatened or endangered species, populations and ecological communities as appropriate and manage in accordance with the TSC Act.</li> <li>Rehabilitate cleared areas within the nature reserve by monitoring and controlling weeds, encouraging natural regeneration and, where necessary, supplement with native plantings.</li> </ul>	High
Long term conservation of the plant and animal species to be found on these areas would benefit from the retention of remaining vegetation on neighbouring properties and roadsides.			High
Cleared areas within the nature reserve decrease reserve habitat values and potentially increase the prevalence of weeds.			High
			Medium
			Low

Current Situation	Desired Outcomes	Strategies	Priority
Introduced species			
<p>All weeds in the nature reserve are subject to ongoing control programs in accordance with the regional Pest Management Strategy and individual pest management control plans.</p> <p>A systematic survey for weeds in the nature reserve and VCA has not been undertaken.</p> <p>The small size of the nature reserve and VCA, together with the proximity to other areas with introduced plants allows weed species the opportunity for ongoing invasion.</p> <p>Foxes, rabbits, deer, goats and pigs occur in the nature reserve. Hares, cats and rabbits may also occur within the nature reserve.</p> <p>Domestic stock (sheep &amp; cattle) sometimes enter the nature reserve and VCA.</p>	<ul style="list-style-type: none"> <li>Introduced species are controlled and where possible eradicated.</li> </ul>	<ul style="list-style-type: none"> <li>Control and where possible eradicate introduced plants and animals from both the nature reserve and VCA.</li> <li>Develop and implement a program to monitor the presence and distribution of introduced species in the nature reserve and VCA, particularly Coolatai grass.</li> <li>Undertake integrated weed control programs in liaison with the New England Weeds Authority.</li> <li>Undertake regular integrated feral animal control programs with Armidale Rural Lands Protection Board, Landcare groups, neighbours and others.</li> <li>Work with neighbours to ensure domestic stock do not enter the nature reserve or VCA (refer to <i>Management Operations</i>).</li> </ul>	<p>High</p> <p>High</p> <p>Medium</p> <p>Medium</p> <p>Low</p>

Current Situation	Desired Outcomes	Strategies	Priority
Fire Management			
Fire management strategies are yet to be prepared for the nature reserve and VCA.	<ul style="list-style-type: none"> <li>Persons and property are protected from bushfire.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare and implement fire management strategies for the nature reserve and VCA.</li> </ul>	High
The effects of fire on the biota of the nature reserve and VCA remain unclear. However, frequent or regular fire can cause loss of particular plant and animal species and communities. Fire can also damage cultural features and fences and threaten neighbouring land.	<ul style="list-style-type: none"> <li>Fire regimes are appropriate for conservation of plant and animal species and communities.</li> </ul>	<ul style="list-style-type: none"> <li>Participate in district Bush Fire Management Committees.</li> </ul>	High
	<ul style="list-style-type: none"> <li>Identified cultural heritage features are protected from damage by fire.</li> </ul>	<ul style="list-style-type: none"> <li>Maintain coordination and cooperation with Rural Fire Service brigades, Council fire control officers and neighbours with regard to fuel management and fire suppression.</li> </ul>	High
Small fires have occurred within the nature reserve during 2002, 2001, 1999, 1994 and 1989. The fire history of the VCA is unknown.	<ul style="list-style-type: none"> <li>Unscheduled fires leaving or entering the nature reserve or VCA are controlled.</li> </ul>	<ul style="list-style-type: none"> <li>As far as possible, a fire free interval of at least 10 to 15 years will be maintained in all dry sclerophyll forest types within the nature reserve and VCA.</li> </ul>	High
	<ul style="list-style-type: none"> <li>All of the nature reserve and VCA together is not burnt in a single wildfire event.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage further research into appropriate fire regimes for the nature reserve and VCA.</li> </ul>	Medium
		<ul style="list-style-type: none"> <li>Prescribed fire will only be used to achieve fire regimes appropriate for maintenance of habitat in accordance with the fire management plan.</li> </ul>	Medium
		<ul style="list-style-type: none"> <li>Prepare agreements with neighbours for access to water sources during fire emergencies.</li> </ul>	Medium
		<ul style="list-style-type: none"> <li>Prohibit camp fires and other unauthorised fires in the nature reserve to remove a potential ignition source for fires (refer to <i>Visitor Use</i> below).</li> </ul>	Medium

