



Environment,
Climate Change & Water
National Parks & Wildlife Service



Mullion Range State Conservation Area and Girralang Nature Reserve Plan of Management



**MULLION RANGE STATE CONSERVATION AREA
AND GIRRALANG NATURE RESERVE
PLAN OF MANAGEMENT**

NSW National Parks and Wildlife Service

Part of the Department of Environment, Climate Change and Water

March 2010

This plan of management was adopted by the Minister for Climate Change and the Environment on 3rd March 2010.

Acknowledgments

This plan of management is based on a draft plan prepared by staff of the Macquarie Area of the National Parks and Wildlife Service.

Cover photograph of part of the wall of the water race on the Water Race Walking Track by Col Adams, NPWS.

Inquiries about this Mullion Range State Conservation Area and Girralang Nature Reserve should be directed to the Parks and Wildlife Office, Level 2, 203–209 Russell Street Bathurst NSW 2795 or by telephone on (02) 6332 9488.

© **Department of Environment, Climate Change and Water 2010:** Use permitted with appropriate acknowledgment

ISBN 978 1 74232 580 4

DECCW 2010/183

FOREWORD

Mullion Range State Conservation Area and Girralang Nature Reserve are located within the Central West Region of NSW, to the north-east of Orange. They cover a combined area of around 1,665 hectares.

Mullion Range State Conservation Area and Girralang Nature Reserve protect a range of remnant vegetation communities, including significant stands of riparian vegetation. They also contain many plant and animal species at the limit of their range.

Some of the first gold mining in NSW took place in and around the reserves, and evidence of this past use remains in places in the reserves, as do sites of Aboriginal heritage value.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve. A plan of management is a legal document that outlines how an area will be managed in the years ahead.

A draft plan of management for Mullion Range State Conservation Area and Girralang Nature Reserve was placed on public exhibition from 25th May until 27th August 2007. The submissions received were carefully considered before adopting this plan.

This plan contains a number of actions to achieve the State Plan priority to “Protect our native vegetation, biodiversity, land, rivers and coastal waterways”, including encouragement of the retention of native vegetation on nearby lands, control introduced plants and animals, and implementation of fire management strategies and research into fire effects. The plan also contains actions to help achieve the State Priority to “Increase the number of people using parks”, including improved information on the reserves and upgrading of walking tracks.

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

Frank Sartor MP
Minister for Climate Change and the Environment

CONTENTS	Page
1. INTRODUCTION	1
1.1 Location, Gazettal and Regional Setting	1
1.2 Landscape	5
2. MANAGEMENT CONTEXT	5
2.1 Legislative and Policy Framework	5
2.2 Management Objectives - General	6
3 KEY VALUES AND MANAGEMENT OBJECTIVES	7
3.1 Values of the Area	7
3.2 Specific Management Objectives for the Reserves	7
4. CONSERVATION OF NATURAL AND CULTURAL HERITAGE	8
4.1 Geology and Landforms	8
4.2 Native Plants	8
4.3 Native Animals	10
4.4 Aboriginal Heritage	11
4.5 Historic Heritage	12
5. PROTECTION OF THE RESERVES	13
5.1 Soil Erosion	13
5.2 Water Quality and Catchment Management	13
5.3 Introduced Species	14
5.4 Fire Management	15
6. VISITOR OPPORTUNITIES AND EDUCATION	17
6.1 Information Provision	17
6.2 Recreation Opportunities	18
7. RESEARCH AND MONITORING	20
8. NPWS MANAGEMENT FACILITIES AND OPERATIONS	20
10. PLAN IMPLEMENTATION	21
11. REFERENCES	23

MAPS OF THE RESERVES

pages 2, 3, 4 & 5

1. INTRODUCTION

1.1 Location, Gazettal and Regional Setting

Mullion Range State Conservation Area and Girralang Nature Reserve (referred to in this plan as “the reserves”) are located within the Central West Region of NSW. Mullion Range State Conservation Area and Girralang Nature Reserve are both located to the north-east of Orange. Mullion Range State Conservation Area is approximately 20 kilometres by road from Orange and Girralang Nature Reserve lies 8 kilometres to the east of Mullion Range State Conservation Area. Both reserves are located within the Cabonne Shire.

Mullion Range State Conservation Area

Mullion Range State Conservation Area was reserved on 3rd March 1999 and covers an area of 1,025 hectares. It consists of three separate parcels of land. Prior to reservation it was managed by the Canobolas Regional Parkland Trust.

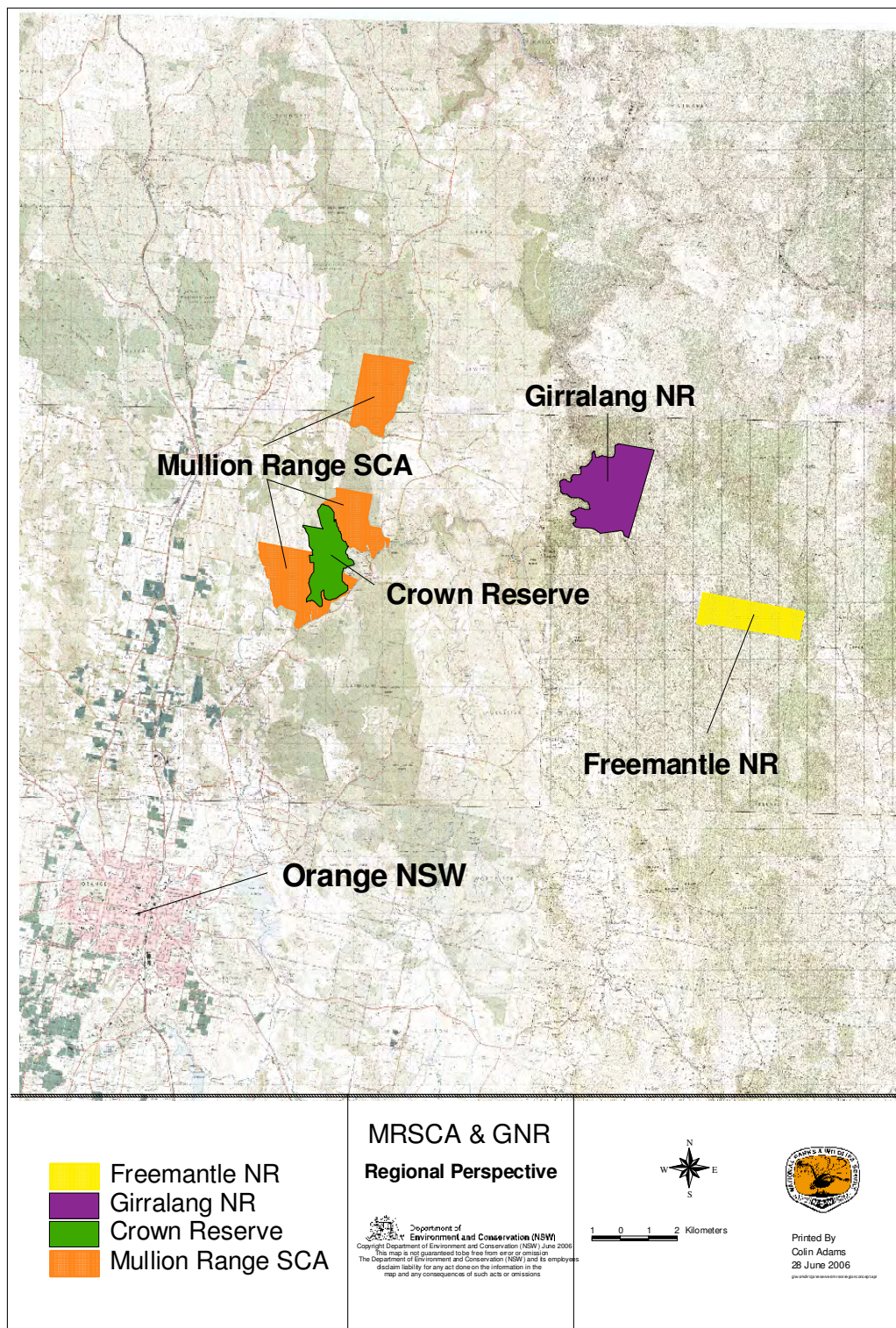
Between and adjoining the two southern blocks of the state conservation area is the 355 hectare Central Mullion Reserve. This Crown Reserve was also previously managed by the Canobolas Regional Parkland Trust. It is currently managed by a trust established under the *Crown Lands Act 1989*. It is likely that this land will be added to the state conservation area in future, following which it will be managed in accordance with this plan.

