DALRYMPLE-HAY NATURE RESERVE

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

Part of the Department of Environment and Conservation (NSW)

May 2004

This plan of management was adopted by the Minister for the Environment on 19 May 2004.

FURTHER INFORMATION:

For additional information or enquires on the management of Dalrymple-Hay Nature Reserve, please contact the NPWS Lane Cove River Area Office in Lane Cove National Park or telephone (02) 9412 1811 during business hours.

ACKNOWLEDGMENTS:

This plan of management is based on a draft plan prepared by Alison Ramsay, Planning Coordinator, and Michele Cooper, Ranger Lane Cove River Area.

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FOREWORD

Dalrymple-Hay Nature Reserve covers 10 hectares of remnant bushland in the suburb of St Ives in north-eastern Sydney. The nature reserve was established in 1972 over what was previously Dalrymple-Hay Demonstration State Forest. The State Forest was named after Richard Dalrymple-Hay, the first Commissioner of Forests in NSW, who proposed the acquisition of the land for a demonstration forest in the 1920s.

Dalrymple-Hay Nature Reserve protects one of the few remaining stands of Blue Gum / Blackbutt forest within the Sydney region. Together with the adjoining Browns Forest, private land and Sydney Water land, it forms one of the largest remnants of Sydney Blue Gum High Forest, an endangered ecological community listed under the *Threatened Species Conservation Act 1995*. Only around 1% of the estimated original 11,000ha of Blue Gum High Forest remains in a relatively natural state.

Dalrymple-Hay Nature Reserve is popular with local residents for short walks and nature appreciation. Bird watchers use the area extensively due to the high number of species within the reserve.

A draft plan of management for Dalrymple-Hay Nature Reserve was placed on public exhibition from 11 October 2002 until 3 February 2003. The exhibition of the draft plan attracted 10 submissions that raised 12 issues. All submissions received were carefully considered before adopting this plan.

The management of Dalrymple-Hay Nature Reserve will emphasise the conservation of the natural vegetation of the reserve, with priority given to conservation of the Sydney Blue Gum High Forest community. Community involvement and appreciation of the reserve, and cooperative management with Ku-ring-gai Council, Sydney Water and neighbours to preserve the endangered Sydney Blue Gum High Forest community in and around the reserve, will also be encouraged.

This plan of management establishes the scheme of operations for Dalrymple-Hay Nature Reserve. In accordance with Section 76 of the *National Parks and Wildlife Act 1974*, the plan of management is hereby adopted.

BOB DEBUS

MINISTER FOR THE ENVIRONMENT

CONTENTS

1. INTRODUCTION

1.1. LOCATION, GAZETTAL AND REGIONAL SETTING

Dalrymple-Hay Nature Reserve covers 10.768 hectares of remnant bushland in north-eastern Sydney, New South Wales (NSW). It is located within the Sydney metropolitan area, approximately 15 kilometres from the centre of Sydney at St Ives. The reserve is currently zoned 6A (Open Space) under the Ku-ring-gai Council Local Environmental Plan.

Dalrymple-Hay Nature Reserve was dedicated in 1972 under the *Fauna Protection Act 1948*, over what was previously Dalrymple-Hay Demonstration State Forest No. 793. The State Forest was named after Richard Dalrymple-Hay, the first Commissioner of Forests in NSW, who proposed the acquisition of the land for a demonstration forest in the 1920s.

Dalrymple-Hay Nature Reserve is bound to the west by the dual carriageway of Mona Vale Road, to the east by Rosedale Road, and to the south by the rear of houses facing Vista Street. On its northern boundary is Browns Forest, a 5-hectare reserve managed by Ku-ring-gai Council. There is no discernible boundary between Browns Forest and Dalrymple-Hay Nature Reserve.

The nature reserve is situated within the upper catchment of High Ridge Creek that flows into Rocky Creek which discharges through Garigal National Park into Middle Harbour.

1.2. THE IMPORTANCE OF DALRYMPLE-HAY NATURE RESERVE

Dalrymple-Hay Nature Reserve protects one of the few remaining stands of Blue Gum (*Eucalyptus saligna)* / Blackbutt (*Eucalyptus pilularis)* forest within the Sydney region. Together with the adjoining Browns Forest, private land and Sydney Water land, it forms one of the largest remnants of Sydney Blue Gum High Forest, an endangered ecological community listed under the *Threatened Species Conservation Act 1995*. Only approximately 1% of the estimated original 11,000ha of Blue Gum High Forest remains in a relatively natural state, and less than 0.1% is protected in a reserve.

