

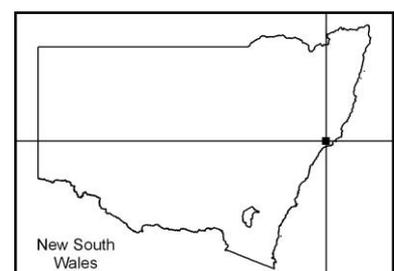


# Plan of Management



## Karuah, Medowie and Wallaroo Group

Incorporating Karuah National Park, Wallaroo National Park,  
Karuah State Conservation Area, Medowie State Conservation Area,  
Karuah Nature Reserve and Medowie Nature Reserve



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### **Acknowledgments**

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Thanks are extended to all members of the community who participated in the consultation process for the draft plan of management.

NPWS acknowledges these parks are part of Country for the Worimi Aboriginal people.

**Front cover image:** Tattersalls Campground, Karuah National Park. Photo: OEH

**This plan of management was adopted by the Minister for the Environment on 30 October 2015.**

For additional information or any inquiries about this park or this plan of management, contact the NPWS Hunter Coast Area Office, Locked Bag 99, Nelson Bay NSW 2315 or by telephone on (02) 4984 8200.

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## Foreword

The Karuah, Medowie and Wallaroo Group of Parks are located on the lower north coast of New South Wales, near Raymond Terrace and Karuah. The group comprises Karuah National Park, Wallaroo National Park, Karuah State Conservation Area, Medowie State Conservation Area, Karuah Nature Reserve and Medowie Nature Reserve, and collectively cover an area of 10,301 hectares. The parks are part of the traditional country of the Worimi Aboriginal people.

The parks protect important remnant vegetation communities in the lower Hunter Valley, and will provide an increasingly valuable conservation resource into the future. Several vulnerable plant and animal species and two endangered ecological communities have been recorded in the parks. The parks also protect several Aboriginal sites and a convict-built road.

The NSW *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each national park, state conservation area and nature reserve, and allows for a single plan to cover a combination of contiguous or related parks. A draft plan of management for the parks (then known as the Karuah, Medowie and Wallaroo Group of Reserves) was placed on exhibition from 27 January 2012 until 30 April 2012. The submissions received on the draft plan were carefully considered before adopting this plan.

The plan contains a number of actions to protect our natural environment, including actions to assist the recovery of threatened species and control of weeds and pest animals. The plan also provides for a range of sustainable recreation opportunities, including camping, horse riding and cycling, and cultural activities.

This plan of management establishes the scheme of operations for the Karuah, Medowie and Wallaroo Group of Parks. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan is hereby adopted.



**Mark Speakman**  
**Minister for the Environment**

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# 1. Introduction

## 1.1 Location, gazettal and regional context

Karuah National Park, Wallaroo National Park, Medowie State Conservation Area, Karuah State Conservation Area, Medowie Nature Reserve and Karuah Nature Reserve (referred to in this plan as ‘the parks’) are located near Raymond Terrace and Karuah. Maps 1 and 2 show the parks in a state and regional context respectively. The total size of the parks is 10,301 hectares (see Table 1). The parks have been grouped in this plan due to their biogeographical association.

**Table 1: Size of the parks**

Park name	Area (ha)
Karuah National Park	3,534
Wallaroo National Park	2,780
Medowie State Conservation Area	2,851
Karuah State Conservation Area	74
Medowie Nature Reserve	238
Karuah Nature Reserve	824
<b>TOTAL</b>	<b>10,301</b>

**Karuah National Park** is located approximately 30 kilometres north-east of Raymond Terrace. The park adjoins the Karuah River to the east, Wallaroo State Forest to the south and freehold land on the other boundaries. Karuah National Park was formerly Karuah State Forest (reserved in 1914) until reserved as Karuah Nature Reserve in 1999 by the *National Park Estate (Land Transfers) Act 1998* (formerly known as the *Forestry and National Parks Estate Act 1998*), then reclassified as national park in 2007 under the *National Park Estate (Lower Hunter Region Reservations) Act 2006*.

**Wallaroo National Park** is located approximately 20 kilometres north-east of Raymond Terrace. The park adjoins Wallaroo State Forest in the south and east, and freehold land in the north and west. Wallaroo National Park was formerly Wallaroo State Forest (reserved in 1922) until dedicated as Wallaroo Nature Reserve in 1999 by the *National Park Estate (Land Transfers) Act 1998*, then reclassified as Wallaroo National Park in 2007 under the *National Park Estate (Lower Hunter Region Reservations) Act 2006*.

**Medowie State Conservation Area** is located approximately 14 kilometres north-east of Raymond Terrace. Medowie State Conservation Area adjoins Defence land and freehold land in the east and freehold land on the other boundaries, with some neighbouring Hunter Water Corporation Land in the south-west. Formerly Medowie State Forest (reserved in 1922), the area was reserved as Medowie State Conservation Area in 2003 by the *National Park Estate (Reservations) Act 2002*.

**Karuah State Conservation Area** adjoins Karuah National Park on all boundaries except the west, where it adjoins the Bucketts Way. Formerly Karuah State Forest, it was reserved by the *National Park Estate (Reservations) Act 2002*.

**Medowie Nature Reserve** adjoins Medowie State Conservation Area in the west and is entirely either mangrove or salt marsh, on the western bank of Reedy Creek. Formerly classified as part of Karuah and Worimi Nature Reserves, the area was renamed Medowie Nature Reserve by the *National Park Estate (Lower Hunter Region Reservations) Act 2006*.