In addition to the Crown Reserve, Mullion Range State Conservation Area is bounded by small rural holdings, private and Forests NSW pine plantations. The northern part of the reserve adjoins larger rural holdings and Forests NSW estate consisting of both pine plantations and native forests.

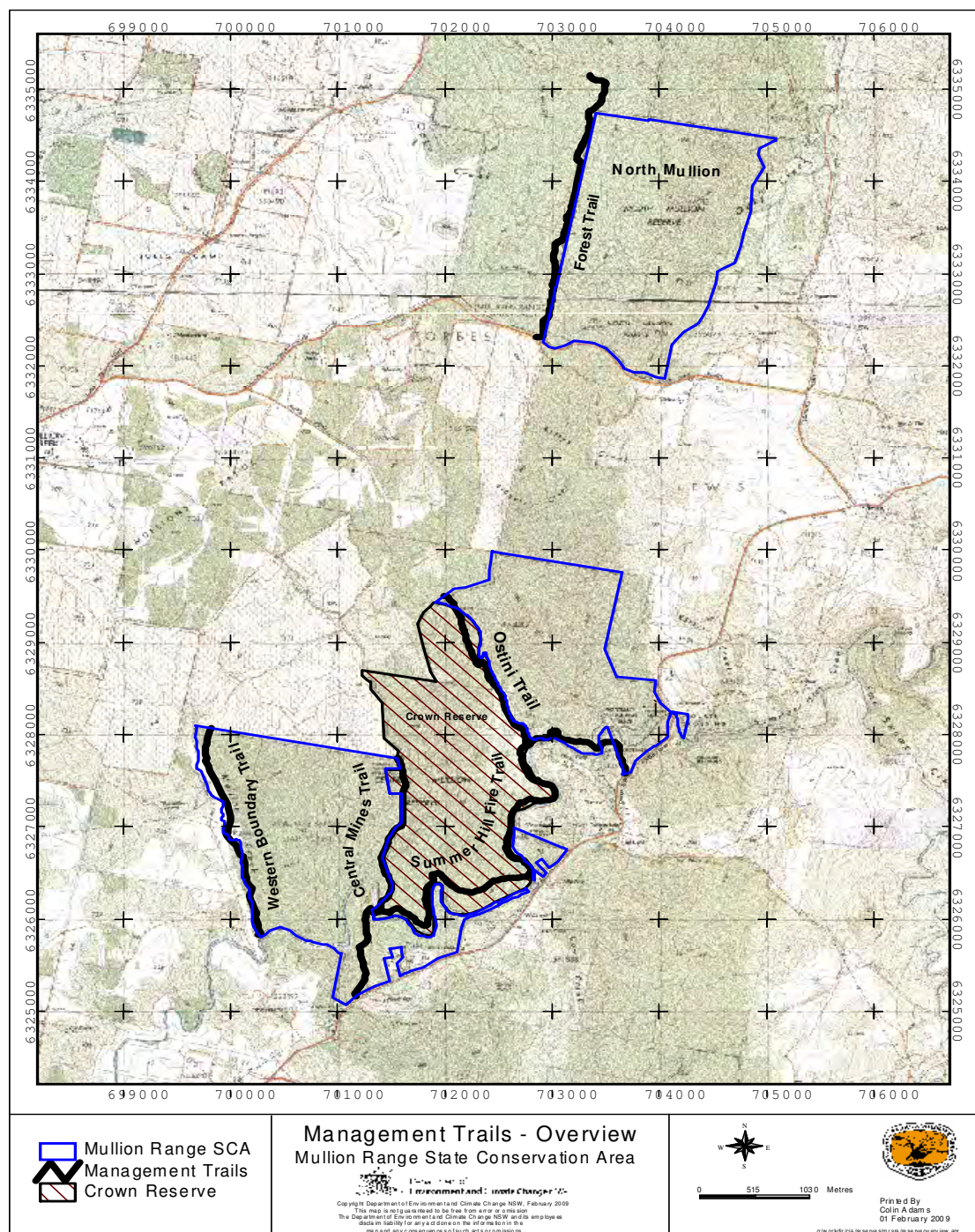
Girralang Nature Reserve

Girralang Nature Reserve was reserved on 4th November 1998 and covers an area of 640 hectares. It is surrounded by larger rural holdings and bounded by Ophir Creek on the reserve’s western boundary. Ophir Creek flows north into the Macquarie River.