Dalrymple-Hay Nature Reserve is part of a number of parks and reserves across Sydney which provide habitat for native animals. A number of local council reserves and native vegetation on private land and road verges form a wildlife corridor between the reserve and the nearby Garigal National Park.

Although little physical evidence remains of past use of the reserve by Aboriginal or European people, the reserve and adjoining Browns Forest have an interesting recent history as part of the struggle to protect small remnant bushland within Sydney from development.

Dalrymple-Hay Nature Reserve is popular with local residents for short walks and nature appreciation. Bird watchers use the area extensively due to the high number of species within the reserve.

2. BASIS FOR MANAGEMENT

2.1. LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974*, the NPW Regulation, the *Threatened Species Conservation Act 1995* and the policies of the National Parks and Wildlife Service. The policies arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

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

The plan of management is a statutory document under the NPW Act. Once the Minister has adopted a plan, no operations may be undertaken within the nature reserve except in accordance with the plan. The plan will also apply to any future additions to Dalrymple-Hay Nature Reserve. Where management strategies or works are proposed for the nature reserve or any additions that are not consistent with the plan, an amendment to the plan will be required.

2.2. NATURE RESERVES IN NEW SOUTH WALES

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.

Nature reserves differ from national parks in that they do not have as a management principle to provide for visitor use.

2.3. SPECIFIC OBJECTIVES FOR DALRYMPLE-HAY NATURE RESERVE

In addition to the above general objectives, Dalrymple-Hay Nature Reserve will be specifically managed to:

- Conserve the natural vegetation of the reserve, with priority given to the Sydney Blue Gum High Forest community;

- Promote public awareness and appreciation of the features and processes of Dalrymple-Hay Nature Reserve and the need to protect remnant shale communities within the Sydney region;

- Encourage community involvement and appreciation of the reserve in environmental education, research and bush regeneration; and

- Encourage cooperative management with Ku-ring-gai Council, Sydney Water and neighbours to preserve the endangered Sydney Blue Gum High Forest community in and around the reserve.

map

3. CONSERVATION OF NATURAL AND CULTURAL HERITAGE

This section contains the policies and framework for the management of Dalrymple-Hay Nature Reserve, together with relevant background information.

3.1. GEOLOGY, SOILS AND DRAINAGE

Dalrymple-Hay Nature Reserve is situated on the ridge between Middle Harbour Creek and Cowan Creek. Along the ridge, Wianamatta Shale forms a capping over the Hawkesbury Sandstone. Wianamatta Shale weathers to a clay soil which becomes saturated in wet weather and highly prone to slumping, while in dry weather it is prone to cracking. These soils have a high nutrient content relative to most other soils in the Sydney area. Bare soil surfaces are highly susceptible to erosion from concentrated and sheet water flow (Chapman and Murphy, 1989).

No sandstone outcrops in the reserve, but in the lower (south) side of the reserve the creeks/drainage lines have worn down to the sandstone bedrock. Soils derived from Hawkesbury Sandstone are common throughout the Sydney region and have a very low nutrient content. Sandstone soils are more porous and hence drier than the shale soils, and are highly erodible if disturbed.

Dalrymple-Hay Nature Reserve is located in one of the wettest regions of Sydney, with an average rainfall of 1400 mm per annum. Average temperatures range from 11°C to a maximum of 22°C.

The reserve slopes to the southeast, with a variation in relief of approximately 40 metres. This results in the reserve being protected from hot dry westerly winds with the south eastern extent remaining damp for long periods and only the upper slopes becoming dry in the summer months.

Two small creeks rise in the reserve and join on the southern (Vista Street) side of the reserve to form one of the headwaters of High Ridge Creek, which eventually flows into Middle Harbour through Garigal National Park. The creeks in the reserve only run after heavy rain but retain moisture for a considerable period.

Increased runoff from residences and stormwater from Mona Vale Road have altered the drainage patterns of the reserve. Between 1939 and 1941 the Sydney Water Board constructed south-flowing sewer lines through the centre of the reserve, which disturbed natural drainage patterns and led to an influx of weeds (Capararo, n.d.).

During road works to upgrade and widen Mona Vale Road, stormwater runoff from the road was piped directly into the reserve and discharged onto the upper side of the central track, badly eroding it and then cutting its way downhill to eventually join a natural creek line before it flows under Vista Street. Recently engineering works to remedy this were undertaken, financed by a NSW Environmental Trust Grant. These involved installation of an erosion-resistant high flow path and a gross pollution trap.