Current Situation	Desired Outcomes	Strategies	Priority
Cultural heritage			
<p>Substantial evidence of Aboriginal occupation has been found both within and adjacent to both the nature reserve and VCA.</p> <p>An archaeological survey has recently been conducted within the nature reserve and VCA. Three sites have been formally recorded and two others have been identified (NPWS, 1996 and G. Stone, pers. comm).</p> <p>A recorded art site exists within 1 km of the eastern boundary of the nature reserve.</p> <p>Although a number of sites have been located within and adjacent to both the nature reserve and VCA, little is known about traditional Aboriginal use and values.</p> <p>Little is known about the European history of the nature reserve or VCA.</p>	<ul style="list-style-type: none"> <li>Cultural heritage values of the nature reserve and VCA are identified and protected.</li> </ul>	<ul style="list-style-type: none"> <li>Consult the local Aboriginal community, traditional groups and the Tamworth Local Aboriginal Land Council about Aboriginal sites, places and other values in the nature reserve and VCA.</li> <li>Precede all ground disturbance work with a check for cultural features.</li> <li>Involve the local Aboriginal community in any works affecting Aboriginal sites and in any interpretation of Aboriginal values.</li> <li>Encourage surveys and research into the cultural heritage values of the nature reserve and VCA.</li> </ul>	<p>High</p> <p>Medium</p> <p>Medium</p> <p>Low</p>

Current Situation	Desired Outcomes	Strategies	Priority
Visitor use			
There is limited public access to the nature reserve on the north-eastern boundary where the nature reserve adjoins Linton Rd. There is no public access to the remainder of the nature reserve as the reserve is surrounded by private property.	<ul style="list-style-type: none"> <li>The local community is aware of the values of the nature reserve and VCA and of management programs.</li> </ul>	<ul style="list-style-type: none"> <li>Promote community understanding and appreciation of the conservation values of the nature reserve and VCA through contact with neighbours, community organisations and media releases, NPWS <i>Discovery</i> programs and interpretive material as necessary.</li> <li>Permit use of the nature reserve for passive appreciation activities (walking, bird watching and nature study). Other recreation activities that do not comply with passive recreation (as outlined above) will not be permitted in the nature reserve.</li> <li>Public vehicle use (including trail bikes), horse riding, and camping will not be permitted in the nature reserve or VCA.</li> <li>Private or NPWS vehicles entering the VCA must remain on formed management trails.</li> <li>Liaise with neighbours to detect illegal activities.</li> </ul>	Medium
There is no public access to the VCA which is private land. Prior consent from the owner is necessary to access the VCA.			Medium
No facilities exist within the nature reserve.			Medium
Other areas of NPWS estate nearby provide visitor facilities and recreation opportunities.			Medium
Public use of the nature reserve must be carefully managed, and public use of the VCA is prohibited as they together constitute a relatively small and significant area of remnant vegetation and habitat.			Medium
There is anecdotal evidence of illegal shooting within the nature reserve.			

Current Situation	Desired Outcomes	Strategies	Priority
<b>Research</b>			
Research will improve understanding of the natural and cultural heritage values of the nature reserve and VCA, threatening processes and the requirements for management of significant plant and animal assemblages and species.	<ul style="list-style-type: none"> <li>Research conducted assists management of the nature reserve and VCA and has minimal impact</li> </ul>	<ul style="list-style-type: none"> <li>Encourage research to improve knowledge and management of natural and cultural heritage.</li> <li>Liaise with the University of New England, other tertiary education providers and the owners of the VCA about priorities for research in the nature reserve and VCA.</li> </ul>	High Medium
<b>Management operations</b>			
<p>The only access to the majority of the nature reserve is through adjacent private lands. The Service does not, at present, have formal access agreements with neighbours.</p> <p>The management trails in the nature reserve (refer figure 1) have been assessed as necessary for management purposes.</p> <p>Additional trails to those shown on the map exist on the VCA, and further trails may be required in future.</p> <p>Fencing along the nature reserve and VCA boundaries is inadequate in some places to exclude stock.</p>	<ul style="list-style-type: none"> <li>Management facilities adequately serve management needs and have acceptable impact.</li> <li>NPWS has long term access to the nature reserve.</li> <li>Domestic stock do not enter the nature reserve or VCA.</li> </ul>	<ul style="list-style-type: none"> <li>Agreement to be negotiated with relevant neighbour(s) to ensure long-term access to the nature reserve is available to NPWS for management purposes.</li> <li>In conjunction with neighbours, maintain fences and determine strategies to exclude stock in areas where construction of boundary fences is difficult.</li> <li>Vehicles will only be permitted to access the nature reserve for authorised management purposes. Any vehicles accessing the nature reserve must remain on the management trails, unless otherwise authorised for emergency or management activities.</li> <li>Maintain the management trails within the nature reserve as shown in figure 1. All other trails in the nature reserve that are not shown on figure 1 will be closed and where necessary rehabilitated.</li> <li>Additional trails may be constructed on the VCA if necessary.</li> </ul>	High High Medium Medium Low

## Key to Priorities

**High** priority strategies are those that are imperative to the achievement of management objectives and desired outcomes. They must be undertaken in the near future to avoid significant degradation of the natural, cultural or management resources of the nature reserve.

**Medium** priority strategies are those that are necessary to achieve management objectives and desired outcomes but will be implemented as resources become available because the time frame for their implementation is not urgent.

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

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