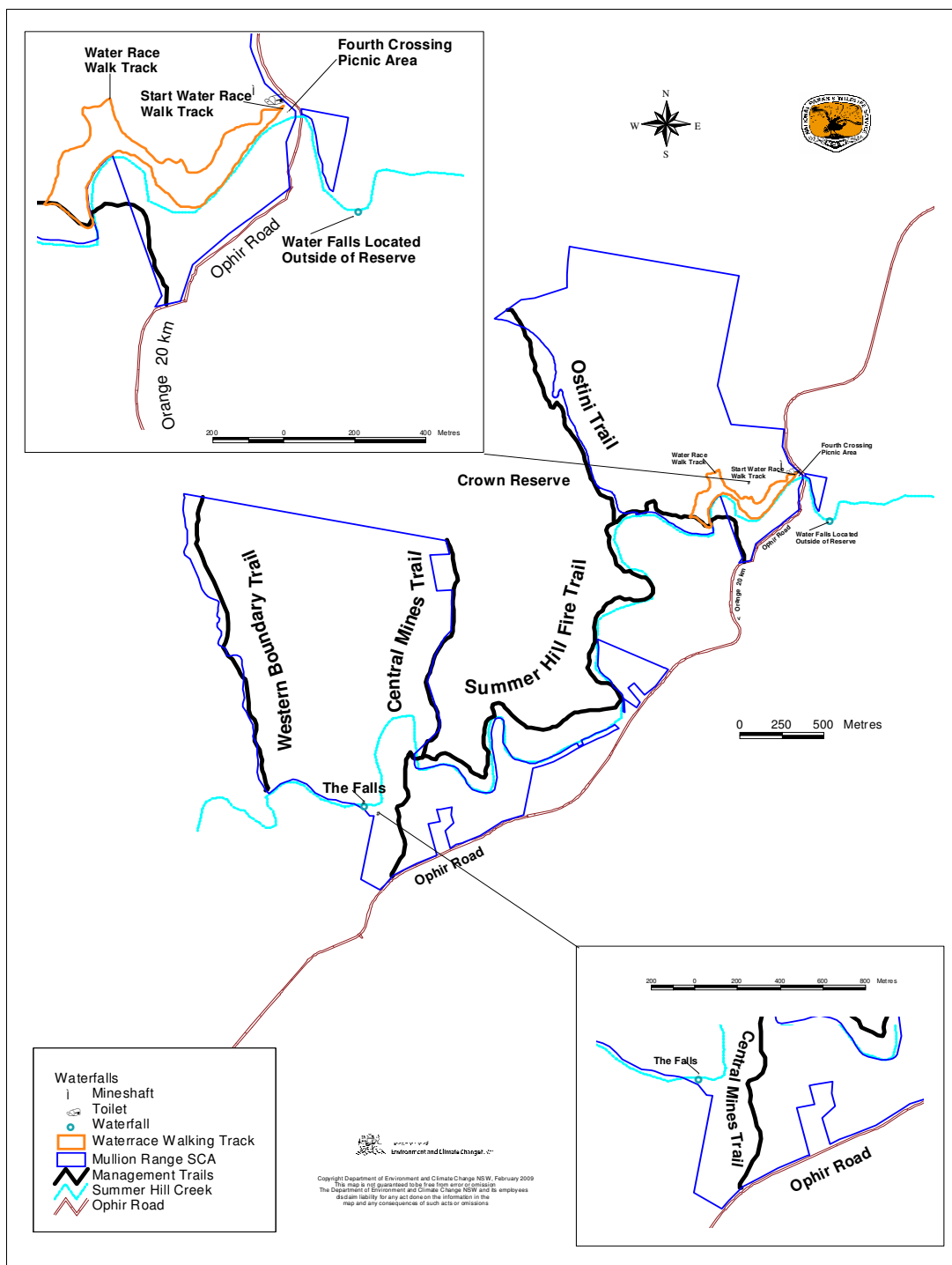
Nearby conservation reserves include Freemantle Nature Reserve which is located 5 kilometres to the south-east of the nature reserve’s south-eastern boundary. Current land uses in the region include cattle and sheep production, cropping and pine plantations.



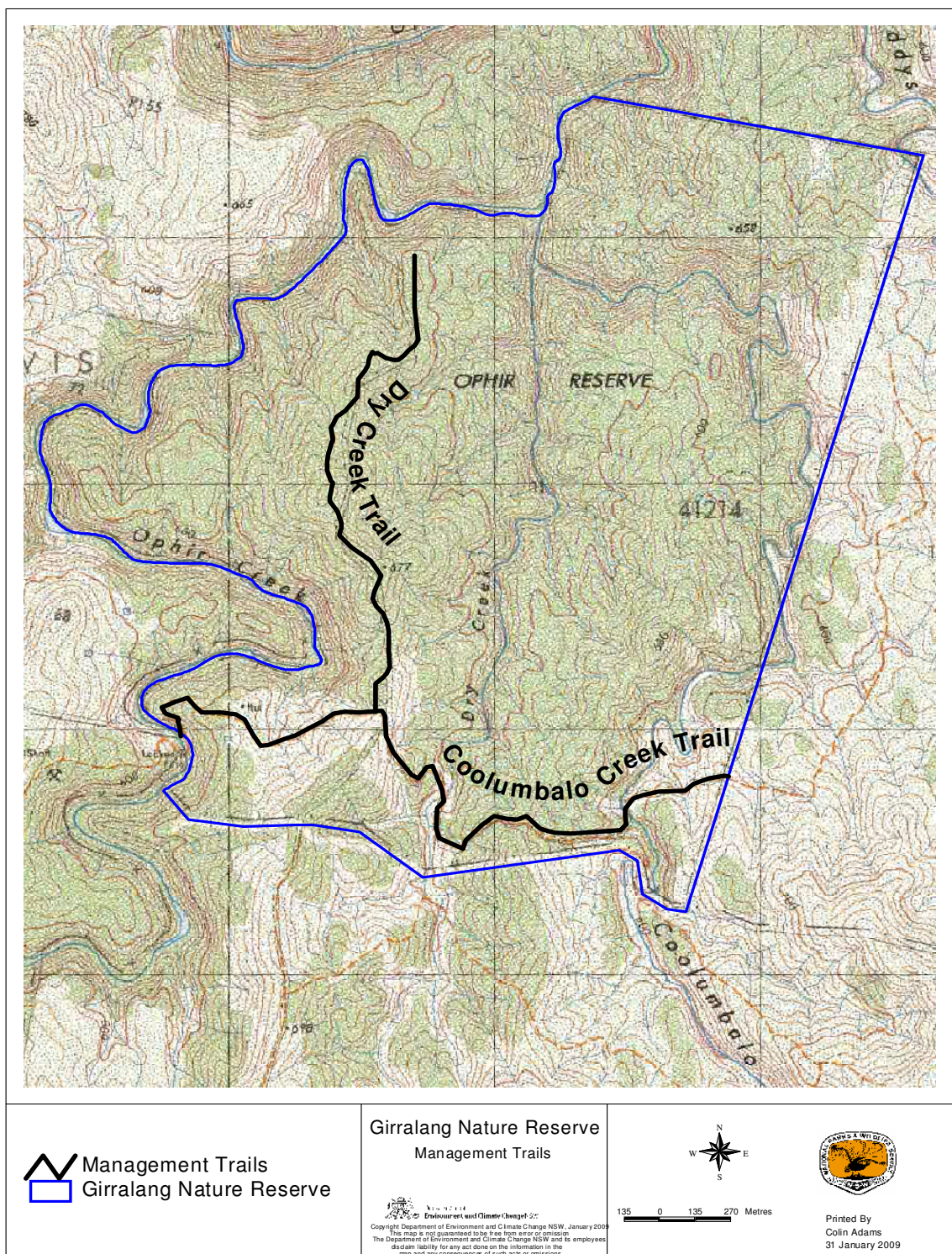
Map 1. Mullion Range SCA and Girralang NR - Region Context



Map 2. Mullion Range State Conservation Area Management Trails.



Map 3. Mullion Range State Conservation Area Visitor Facilities



Map 4. Girralang Nature Reserve Management Trails

1.2 Landscape

Natural and cultural heritage and ongoing use are closely related, and combined form the landscape of an area. A large portion of Australian environment has been influenced by past Aboriginal and non-Aboriginal land use practices and the activities of modern day Australians continue to influence and impact bushland through recreational use, cultural practices, the presence of introduced plants and animals and in some cases water and air pollution. Therefore the location, geology, landform, climate, flora and fauna of reserves such as Mullion Range State Conservation Area and Girralang Nature Reserve have determined how they have been utilised in the past and will continue to be 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 such as the value of certain animals and plants as a food and material resource by Aboriginal people. This plan of management aims to conserve both natural and cultural heritage values within the reserves as well as recognise and document the inter-relationships of these values with non-human threats and ongoing use.

2. MANAGEMENT CONTEXT

2.1 Legislative and Policy Framework

The management of state conservation areas and nature reserves in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the NPW Regulation, the *Threatened Species Conservation Act 1995* and the policies of the National Parks and Wildlife Service (NPWS). Section 72AA of the NPW Act lists the matters to be considered in the preparation of a plan of management. The policies arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

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

This plan is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within Mullion Range State Conservation Area and Girralang Nature Reserve except in accordance with the plan. This plan will also apply to any future additions to Mullion Range State Conservation Area and Girralang Nature Reserve. Where management strategies or works are proposed for the state conservation area and nature reserve or any additions that are not consistent with the plan, an amendment to the plan will be required.