Policies

- No new walking tracks or other developments will be undertaken in the reserve so as to minimise erosion and other impacts.
- Where erosion has been accelerated by human activity or is threatening the conservation values of the reserve, erosion control and prevention measures will be undertaken in accordance with relevant guidelines.
- Efforts will be made to ensure that any soils or other material brought onto the reserve is weed free.

Actions

- Current erosion and stormwater controls will be monitored.
- Stabilisation and rehabilitation work will be undertaken along the length of the artificial stormwater drain to prevent further erosion.
- Stabilisation work will be undertaken on the central track to prevent further erosion.
- Liaison will be continued with the RTA and Ku-ring-gai Council to improve stormwater management in and around the reserve.

3.2. FLORA

3.2.1. Native Plants

Dalrymple-Hay Nature Reserve is dominated by a tall open sclerophyll forest. It contains a large diversity of plants, with 172 native species recorded by Rodgie and Hartnell (1985) and increased to over 180 by Limburg (1991).

The main canopy species within the reserve are Blue Gum (*Eucalyptus saligna*) and Blackbutt (*Eucalyptus pilularis*), interspersed with Sydney Red Gum (*Angophora costata*). This community makes up approximately 85% of the reserve's total area. Due to logging early this century and later land clearance for urban development, this vegetation type is now uncommon within the Sydney region with only approximately 1% remaining in a relatively natural state. Consequently, the stand of Blue Gum and Blackbutt located within Dalrymple-Hay Nature Reserve constitutes one of the largest remnants remaining today.

Small patches of forest dominated by Turpentine (*Syncarpia glomulifera*) are found in the lower sections and along the creeklines of the reserve. These Turpentine-dominated areas are restricted to the sandstone soils.

The reserve's gullies and creeklines contain mesophylic and rainforest species, such as Lilly Pilly (*Acmena smithii*) and Sweet Pittosporum (*Pittosporum undulatum*). Many of these plants are of sufficient age to indicate that they have been present for a long time.

The higher more exposed ridge tops and upper slopes contain Grey Ironbark (*Eucalyptus paniculata*) and Sydney Red Gum interspersed with Blue Gums and

Blackbutts. The higher sections of the north-eastern part of the reserve also contain small stands of Forest Oak (*Allocasuarina torulosa*).

Table 1. Common Native Plant Species

Canopy	Small trees	Understorey	Ground Covers
Eucalyptus saligna	*Acacia longifolia*	*Notelaea longifolia*	*Hardenbergia violacea*
Eucalyptus pilularis	*Pittosporum undulatum*	*Leucopogon lanceolatus*	*Kennedia rubicunda*
Allocasuarina torulosa	*Acacia longissima*	*Leucopogon juniperinus*	*Themeda australis*
Eucalyptus paniculata	*Clerodendrum tomentosum*	*Persoonia levis*	*Echinopogon caespitosum*
Angophora costata	*Elaeocarpus reticulatus*	*Persoonia linearis*	*Poa affinis*
Acmena smithii		*Pittosporum revolutum*	*Eustrephus latifolius*
Angophora floribunda		*Dodonaea triquetra*	*Hibbertia scandens*
Syncarpia glomulifera		*Platylobium formosum*	*Calochlaena dubia*
		Zieria smithii	*Imperata cylindrica*
		Rapanea variabilis	*Dichondra repens*
			Goodenia heterophylla

Information from 1926 newspaper articles and photographs indicate that there was extensive thinning of the forest and the planting of many young trees soon after acquisition. This would make most of the canopy trees approximately 85 years old.

3.2.2. Threatened Species

Dalrymple-Hay Nature Reserve together with Browns Forest conserves one of the last stands of Blue Gum High Forest.

Listed as an endangered ecological community under the *Threatened Species Conservation Act 1995*, Blue Gum High Forest is confined to soil derived from Wianamatta Shale. Approximately 1% of the original area of the community currently exists in the form of a number of remnants in NSW.

A number of Blue Gum trees along the present erosion gully have died, most likely due to a combination of waterlogging and pollutant effects from uncontrolled stormwater drainage. The stormwater control device was installed to address and mitigate this problem.

3.2.3. Introduced Plants

Introduced plants are those species not locally indigenous to an area. Introduced plants within the nature reserve and on adjoining land are of concern because they can have potentially detrimental effects on the important ecological values of the reserve.