The Act also requires review of the classification of state conservation areas every 5 years to determine whether they should receive either a national park or nature reserve classification. The classification review for state conservation areas is described in section 47M of the NPW Act and is undertaken in consultation with the Minister administering the *Mining Act 1992*.

2.2 Management Objectives – General

The following general objectives, derived from the NPW Act, apply to the management of state conservation areas and nature reserves in New South Wales:

State Conservation Areas

State conservation areas are reserved 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, state conservation areas are managed to:

- conserve biodiversity, maintain ecosystem functions, 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.

The Department of Industry and Investment (DII) is the lead authority for mining, mineral exploration and mine site rehabilitation. DII is required under the EPA Act to undertake environmental assessments for mining and exploration activities in all SCAs. The Memorandum of Understanding (MOU) between NPWS and DII (then called the Department of Mineral Resources) describes the management and consultative arrangements associated with exploration and mining in SCAs.

Nature Reserves

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 understanding of the area's & reserve's natural and cultural values; and
- provide for appropriate research and monitoring.

3. KEY VALUES AND MANAGEMENT OBJECTIVES

3.1 Values of the Reserves

- Mullion Range State Conservation Area and Girralang Nature Reserve protect a significant section of lands containing a wide range of remnant vegetation communities which include significant stands of riparian vegetation.
- Both reserves contain outstanding scenic values, many plant and animal species at the limit of their range, and opportunities for research and education.
- Some of the first gold mining in NSW took place in and around the reserves, and evidence of this past use remains in places in the reserves.
- Mullion Range State Conservation Area contains sites of Aboriginal heritage value.
- Mullion Range State Conservation Area provides opportunities for low key recreational activities.

3.2 Specific Management Objectives for the Reserves

In addition to the above general objectives (refer section 2.2), the management of Mullion Range State Conservation Area and Girralang Nature Reserve will be in accordance with the following more specific objectives.

- The protection of Mullion Range State Conservation Area and Girralang Nature Reserve as a relatively large remnant sample of Central Tablelands woodlands and forests with emphasis on riparian area protection.
- Investigation and recording of European heritage within Mullion Range State Conservation Area and Girralang Nature Reserve with emphasis on historic gold mining areas, historic water races and associated ruins.
- Protection of Aboriginal sites and involvement of the local Aboriginal community in the management of Mullion Range State Conservation Area and Girralang Nature Reserve.
- Provision and maintenance of environmentally sustainable recreational opportunities based on specific features of Mullion Range State Conservation Area and located and developed so as to protect the scenic values of the landscape.

4. CONSERVATION OF NATURAL AND CULTURAL HERITAGE

4.1 Geology and Landforms

Mullion Range State Conservation Area is situated within the central and north sections of the Mullion Range. The range extends from 8 kilometres north-east of Orange to 30 kilometres north of Orange towards Euchareena. Girralang Nature Reserve is situated to the east of the range and is on average several hundred metres lower in altitude than Mullion Range State Conservation Area. Mullion Range State Conservation Area has an altitudinal range between 670 and 960 metres above sea level (ASL) while Girralang Nature Reserve has a range between 530 to 690 metres ASL.

Both the reserves lie within the Hill End Trough Capertee Geanticline. The Mullion Range is a prominent regional landscape feature comprised of volcanic rhyolite, dacite and tuff. This results in an undulating and often steeply sloping hilly landscape, which is often rocky and has areas of low soil fertility. Soils are skeletal sand and loams near outcrops, red podzolics in the mid slope, and yellow podzolics in drainage depressions. These soils are susceptible to erosion. The state conservation area is cut by Summer Hill Creek.

Girralang Nature Reserve largely consists of eastern and western facing slopes of Devonian/Silurian sedimentary rocks characteristic of the Cunningham Formation. They are comprised of slate, siltstone, lithic and calcareous greywacke and greywacke conglomerates. The soils are skeletal, low in fertility and subject to erosion. Along the western boundary is Ophir Creek, while Dry Creek and Coolumbarlo Creek traverse the reserve.

Both Mullion Range State Conservation Area and Girralang Nature Reserve lie within the Macquarie River Catchment.

4.2 Native Plants

Mullion Range State Conservation Area is situated within the Central Tablelands botanical subdivision of New South Wales and lies within the NSW South Eastern Highlands biogeographic region (Thackway & Cresswell 1995). One hundred and seventy-three (173) plant species have been recorded in the state conservation area representing 55 families and 129 genera. These have been grouped into three vegetation communities (Porteners 2000):

- Inland Scribbly Gum *Eucalyptus rossii* and Red Stringybark *E. macrorhyncha* Woodland to Open Woodland;
- Red Stringybark and Bundy *E. goniocalyx* Woodland to Open Woodland;
- River Oak *Casuarina cunninghamiana* Riparian Communities (Open Forest to Open Woodland).

Brittle Gum *E. mannifera* and Manna Gum *E. viminalis* also occur in the open forests and open woodlands of the area.

The riparian communities which fringe Summer Hill Creek are well developed with extremely tall trees shading a dense shrub layer, with grass and herb cover on the banks and adjoining flats. This area, which is located close to the Ophir road and neighbouring agricultural and residential land, also contains exotic species such as Blackberry and Black Willow.

The vegetation on the flatter areas of Mullion Range State Conservation Area is relatively disturbed, due to past mining and logging activities. There is considerable regrowth in the Scribbly Gum and Red Stringybark communities although evidence of previous logging activity and numerous old fire scars remain (Porteners 2000). The vegetation on the slopes and ranges of Mullion Range State Conservation Area is in relatively good condition. It contains a number of species which are poorly represented in the Central West. Most of the plant communities are at the north-western limit of their known distribution and some of these communities are highly significant.

Fifty (50) plant species have been recorded in Girralang Nature Reserve, representing 23 families and 37 genera. Porteners (2000) divided the vegetation of the reserve into two communities: Red Box *E. polyanthemos* and Red Stringybark *E. macrorhyncha* Open Woodland to Woodland on the upper slopes and River Oak *Casuarina cunninghamiana* Riparian Open Forest along Ophir Creek.

Within areas of lower slopes containing deeper rich soils, White Box *E. albens* and Red Ironbark *E. sideroxylon* occur. The reserve also has an infestation of Blackberry and Black Willow along Ophir Creek.

Table 1. Regionally significant species

Area	Significant Plants	Comments	Disturbance
Mullion Range State Conservation Area Open woodland to woodland. Trees to 28m. Mid to upper slopes, spurs ridges and crests.	Ruby Urn Heath <i>Melichrus erubescens</i>	Few recorded. At the eastern edge of the species distribution.	Relatively disturbed with a high proportion of weeds and history of human uses
	Snow Grass <i>Poa sieberiana</i> var. <i>cyanophylla</i>	Restricted to the Central & Southern Tablelands and Western Slopes of NSW.	
	Wattle <i>Acacia meiantha</i>	Restricted to an area of less than 100km, classified "rare" by Briggs & Leigh (1996).	
Girralang Nature Reserve Open woodland to woodland to low open woodland. Trees to 12m. Mid to upper slopes, spurs ridges and crests.	Bush Pea <i>Pultenaea lapidosa</i>	A Central West species which becomes common south of Rylestone. It is becoming a component of understorey. Found in both MRSCA and the GNR.	Relatively good condition with signs of disturbance from goats in the form of tracks and browsing of vegetation
	Pennywort <i>Hydrocotyle tripartita</i>	Common in open communities, representing new records for Central Tablelands distribution.	