Introduced plants in Dalrymple-Hay are found predominately around the boundaries of the reserve, many have grown from garden escapees or have flourished from the increase of nutrients bought in from stormwater.

Prior to a major bush regeneration project undertaken by Ku-ring-gai Bushland and Environmental Society under a Community Employment Program in 1984/85, sections of the reserve were more than 90% Privet (*Ligustrum sinense* and *Ligustrum lucidum*) and Lantana (*Lantana camara*). There were also over 100 Camphor Laurels (*Cinnamomum camphora*) in the reserve. In addition, Honeysuckle (*Lonicera japonica*) was a problem near Mona Vale Road, with many garden species along road edges and in sections of the reserve behind the houses fronting Vista Street.

The weeding program in 1985 worked approximately 60% of the reserve. This resulted in the centre of the reserve being largely free of weeds, except for isolated occurrences. Heavy bands of weeds remain along the Rosedale Road edge, to the south of the central track, and adjoining the asset protection zone along the southern boundary of the reserve.

Although there has been work carried out under various grants, the current level of work is not enough to significantly reduce the continued invasion of weeds from neighbouring private properties and from lands managed by Sydney Water, Ku-ring-gai Council and the Roads and Traffic Authority.

Policies

- The native plant communities in the reserve will be conserved, with priority given to the endangered Blue Gum High Forest community.
- Introduced plants are controlled and where practical eradicated.
- Only plant species endemic to Dalrymple-Hay Nature Reserve will be used in revegetation work. Where possible, plant material will be propagated from seed collected within the area to be treated.
- Control of introduced plant species will be by techniques that cause minimal disturbance to the environment.
- Research into the ecology and distribution of native plants, particularly threatened and uncommon species and communities, will be encouraged.

- The local community and neighbours will be encouraged to support and assist in the conservation of the native vegetation of the reserve.

Actions

- A volunteer bush regeneration program will be encouraged.
- Priority weed species and areas will be identified and controlled.
- The co-operation of Ku-ring-gai Council, Sydney Water and neighbours will be sought to prevent the spread of weeds onto the reserve and to implement complementary weed control programs adjacent to the reserve.
- Interpretive signs describing local species and the importance of the Blue Gum High Forest will be erected on the central track through the centre of the reserve.
- The Service will liaise with other managers of Blue Gum High Forest to encourage best practice management.
- When an approved recovery plan for the Blue Gum High Forest is released, any necessary actions listed will be implemented.

3.3. FAUNA

3.3.1. Native Fauna

Reserves such as Dalrymple-Hay are crucial to many species of native birds, small mammals and reptiles as they provide food, habitat and sanctuary. Dalrymple-Hay is also important because it provides a small link in the wildlife corridor including Garigal National Park and a number of local council reserves.

No comprehensive animal surveys have been undertaken in Dalrymple-Hay Nature Reserve and records are consequently incomplete. However, mammals commonly sighted within Dalrymple-Hay Nature Reserve include Brushtail Possums (*Trichosurus)*, Ringtail Possums (*Pseudocheirus peregrinus*), Sugar Gliders (*Petaurus breviceps*) and Grey-headed Flying Foxes (*Pteropus poliocephalus*). Despite a lack of historical data it is considered likely that mammal species diversity and richness has declined within the reserve due to its isolated nature, small size and urban interface problems. It is also expected that predation by domestic and feral animals such as cats, dogs and foxes has led to no small ground dwelling mammals having been sighted within the reserve in recent years. In addition, introduced animals create stress among native animals, thus reducing the chances of recovery of any locally remaining native species, and increase the nutrients in the soil resulting in increased weed growth. Although dogs and other introduced animals are prohibited in the reserve, dogs are frequently sighted.

Although Dalrymple-Hay supports large populations of many common bird species, and several locally uncommon species, introduced animals and urbanisation are likely to have affected the species diversity. In addition, competition for nesting sites, food and habitat by introduced bird species such as Common Mynas (*Acridotheres tristis*), and by Australian bird species that were once rare within the Sydney region such as Sulphur-crested Cockatoos (*Cacatua*

galerita), Long-billed Corellas (*Cacatua tenuirostris)* and Little Corellas (*Cacatua sanguinea*), have probably affected local species of native birds.