There is a large area of native forest adjoining the northern section of Mullion Range State Conservation Area. Native forests also occur on private land north of Girralang Nature Reserve, with pockets on other lands around the nature reserve. Maintenance of native vegetation increases the habitat value of the reserves and can provide links to other conservation reserves.

Desired Outcomes

- The full range of native plant species found in the reserves is conserved.
- Vegetation structural diversity and habitat values are conserved, and are restored where subject to past logging and clearing.
- Significant and restricted plant communities are conserved.
- Neighbours support conservation of remaining areas of privately owned native vegetation near the reserves.

Strategies

- Ensure that management and visitor facilities are not located in areas of significant plant species or restricted plant communities.
- Allow natural regeneration of past cleared and logged areas, apart from maintenance of visitor facilities.
- Undertake additional vegetation surveys, in particular to look for additional significant species.
- Institute a program to monitor the status of the significant communities and threatened plant species and to evaluate the success of management programs, including the control of introduced species (see also section 5.3).
- Liaise with neighbours, Landcare, vegetation management committees and land use authorities to encourage retention, and if possible expansion, of areas of native vegetation close to the reserves.

4.3 Native Animals

Seventy-three (73) species of native animals have been recorded in Mullion Range State Conservation Area and 55 species recorded in Girralang Nature Reserve. Most of these are common species to the region, such as Red-necked Wallabies *Macropus rufogriseus*, Eastern Grey Kangaroos *Macropus giganteus* and Wallaroos *Macropus robustus*.

As there has not been a systematic survey of fauna conducted in either reserve, fauna species lists are considered incomplete. The range of vegetation communities provide potential habitat for many species not currently recorded.

Although no threatened species have been recorded, based on the habitats that occur in Mullion Range State Conservation Area and Girralang Nature Reserve and information within the BIOCLIM database, a number of threatened species are predicted to occur within the reserves.

Table 2: Threatened species predicted to occur in the Reserves

Amphibians	Birds
Yellow-spotted tree frog <i>Litoria castanea</i>	Freckled duck <i>Stictonetta naevosa</i>
Southern bell frog <i>Litoria raniformis</i>	Blue-billed duck <i>Oxyura australis</i>
	Grey falcon <i>Falco hypoleucos</i>
Reptiles	Square-tailed kite <i>Lophoictinia isura</i>
Little whip snake <i>Suta flagellum</i>	Pink cockatoo <i>Cacatua leadbeateri</i>
Broad-headed snake <i>Hoplocephalus bungaroides</i>	Glossy black cockatoo <i>Calyptorhynchus lathami</i>
Pink-tailed worm-lizard <i>Aprasia parapulchella</i>	Superb parrot <i>Polytelis swainsonii</i>
	Swift parrot <i>Lathamus discolor</i>
Mammals	Turquoise parrot <i>Neophema pulchella</i>
Spotted-tail quoll <i>Dasyurus maculatus</i>	Barking owl <i>Ninox connivens</i>
Brush-tailed phascogale <i>Phascogale tapoatafa</i>	Powerful owl <i>Ninox strenua</i>
Koala <i>Phascolarctos cinereus</i>	Brown treecreeper <i>Climacteris picumnus</i>
Eastern pygmy-possum <i>Cercartetus nanus</i>	Hooded robin <i>Melanodryas cucullata</i>
Squirrel glider <i>Petaurus norfolcensis</i>	Speckled warbler <i>Sericornis sagittatus</i>
Yellow-bellied glider <i>Petaurus australis</i>	Diamond firetail <i>Stagonopleura guttata</i>
Brush-tailed rock-wallaby <i>Petrogale penicillata</i>	Regent honeyeater <i>Xanthomyza phrygia</i>
Eastern bentwing-bat <i>Miniopterus schreibersii oceanensis</i>	Black-chinned honeyeater (eastern subsp.) <i>Melithreptus gularis</i>
Greater long-eared bat <i>Nyctophilus timoriensis</i>	Grey crowned babbler <i>Pomatostomus temporalis</i>

Desired Outcomes

- The diversity of habitats for native animals is maintained within the state conservation area and nature reserve.
- Research is undertaken within the Mullion Range State Conservation Area and Girralang Nature Reserve to determine which animal species, including threatened species, are present and any specific habitat requirements.

Strategies

- Surveys will be encouraged and/or undertaken to determine the presence and abundance of native animal species in various habitats within the reserves.
- Implement recovery plans for threatened species as relevant when prepared.

4.4 Aboriginal Heritage

Aboriginal communities have a cultural association and connection to the land. The land and water within the landscape are central to Aboriginal spirituality and continue to contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and benefit of traditional foods and medicines, caring for the land, passing on cultural knowledge and strengthening social bonds.

Mullion Range State Conservation Area and Girralang Nature Reserve are within Wiradjuri country and it is highly likely that the reserves contributed to the social, economic and ceremonial life of the Wiradjuri people and they may have economic and cultural significance to the contemporary indigenous community. Girralang is a

Wiradjuri word which means “high up towards the stars” (pers. com. Bill Allen, Wiradjuri elder).

The Orange Local Aboriginal Land Council were involved in a survey of the reserves for Aboriginal sites. An occupation site, scarred tree and stone tools have been recorded in Mullion Range State Conservation Area. The occupation site is near the trail to The Falls and needs protection works.

Because travel routes often followed watercourses, it is likely that Summer Hill Creek, Ophir Creek and the Macquarie River were part of a travel route from west and north-west to Mount Canobolas, which was a very important area to the Wiradjuri.

Desired Outcomes

- Aboriginal sites and places are protected from damage.
- Aboriginal people are involved in management of their cultural heritage and the interpretation of their cultural values in Mullion Range State Conservation Area and Girralang Nature Reserve.

Strategies

- Manage Aboriginal heritage in consultation with the Orange Local Aboriginal Land Council and other relevant Aboriginal community organisations, such as the Central West Catchment Management Authority’s Aboriginal Reference Group.
- Undertake a cultural heritage survey prior to any works which may impact on Aboriginal sites and ensure facilities are not located close to Aboriginal sites/places.
- Undertake protection works at the occupation site near The Falls.
- Do not publicise the location of Aboriginal sites unless the agreement of the relevant Aboriginal community has been obtained.

4.5 Historic Heritage

Mullion Range State Conservation Area and Girralang Nature Reserve contain and are surrounded by sites and artefacts of very high local cultural significance as the area was once an important gold mining site. Girralang Nature Reserve adjoins the historic Ophir Reserve, the site of the first payable gold in Australia around the 1850s.

There are numerous mine shafts in the area, including in Mullion Range State Conservation Area. Those shafts in Mullion Range State Conservation Area considered to be dangerous have been filled in, while a number of other shafts have been fenced to protect the public. Not all the old mine shafts have been located or recorded.

There are two historic water races in Mullion Range State Conservation Area which were used by the miners to divert water from the original water source to the mining sites. The races were designed to follow the contours across a variety of terrain so as to allow the water to flow slowly to mine sites. Both water races are in excess of

one kilometre in length. One leads from The Falls while the other, which is near Fourth Crossing, is used in part as a walking track from the picnic area.

Both reserves also have a history of logging and agriculture. Girralang Nature Reserve contains the ruins of a woolshed associated with agriculture use of the area prior to the reserve's proclamation.

Desired Outcomes

- Historic places and features are appropriately managed.
- Research into past European use of the reserves will be encouraged

Strategies

- Historic places and features in the reserves will be progressively recorded.
- Undertake work on the water races to protect them from further erosion and other damage, but the races will not be rebuilt or repaired.
- Investigate public safety implications and responsibilities with the Department of Industry and Investment when planning in areas where historic mine sites occur.
- Research into the history and routes of the water races will be undertaken in consultation with local historical organisations, and interpretive information prepared.

5. PROTECTION OF THE RESERVES

5.1 Soil Erosion

The soils in the reserves are susceptible to erosion. Sections of the state conservation area have been impacted by mining operations dating from the 1850s through to the 1930s, especially the Eldorado area, and been affected by gully erosion due to mining. Other areas of the reserve have been affected by erosion caused by clearing and logging over time of the native vegetation.

Girralang Nature Reserve is much more stable as it is more isolated and has not had the heavy impacts of mining and logging as with Mullion Range State Conservation Area. Mining activity in Girralang Nature Reserve was almost entirely to along Ophir Creek.

Illegal trail bike riding (unregistered bikes and riding off public access roads) occurs in the reserves, mainly in the state conservation area. Due to the isolation, topography and many entry and exit points allowed by poor fencing of the area, trail bikes are difficult to control. Trail bikes contribute to significant levels of soil erosion in the reserves.

Desired Outcomes

- Human induced soil erosion in the reserves is minimised.
- Trail bike use in the reserves is restricted to registered bikes on public access roads.

Strategies

- Design and undertake all works in a manner that minimises soil erosion.
- Erect gates on all management trails and signs to identify the reserves and permitted uses.
- Increase patrols of reserves.
- Undertake rehabilitation works on eroded gullies.
- Monitor other areas of erosion and treat if found to be extending.

5.2 Water Quality and Catchment Management

The *Catchment Management Act 1989* provides a framework for achieving cleaner water, less soil erosion, improved vegetation cover, maintenance of ecological processes and a balanced and healthier environment. It also provides a focus to balance conservation needs and development pressures and encourages a more aware and involved community. An important means of achieving these aims is the formation and support of catchment management boards at a local level. The reserves are within the area of the Central West Catchment Management Authority.

Desired Outcome

- The catchment values and the water quality and health of the reserves' streams are maintained.

Strategies

- Design and undertake all works in a manner that minimises water pollution.
- Liaise with local government and other authorities as needed to maintain the water quality of the reserves' catchments.
- Continue to participate as a member of the Central West Catchment Management Authority.

5.3 Introduced Species

Introduced Animals

Introduced animal species recorded in Mullion Range State Conservation Area are the European red fox, feral pig, wild dog and Eurasian blackbird. Three introduced animals have been recorded in Girralang Nature Reserve: the goat, rabbit and common starling. It is expected that all seven introduced species occur in both reserves.

Wild dogs, possibly from nearby residential areas, have been reported in Mullion Range State Conservation Area and control programs have been undertaken in response to stock loss problems on neighbouring properties. Wild dogs can be divided into three groups - dingos, hybrids with domestic dogs, and feral dogs. Wild dogs, including dingoes, are declared pest animals under the *Rural Lands Protection Act 1989* and must be controlled, however, large sections of the community consider the dingo to be part of the native fauna of NSW which should be conserved. The NPWS therefore has to balance the objectives of preventing attacks on livestock from wild dogs moving out of its reserves and conserving dingoes.

In November 2003, a fox and wild pig baiting program was conducted with a low incidence of bait uptake. It is believed that the incidence of fox and wild pig numbers in the reserves is very low. NPWS have continued to monitor the reserves and have not identified evidence of significant pig activity. Illegal pig hunting within Mullion Range State Conservation Area is not a significant issue due to low pig numbers.

Introduced Plants

A range of introduced plant species have entered the reserves through previous land use activities and been spread by animals and weather conditions. Introduced plants are plants that are not native to the state conservation area and nature reserve. These plants can spread to and from the reserves.

Both Mullion Range State Conservation Area and Girralang Nature Reserve have good stands of native vegetation, however introduced plants impact on the abundance and diversity of native species and affect the functions of ecosystems. The majority of weed infestation within Mullion Range State Conservation Area and Girralang Nature Reserve are confined to along creeks and watercourses where Blackberry (*Rubus fruticosus*) has spread. Black Willows (*Salix* spp) have also established along the creeks and lower sections of gullies in Mullion Range State Conservation Area and Radiata Pines (*Pinus radiata*) have invaded large sections along the interface with Mullion State Forest and a private pine plantation. Serrated Tussock (*Nassella trichotoma*) and St Johns Wort (*Hypericum perforatum*) are confined to Girralang Nature Reserve and have spread on previously disturbed lands.

Cooperative arrangements are in place with the Land and Property Management Authority for the control and eradication of introduced plants and animals within the adjoining Crown Reserve.

Desired Outcome

- The impact of introduced species on native plants and animals is minimised.

Strategies

- Control introduced species and eradicate them where practicable in accordance with best management practice, to deliver optimal biodiversity outcomes. Priority will be given to the control of Blackberry, Serrated Tussock and St Johns Wort. An eradication program for Black Willow will be established and included in the Region's Pest and Weed Management Strategy. Control of Radiata Pines will be managed in association with fire management activities.
- Undertake control programs for pest animals as required.
- Control other introduced species that:
 - are declared noxious or for which a national emergency control program has been declared or are known to be an important problem in other reserves or states;
 - have a significant environmental impact, including damage to threatened species, catchment values and recreation values;
 - affect neighbouring lands or are considered a high priority by the community;

- where management is needed to maintain benefits gained from previous control programs or to allow another high priority management program to be effective; or where a window of opportunity occurs.
- Avoid unnecessary environmental disturbances. Where disturbance is inevitable or is planned, consider the likely impact of the activity in terms of introduced species and put in place controls or programs to reduce any such impact.
- Seek the cooperation of neighbours, the Tablelands Livestock Health and Pest Authority and Cabonne County Council in implementing weed and pest animal control programs.
- Encourage maintenance of effective fencing of boundaries with grazing properties to prevent domestic stock from entering into the reserves. Provide fencing assistance where possible and appropriate.

5.4 Fire Management

Fire is a natural feature of the environment and is essential to the survival of some plant and animal communities. Inappropriate fire, however, can damage natural and cultural heritage and endanger reserve visitors and neighbours. Management must aim to achieve both long-term conservation of native plant and animal communities and ongoing protection of life and property within and adjacent to the reserves.

NPWS maintains cooperative arrangements with surrounding landowners and Rural Fire Service brigades and is actively involved in the Canobolas Zone Bush Fire Management Committee. Cooperative arrangements include approaches to fuel management, support for neighbours fire management efforts and information sharing. A map-based Fire Management Strategy for Mullion Range State Conservation Area and Girralang Nature Reserve was adopted in 2005.

Ecological Requirements for Fire

Fire regimes are a major determinant of the distribution and abundance of plants and animals in the area. They also affect nutrient cycles, erosion patterns and hydrological regimes. Ecological research suggests the following requirements for biodiversity conservation:

- variability of fire intervals and area burnt is important to conserve floristic diversity and provide diversity of habitat for animals; fire at regular intervals will lead to loss of species;
- most plant species and communities require infrequent fires of moderate to high intensity to achieve regeneration, but patchy burns are better for fauna as they retain shelter and food refuges;
- fires during the breeding season are the most damaging to fauna communities because of direct killing of young and increased exposure;
- a fire frequency of between 7 and 20 years is generally appropriate for the reserves' vegetation communities; species decline is predicted if successive fires occur less than 5 years apart or there are no fires for more than 30 years. Current fire regimes within the reserves are believed to be appropriate for obligate seeders.