Native birds found within the reserve include Variegated Wrens (*Malurus lamberti*), Black-faced Cuckoo-shrikes (*Coracina novaehollandiae*), Superb Fairy Wrens (*Malurus cyaneus*), Silvereyes (*Zosterops luteus)*, Red Browed Firetails (*Neochmia temporalis*), Eastern Spinebills (*Acanthorhynchus tenuirostris*), King Parrots (*Alisterus scapularis*), Eastern Rosellas (*Platycercus eximius*), Crimson Rosellas (*Platycercus elegans*), Rainbow Lorikeets (*Trichoglossus haematodus*), Eastern Yellow Robins (*Eopsaltria australis*) and Scrubwrens (*Sericornis spp.)*.

3.3.2. Introduced Animals

Cats (*Felis catus)* have been sighted in Dalrymple-Hay Nature Reserve and are a major concern to the protection of mammal, bird and reptiles species. In addition, domestic animals are a major problem for the reserve. Dogs are exercised in the reserve, and domestic dogs and cats enter the reserve from nearby properties. These animals disturb wildlife thus affecting their feeding and breeding, as well as posing a direct threat to small native animals. Foxes have not been sighted in the reserve in recent years.

Dogs and other introduced animals are prohibited in all National Parks and Nature Reserves in NSW.

Policies

- A diversity of habitats for native animals will be maintained within the reserve.
- Research into the significance of Dalrymple-Hay Nature Reserve as habitat in a regional context will be encouraged.
- No dogs will be permitted in this Reserve.
- Introduced animals within the reserve will be controlled, with the long-term aim of eradication.
- Liaison with local residents will be continued to minimise the introduction of non-native species into the reserve.

Actions

- Introduced animal control programs and monitoring will be continued in the reserve.
- Liaison with local residents will be undertaken to explain why domestic animals are prohibited within the reserve.
- Liaise with Ku-ring-gai Council to prohibit domestic animals from Browns Forest and develop consistent signage for Browns Forest and the reserve so that both areas give consistent messages.
- Information will be provided to neighbours on the impacts of pets in an effort to reduce introduced animals entering the reserve.
- Interpretive signs describing local species will be erected on the central track through the centre of the reserve.

3.4. CULTURAL HERITAGE

Dalrymple-Hay Nature Reserve lies within the area occupied by the Guringai (or Kuringai) Aboriginal people, whose territory stretched from the northern shore of Sydney Harbour to Broken Bay. Little is known about the Guringai because European diseases and conflict killed most of their population within the first few years of European settlement of Sydney. Today Dalrymple-Hay Nature Reserve lies within the area of the Metropolitan Local Aboriginal Land Council.

In 1838 the area that is now Dalrymple-Hay Nature Reserve was part of a grant to Daniel Mathews, who had previously established a sawmill nearby in Cowan Road. Its closeness to the mill suggests that the reserve was selectively logged in those early days. In the 1870s Thomas Brown purchased an area which, unlike most of the surrounding land, remained uncleared.

In the 1920s Richard Dalrymple-Hay, the first Commissioner of Forests in NSW, proposed acquiring a remnant of the remaining forest for use as a demonstration forest. Fifty-six acres (around 23 hectares) were resumed in 1926 and the Minister for Lands paid Mr Dalrymple-Hay the honour of naming the demonstration forest after him. The acquisition of the northern 29 acres was, however, not completed and in 1931 this area was revested in the former owners who proposed it for subdivision. The Dalrymple-Hay Forest Preservation Committee managed to obtain an option on 11 of these acres, which were subsequently purchased with 350 pounds raised by the Australian Forest League and 800 pounds paid by Ku-ring-gai Council and named Browns Forest. The Forestry Commission subsequently discovered their acquired land was too small to be managed economically as a forest, so no use was made of it. In 1971 Dalrymple-Hay State Forest was handed to the Service and the area was dedicated as a nature reserve on 28th January 1972.

Although Dalrymple-Hay Nature Reserve has a long history of Aboriginal and European use (a 1926 Sydney Morning Herald newspaper article on the opening of the forest noted that there was “a motor drive, refreshment rooms and other conveniences for tourists and picnic parties”), no cultural sites have been recorded within the reserve.

Policies

- All Aboriginal and historic cultural sites located on the nature reserve will be recorded and protected from disturbance.
- Any Aboriginal sites found on the reserve will be managed in consultation with the Metropolitan Land Aboriginal Land Council.

Action

- Research into the cultural heritage of the reserve will be encouraged.

3.5. FIRE

The Service regards fire as a natural process, one of the established physical factors of the Australian environment to which native plant and animal communities are adapted. The correct management of fire is essential to avoid extinction of native plant and animal species. Management must also consider the on-going protection of life and property within and adjacent to the reserve.

Fire frequency, intensity and seasons of occurrence are major factors influencing the distribution and composition of plant and animal communities. Whilst the ecological requirements for the management of fire on the surrounding Sydney sandstone environments have been well researched, there has been little research in fire management requirements of shale associations.

Little is known about the natural fire regimes of the area, however, approximate fire regimes can be estimated for the reserve when consideration is given to the combined effects of vegetation structure, topographical features and the aspect of the reserve. The Blue Gum/Blackbutt tall forest community found within much of the reserve, combined with the predominantly south-easterly aspect, suggests that there has been a relatively low fire frequency within most of Dalrymple-Hay Nature Reserve. The natural fire frequency has been estimated at between 15 and 30 years or longer (NPWS 2000). The presence of mature mesophylic plant species such as Sweet Pittosporum (*Pittosporum undulatum*) and Lilly Pilly (*Acmena smithii*) in many of the deeper gullies and along the main creekline indicate that these areas have remained unburnt for extended periods. The higher ridge line areas of the reserve are more susceptible to fires and hence would have sustained a higher, more frequent fire frequency. This is supported by the presence of more xerophytic species such as Forest Oak (*Allocasuarina torulosa*).

In recent years, small prescribed burns have been undertaken in the reserve. The most recent recorded fire was 1998 in the northwestern section of the Reserve and a prescribed burn in 1997 in the western section. These burns were undertaken to remove weeds and encourage regeneration of native flora species from soil seed stores. Another prescribed burn was undertaken in 1978 in the northeastern part of the Reserve, however the exact boundaries are unknown.

Apart from these small prescribed burns in the reserve, there has been little fire within either Dalrymple-Hay Nature Reserve or Browns Forest for the past 50 years. Due to the urban nature of the surrounding area, the small size of the reserve and the vegetation, the reserve's present fire frequency is probably much lower than the expected natural fire frequency. This low fire frequency has probably contributed to the increase in the presence of mesophylic shrub and tree species such as Sweet Pittosporum (*Pittosporum undulatum*) and Blueberry Ash (*Elaeocarpus reticulatus*). The low fire frequency may also have contributed to a substantial increase in exotic plant species such as Privet (*Ligustrum sinense*), Lantana (*Lantana camara*) and Camphor Laurel (*Cinnamomum camphora*).

The urban nature of the reserve, its small size and the past low fire frequency combined with the reserve's south-easterly aspect mean that the fire potential for naturally-occurring fires is considered low. The potential of fires starting from

arson or accidental ignition is considered to be much higher than for natural ignition sources. The probability of fire threatening the neighbouring houses is low, given that nearby residences are separated from the reserve by roads or an asset protection zone. In addition, fire spreading towards the houses on Rosedale Road and most of the houses along Vista Street which border the reserve would be travelling down hill and hence would in most conditions be travelling slowly and of only low intensity. Much of the Vista Street boundary is also bordered by extremely damp gully and creekline vegetation which rarely attains fuel moisture levels low enough to support a medium to high intensity fire. Only in the reserves south-western corner can fire burn up-slope toward the urban interface. This area presents the highest risk to life and property within the reserve. This relatively high risk means that regular maintenance of the asset protection zone along this boundary is essential. There is also the potential that fires could spread from the reserve into Browns Forest.

The Service is a designated fire authority under NSW bushfire legislation and is responsible for controlling fires in Dalrymple-Hay Nature Reserve. This includes the control and suppression of fires and the implementation of fuel management programs to protect life and property from fires. The Service may also assist with the control and suppression of fires adjacent to the nature reserve. An important part of the Service's fire management regime is the continual co-operation and participation with local fire services, in this case, Hornsby/Ku-ring-gai Rural Fire Service, Ku-ring-gai Council and the NSW Fire Brigade.

The Service's approach to fire management emphasises the protection of life and property as well as providing direction for the protection of natural and cultural heritage. The Service uses a zoning system for bushfire management in its reserves. Service zones are compatible with the zones adopted by the Bushfire Coordinating Committee for use in District Bushfire Management Committee bushfire risk management plans. The Service has assessed the reserve for fire management planning purposes and has zoned the Dalrymple-Hay Nature Reserve as a Heritage Area Management Zone. The primary fire management objectives for the zone are to prevent the extinction of all species which are known to occur naturally within the reserve, and to protect any culturally significant sites found on the reserve.