Strategies and Cooperative Arrangements

Under the *Rural Fires Act 1997*, the NPWS is a fire authority and is responsible for controlling fires in the areas and ensuring that they do not cause damage to other land or property. An important part of NPWS fire management is participation in local co-operative fire management arrangements, including implementation of Bush Fire Risk Management Plans developed by District Bush Fire Management Committees. The NPWS is a member of the Canobolas Zone Bush Fire Management Committee.

A Fire Management Strategy for Mullion Range State Conservation Area and Girralang Nature Reserve has been adopted. This identifies the bushfire threat, requirements for the conservation of native plants and animals (such as protection of potential nesting sites and reducing the threat of fire reaching the canopy) and protection of cultural heritage, and community protection measures in areas where it is identified that fire is a threat to property.

NPWS uses a zoning system for bushfire management that is compatible with the system adopted by the Bushfire Coordinating Committee for use in District Bushfire Management Committee Bushfire Risk Management Plans. NPWS has assessed the reserves for fire management planning purposes and has zoned most of the reserves as a Land Management Zone (LMZ), although an Asset Protection Zone (APZ) has been identified on the eastern boundary of Mullion Range State Conservation Area.

The areas designated as an LMZ have not burnt for many years, are not adjacent to built assets which would be exposed to a high level bushfire risk, and do not have a history of fire ignitions or known areas of high bushfire behaviour potential. Management of a LMZ focuses on actions appropriate to conserve biodiversity and cultural heritage while still considering the need to protect life and property.

Management will aim to maintain biodiversity by restricting fires to only part of the distribution of a vegetation community at any one time and ensuring that the fire thresholds are not exceeded. In accordance with these principles, prescribed burns were undertaken most recently in Mullion Range State Conservation Area (April 2003) and Girralang Nature Reserve (April 2005) with the knowledge and support of the Canobolas Zone Bush Fire Management Committee and in accordance with the Zone's Bush Fire Risk Management Plan.

Desired Outcomes

- Fire will be managed:
 - to conserve all native species that occur naturally within reserves;
 - to maintain ecosystem processes associated with the native species and communities;
 - to reduce risk of bushfires spreading to areas outside the reserves;
 - to prevent damage to Aboriginal and historic sites;
 - to minimise risk to assets inside the reserves;
 - co-operatively with neighbours, Canobolas Zone Bushfire Management Committee, Rural Fire Brigades and State Forests.

Strategies

- The Fire Management Strategy for the reserves will be implemented.
- Prescribed burns will be used to achieve a variety of fire regimes that maintain fire thresholds for each vegetation community in accordance with the Fire Management Strategy.
- Seek to avoid use of heavy machinery for fire suppression in areas of threatened plants and animals, Aboriginal sites and historic places.
- Rehabilitate areas disturbed by fire suppression operations as soon as practical after the fire and during the duration of the fire.
- Encourage research into the ecological effects of fire in the reserves, particularly the fire response of significant plant species and communities.
- Continue to actively participate in the Canobolas Zone Bush Fire Management Committee. Maintain close contact and cooperation with Council fire officers and volunteer bush fire brigades.
- Carry out fuel management in Asset Protection Zones in cooperation with neighbours for mutual protection.
- Consider closing the reserves to public use during periods of extreme fire danger.

6. VISITOR OPPORTUNITIES AND EDUCATION

6.1 Information Provision

Mullion Range State Conservation Area is a significant educational resource because of its natural values, historic features and proximity to a major city. Visitation is generally higher in the warmer months of summer and autumn, with a decrease of visitors during the colder months of winter and spring. Public holidays and long weekends are popular times for visitors.

The reserves provide opportunities for visitors to enjoy, appreciate and understand the value of the natural and cultural heritage of the area. Information at key visitor sites such as picnic areas assists in the protection of natural and cultural heritage, promotes support for conservation and increases the enjoyment and satisfaction of visitors.

Girralang Nature Reserve, however, provides for the promotion of environmental education and appreciation of the reserve's unique cultural and natural heritage values. Themes for the study, research and interpretation include native fauna surveys, historic ruins on and adjacent to Ophir Creek and the past land users of the area and effects on current plant communities.

Desired Outcome

- Information is provided to the public that assists in the protection of the natural and cultural heritage of the reserves, promotes support for conservation and increases the enjoyment and satisfaction of visitors.

Strategies

- The following themes will be emphasised in interpretation programs:
 - Understanding and appreciation of the reserves' natural and cultural values;
 - The value of a relatively large remnant vegetation community in a largely cleared landscape;
 - Aboriginal cultural use of the area; and
 - The significance of Mullion Range State Conservation Area and Girralang Nature Reserve plant communities including the presence of endemic species and communities at the limit of their distribution.
- Interpretive information will be provided at the Fourth Crossing Picnic Area.
- Work cooperatively with local tourism organisations to provide appropriate information on the reserves.

6.2 Recreation Opportunities

Mullion Range State Conservation Area is accessible from Orange NSW via the Ophir Road and has become a popular destination to visitors and local people. Visitation to Mullion Range State Conservation Area is in excess of 6,000 annually based on traffic counts. Activities undertaken in Mullion Range State Conservation Area include bushwalking, bird watching, photography, fishing in Summer Hill Creek, exploring the mining sites and picnicking.

The Fourth Crossing is a favourite spot for tourist and locals as it is picturesque natural setting on the banks of the Summer Hill Creek. Facilities include toilets, picnic tables and a picnic shelter (drinking water is not provided).

Mullion Range State Conservation Area has one major walking track, the Water Race Walking Track, which is a loop walk 2.6 kilometres in length (see Map 3). There is also a short walking track (450 metres long) within the state conservation area to a waterfall located just outside the reserve's eastern boundary near the Fourth Crossing picnic area, and 600 metres along the Central Mines Trail from the Ophir Road are 'The Falls' within the southern section of the reserve. The significant cultural heritage values of the water race which forms the basis of the Water Race Walking Track are suffering from weathering processes and inappropriate use of the track by trail bikes, and the track consequently requires considerable maintenance and protection works. Use of walking tracks will be limited to walkers only.

At present there are no licensed or known commercial recreation activities in the state conservation area. Currently there has been no inquiries or interest shown towards commercial recreation, however some potential may exist in the future due to the highly significant areas of Aboriginal and European heritage within the state conservation area and local area.

There are no public vehicle access roads in Mullion Range State Conservation Area and Girralang Nature Reserve apart from within the Fourth Crossing picnic area. There are no camping areas in the reserves but camping is permitted on the adjoining Ophir Reserve. Some cycling occurs in Mullion Range State Conservation Area but there is no history of horse riding in the reserves.

Desired Outcomes

- Visitor use of the reserves is compatible with the protection of the natural and cultural values
- Appropriate opportunities are provided for visitors within Mullion Range State Conservation Area.
- Girralang Nature Reserve provides for research and educational activities with approval from NPWS.