Policies

- Dalrymple-Hay Nature Reserve will be managed as a Heritage Area Management Zone with the aim of protecting the Blue Gum High Forest.
- The unauthorised lighting of fires in Dalrymple-Hay Nature Reserve will continue to be prohibited.
- Fire regimes will be implemented which are appropriate for long-term maintenance of the reserve's plant communities.
- Records of all fire occurrences will be maintained.
- Fire may be used within the nature reserve for:
    - the maintenance of species and habitat diversity;
    - the reduction of weeds; and/or
    - the protection of any rare species or communities of special significance.

- Unauthorised fires will be contained and extinguished as soon as possible.
- All planned fuel reduction activities will include post-fire control of introduced plants, and surveys and monitoring of native flora and fauna.

Actions

- The existing central track within the reserve will be maintained to provide access for fire management and suppression purposes if necessary. No additional tracks will be constructed.
- The existing asset protection zone (5-10 metres wide) behind the houses fronting Vista Street will be maintained and any introduced plants or other encroachments removed.

4. PUBLIC USE AND UNDERSTANDING OF THE NATURE RESERVE

It is important to ensure that use and activities within the Dalrymple-Hay Nature Reserve are “appropriate”, that is, in conformity with the Act and the management objectives and actions outlined within this plan.

The major categories of use that can be appropriate, to varying degrees, on nature reserves are:

- education and promotion of the area, the Service and the conservation of natural and cultural resources;
- research; and
- management operations, by the Service itself and other authorities with statutory responsibilities in the area.

The extent to which these categories of use are appropriate to Dalrymple-Hay Nature Reserve is indicated in the following sections.

4.1. PROMOTION, INTERPRETATION AND EDUCATION

Dalrymple-Hay Nature Reserve has had over 160 years of European history from a logging and demonstration forest to gazettal as a Nature Reserve in 1972. Included in this history is the public fight to preserve what is now known as Browns Forest from urban development.

The reserve is extremely popular with local residents for short walks and nature appreciation. Bird watchers also use the area extensively because of the high numbers of species that can be observed in the reserve. The reserve is adjacent to residential areas and bordered on two sides by sealed public roads.

Lane Cove National Park, Garigal National Park and a number of local parks and reserves in the vicinity of Dalrymple-Hay Nature Reserve provide for public recreation. The proximity of these neighbouring reserves and the recreational opportunities they offer means Dalrymple-Hay Nature Reserve can be managed as it was proposed, for protection of the natural heritage, environmental education and research.

It is an objective of management for the Dalrymple-Hay Nature Reserve to promote public understanding of the natural features and processes operating in the reserve. This assists in the protection of the natural and cultural heritage of the reserve and increases the understanding and appreciation of visitors. The provision of a walking track with interpretation signs is seen as an appropriate means of promoting awareness and appreciation of Dalrymple-Hay Nature Reserve. Other recreational uses of the reserve detract from this objective as well as having a direct impact on these natural processes.

Policies

- Promotion of Dalrymple-Hay Nature Reserve will be directed towards encouraging the appreciation and awareness by visitors of the Endangered Ecological Community contained in the reserve and the need for its protection.
- Interpretation on the natural features, the cultural history of the reserve and requests for visitors to remain on the central track will be provided on signs in the reserve.
- Camping, fires, bicycles, horses and dogs are not permitted in the reserve.
- Liaison will be undertaken within local community to emphasis the importance of staying on the designated track and the problems caused with introduced fauna and flora.

Actions

- Interpretive signs will be erected at the entrances to the reserve on Mona Vale and Rosedale Roads, and small signs may be erected at selected sites along the central track.
- Bush regeneration days will be held with Ku-ring-gai Council and interested neighbours.

4.2. RESEARCH

The function of research in the nature reserve is to assist in the understanding of its ecosystem and use, subsequently to aid effective management.

The Service has only limited staff and financial resources for research and efforts must be directed towards the areas of greatest need. Research by other organisations and students can provide invaluable information for management and increase understanding of the area.

Dalrymple-Hay Nature Reserve is located close to Macquarie University, Ryde School of Horticulture, University of Technology Sydney (Ku-ring-gai Campus) and a number of primary and secondary schools.

Policies

- Research into the natural and cultural features of Dalrymple-Hay Nature Reserve will be encouraged.
- All research will be subject to Service policy and procedures for the granting of permits, conduct of research and the production of results.
- Research applications will be granted only where the proposed research does not conflict with the management objectives of the reserve.