Strategies

- All vehicles, including trail bikes, will be restricted to the access roads to and within the Fourth Crossing Picnic Area.
- Wood burning fireplaces will be removed and wood fires will not be permitted in the reserves.
- Garbage bins will not be provided and visitors will be requested to remove their rubbish when they leave.
- Maintenance will be undertaken of the walking tracks in the reserve on a priority basis. Highest priority will be maintenance of the Water Race Walking Track.
- Horse riding will not be permitted in the reserves.
- Cycling will be permitted on roads and management trails but not on walking tracks, or off tracks and trails.
- Any commercial operators will require a licence. Commercial operations will not be licensed if there is the potential to damage the natural and cultural values or interfere with the enjoyment of other users and visitors. Licenses will be modified or cancelled if compliance is not adhered to.

7. RESEARCH AND MONITORING

The purpose of scientific study is to improve an understanding of its natural and cultural heritage and the processes which affect them. Research also establishes the requirements for management of particular species and cultural resources. The NPWS has limited staff and financial resources for research and efforts must be directed towards the areas of greatest need. Research by other organisations and students may also provide valuable information for management. A prospectus will be prepared to encourage involvement of other organisations in priority research areas.

Desired Outcome

- Research contributes to improved management of the reserves and their natural and cultural heritage.

Strategies

- NPWS conducted research will aim to provide information on the natural and cultural heritage and on human use of the reserves in order to facilitate improved management of the reserves.
- The reserves will be available for appropriate research under licence from NPWS. Researchers from other organisations will be encouraged to design programs which provides information of direct use for management purposes.

- Liaison will be maintained with researchers to obtain as much mutual information and assistance as possible.
- A prospectus will be prepared as a guide to preferred research projects in the area. Preferred topics will be those of direct relevance to management and will include:
 - Fauna survey linked to vegetation communities and significant species;
 - Aboriginal site and place significance;
 - Historic uses of the area;
 - Fire effects on endemic and regionally significant plant species / communities; and
 - Visitor use (Mullion Range State Conservation Area only).

8. MANAGEMENT FACILITIES AND OPERATIONS

Mullion Range State Conservation Area and Girralang Nature Reserve are managed by staff from the NPWS Macquarie Area, based in Bathurst.

There are a number of management trails through the reserves which are required for fire, feral animal, and weed control.

Girralang Nature Reserve has one neighbour who has no other practical means of access except through the reserve. Access through Girralang Nature Reserve via the Coolumbalo Trail is essential for the reserve neighbour to access his property.

Desired Outcomes

- Management facilities adequately serve the needs of reserve management and have minimal environmental impact.
- A good relationship is maintained with the reserves' neighbours.

Strategies

- Formalise access arrangements for the affected neighbour along Coolumbalo Trail through Girralang Nature Reserve. No droving of stock will be permitted through the nature reserve.
- Maintain management trails to a high standard. Access gates to management trails will be locked.
- Maintain close liaison with the reserves' neighbours to deal with matters of mutual concern.

9. PLAN IMPLEMENTATION

This plan of management establishes a scheme of operations for Mullion Range State Conservation Area and Girralang Nature Reserve. It is part of a system of management developed by the National Parks and Wildlife Service. The system includes the National Parks and Wildlife Act, management policies, established conservation and recreation philosophies, and strategic planning at corporate, directorate and regional levels. The latter may include development of related plans

such as regional recreation plans, species recovery plans, fire management plans and conservation plans.

In accordance with Section 81 of the *National Parks and Wildlife Act 1974* this plan shall be carried out and given effect to and no operations shall be undertaken in relation to Mullion Range State Conservation Area and Girralang Nature Reserve unless those operations are in accordance with the plan of management. If after adequate investigation, operations not included in the plan are found to be justified, the plan may be amended in accordance with Section 73B of the Act.

Implementation of this plan will be undertaken within the annual programs of the Division's Western Rivers Region. Relative priorities for identified activities are set out in the table below. These priorities are determined in the context of directorate and regional strategic planning, and are subject to the availability of necessary staff and funds and to any special requirements of the Director-General or Minister. The implementation of the plan will be monitored and its success in achieving the identified objectives will be assessed.

The environmental impact of proposed activities will be assessed at all stages in accordance with established environmental assessment procedures. Where impacts are found to be unacceptable, activities will be modified.

Strategies

- Undertaken an annual review of progress in implementing this plan of management.
- Undertake an assessment after 5 years of the effectiveness of managing the state conservation area and nature reserve in accordance with this plan and of the degree of success in achieving the plan's objectives and desired outcomes.
- Base the evaluation on the monitoring programs set out in this plan and any others that may be developed.

As a guide to the implementation of this plan, relative priorities for identified activities are listed below:

High Priority: programs that need to be done in the immediate to near future on the basis that to not undertake these works will result in unacceptable degradation of the resource and/or greatly increased costs associated with rehabilitation at a later date. Also included as high priority are programs which are given a high priority for legal or public safety reasons.

Medium Priority: programs which are important but can be deferred without unacceptable loss of natural and/or cultural heritage values.

Low Priority: programs which will be undertaken only after high and moderate priority programs have been completed or which can be undertaken by other means such as volunteers, grant, concession operation, sponsorship or similar.

Activities	Priority	Reference
Encourage retention of native vegetation on nearby lands.	High	4.2
Undertake Aboriginal site protection works at The Falls.	High	4.4
Undertake protection works on the water races.	High	4.5
Erect gates and signs on management trails. Lock gates.	High	5.1
Undertake weed control programs, including an eradication program for Black Willow	High	5.3
Undertake pest animal control programs if necessary	High	5.3
Implement the Fire Management Strategies	High	5.4
Provide interpretive information at Fourth Crossing picnic area.	High	6.1
Undertake maintenance of the Water Race walking track.	High	6.2
Formalise access agreement with the affected neighbour of Girralang Nature Reserve.	High	8
Institute program to monitor significant vegetation and to evaluate the success of management programs.	Medium	4.2
Undertake and/or encourage fauna surveys.	Medium	4.3
Undertake rehabilitation of eroded gullies.	Medium	5.1
Monitor other areas of erosion and treat if necessary.	Medium	5.1
Seek cooperation of authorities and neighbours in implementing cooperative weed and pest animal control programs.	Medium	5.3
Encourage research into the ecological effects of fire.	Medium	5.4
Remove wood burning fireplaces from picnic areas.	Medium	6.2
Liaise with authorities over maintaining water quality.	Low	5.2
Liaise with tourist organisations to provide appropriate information on the reserves.	Low	6.1
Research the history of water races	Low	6.2
Prepare a research prospectus	Low	7

10. REFERENCES

Bathurst Map Sheet 1;250000 Geological Series Sheet SI 55-8.

Briggs, J.D. and Leigh, J.H. (1996) *Rare and Threatened Australian Plants*. CSIRO, Canberra.

NPWS (2005) *Mullion Range State Conservation Area / Girralang Nature Reserve, Reserve Fire Management Strategy*
<http://www.environment.nsw.gov.au/resources/parks/0623MullionGirralangFMS.pdf>

NPWS (2008) Western Rivers Region Pest Management Strategy 2009-2011
<http://www.environment.nsw.gov.au/resources/pestsweeds/08249WesternRiversPestMgmtStrategy.pdf>

Porteners, M., (2000) *Vegetation Survey of Mullion Range SRA & Wambool, Freemantle, Girralang & Eugowra Nature Reserves*. Report for the NSW National Parks and Wildlife Service.

Thackway, R. & Cresswell I.D. eds (1995) *An interim biogeographic regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program*. Canberra.