Actions

- Research will be specifically encouraged into:
  - Soils, drainage and nutrient levels in the reserve and their impacts on vegetation communities;

  - appropriate fire regimes for conserving the vegetation of the reserve;
  - the value of the reserve as wildlife habitat in a regional context;
  - systematic fauna and flora monitoring; and
  - long term monitoring of the stormwater trap device objectives.
- A prospectus of research topics will be developed and distributed to nearby academic institutions.

4.3. MANAGEMENT OPERATIONS

Management of Dalrymple-Hay Nature Reserve is based at Lane Cove National Park. There is no foreseeable need for management facilities to be provided on the reserve.

Access for maintenance and emergency vehicles is provided at either end of the central track, on Rosedale and Mona Vale Roads. Public parking is available on Rosedale Road and on a small clearing off Mona Vale Road.

There are a number of informal tracks through the reserve. These are not necessary given the small size of the reserve and as access is provided along the central track and along three boundaries (Mona Vale Road, Rosedale Road and along the asset protection zone behind the Vista Street houses).

Management of the reserve and protection of the Blue Gum forest would be enhanced by more consistent management of the reserve and the adjoining Browns Forest.

Policies

- No additional permanent tracks or management or storage facilities will be constructed in the reserve.
- Boundary fencing will be upgraded and gates installed and locked where necessary to prevent unauthorised access.
- Vehicular access within the reserve will only be permitted for essential management purposes.

Actions

- Informal tracks in the reserve will be rehabilitated and their use discouraged through interpretation and education.
- Ku-ring-gai Council will be approached with a proposal that Browns Forest be managed as part of the nature reserve.

5. PLAN IMPLEMENTATION

This plan of management 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, regional and area levels.

The implementation of this plan will be undertaken within the annual programs of the Service's Sydney North Region and Lane Cove River Area. Priorities, determined in the context of area and regional strategic planning, will be subject to the availability of necessary staff and funds and to any special requirements of the Director-General or Minister.

Regional programs are subject to ongoing review, within which works and other activities carried out at Dalrymple-Hay Nature Reserve are evaluated in relation to the objectives laid out in this plan.

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

Section 81 of the National Parks and Wildlife Act requires that this plan shall be carried out and given effect to, and that no operations shall be undertaken in relation to the nature reserve unless they are in accordance with the plan. However, if after adequate investigation, operations not included in the plan are found to be justified, this plan may be amended in accordance with section 73B of the Act.

Any land added to Dalrymple-Hay Nature Reserve will be managed in accordance with this plan of management. No development will be undertaken in these areas except for soil conservation, weed control, bush regeneration, maintenance of existing improvements and fire management without an amendment to this plan being exhibited for public comment.

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

Activity	**Plan Reference**
High Priority	
Current erosion and stormwater controls will be monitored	**3.1**
Stabilisation work will be undertaken along the length of the artificial stormwater drain to prevent further erosion	**3.1**
Stabilisation work will be undertaken on the central track to prevent further erosion	**3.1, 3.5**

Liaison will be continued with the RTA and Ku-ring-gai Council to improve stormwater management in and around the reserve.	**3.1**
Encourage the establishment of a volunteer bush regeneration program	**3.2**
Prepare list of priority weeds/areas and undertake weed control	**3.2**
Implement actions in the Blue Gum High Forest recovery plan	**3.2**
Erect interpretive signs describing local species and the importance of the Blue Gum High Forest on the central track through the centre of the reserve	**3.2, 3.3, 4.1**
Continue introduced animal control and monitoring	**3.3**
Maintain asset protection zone behind the houses fronting Vista Street	**3.5**
Maintain existing central track for fire access	**3.5**
Rehabilitate informal tracks and discourage ongoing use	**4.3**

Medium Priority

Seek cooperation of Ku-ring-gai Council and neighbours to implement complementary weed control programs adjacent to the reserve	**3.2**
Liaise with local residents to explain why domestic animals are prohibited within the reserve and why use of informal tracks is discouraged. Provide information on impacts of pets.	**3.3**
Liaise with Ku-ring-gai Council to develop a conservation agreement	**3.3**
Clear weeds from the southern boundary asset protection zone	**4.3**
Hold bush regeneration days with Ku-ring-gai Council and interested neighbours as required	**4.1**
Develop a prospectus of research topics and distribute to nearby academic institutions.	**4.2**

Lower Priority

Encourage research into priority research areas.	**4.2**

6. REFERENCES

Capararo, G. (n.d.). *Dalrymple-Hay and Browns Forest Reserves, Site Assessment and Recommendations for Bush Regeneration.* Unpubl. Report prepared for NPWS.

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