**Karuah Nature Reserve** comprises two separate portions of land. The larger portion covers 701 hectares and is located three kilometres east of Karuah. This portion was reserved in 2007 under the *National Park Estate (Lower Hunter Region Reservations) Act 2006* as part of the compensatory habitat process for the construction of the Pacific Highway Karuah bypass. The smaller portion covers 123 hectares and is located 15 kilometres north of Karuah (see inset map, Map 2). It was formerly Karuah State Forest (1914) until reserved in 1999 as Karuah Nature Reserve by the *National Park Estate (Land Transfers) Act 1998*. Both portions are surrounded by freehold land.

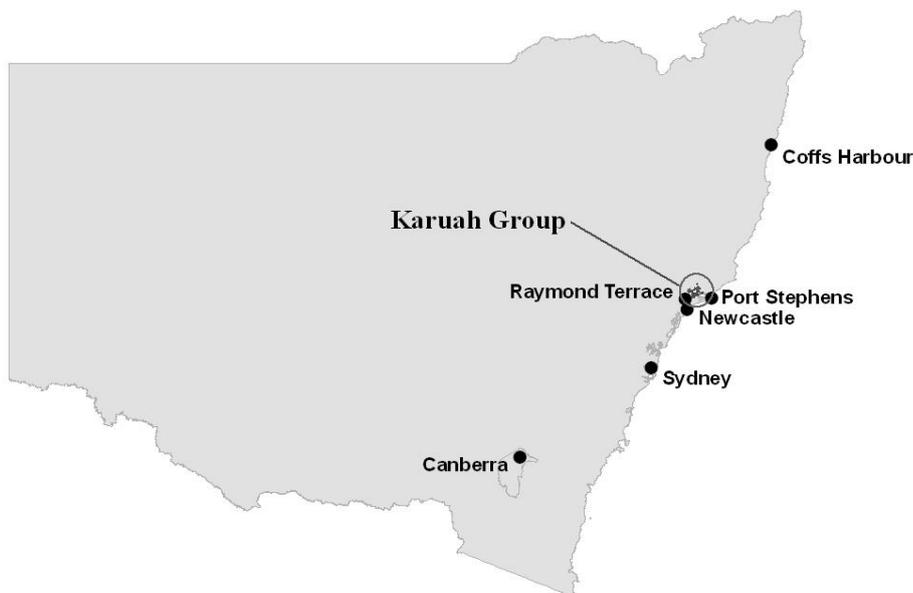
The parks also include lands which are vested in the Minister under Part 11 of the *National Parks and Wildlife Act 1974* (NPW Act). These lands ensure a continuation of access arrangements to neighbouring private lands and include Winters and Mine Hill trails, and Witt Road (see Map 2).

The parks are located to the west of Port Stephens, which is part of the Port Stephens – Great Lakes Marine Park.

The Hunter Valley has experienced major land clearing since European settlement. The parks protect landscapes and vegetation communities in the Karuah and Williams river catchments. Most of the areas covered by this plan were state forests, some reserved in 1914. While the areas have experienced major changes through logging activity over many years, they conserve vegetation types with restricted distribution.

The parks are within the administrative areas of Port Stephens, Dungog Shire and Great Lakes councils, Hunter Local Land Services, and both Worimi and Karuah local Aboriginal land councils.

**Map 1: State location map**



## **1.2 Statement of significance**

The parks are significant because of their natural and cultural values, including:

### **Biological values**

The parks contain remnant vegetation communities following large-scale clearing in the Williams and Karuah river valleys. Several plant and animal species listed as vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act) have been recorded in the parks. The parks also include two endangered ecological communities listed under the TSC Act: saltmarsh and floodplain rainforest.

### **Landscape and catchment values**

Gilmore Hill and Karuah Mountain provide scenic backgrounds to Clarence Town and Karuah townships. The parks contain some of the largest forested sections in the lower catchments of the Williams River, Karuah River and Port Stephens.

### **Aboriginal heritage values**

Several Aboriginal sites have been recorded along the Karuah River within the parks, and there is a high probability that other sites occur in the parks.

### **Historic heritage values**

A convict-built road constructed during the establishment of the Australian Agricultural Company in Port Stephens between 1826 and 1830 is located in Karuah Nature Reserve.

## 2. Management context

### 2.1 Legislative and policy framework

The management of nature reserves, national parks and state conservation areas in New South Wales is in the context of the NSW legislative and policy framework, primarily the NPW Act and Regulation, the TSC Act and the policies of the National Parks and Wildlife Service (NPWS).

Other legislation, international agreements and charters may also apply to management of the parks. In particular, the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) may require the assessment and mitigation of the environmental impacts of works proposed in this plan. The NSW *Heritage Act 1977* may apply to excavation in known archaeological sites or in sites with potential to contain historical archaeological relics. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) also applies in relation to actions that may impact on matters of national environmental significance, such as migratory species and threatened species listed under that Act.

A 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 parks except in accordance with this plan. This plan will also apply to any future additions to the parks. Should management strategies or works be proposed for the parks, or any additions to the parks, that are not consistent with this plan, an amendment to this plan or a new plan will be prepared and exhibited for public comment.

### 2.2 Management purposes and principles

**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 NPW Act (section 30J), 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
- provide for appropriate research and monitoring.

Nature reserves differ from national parks in that they do not have the provision of recreation as a management principle.

**National parks** are reserved under the NPW Act to protect and conserve areas containing outstanding or representative ecosystems, natural or cultural features or landscapes or phenomena that provide opportunities for public appreciation and inspiration and sustainable visitor or tourist use.

Under the NPW Act (section 30E), national parks are managed to:

- conserve biodiversity, maintain ecosystem functions, protect geological and geomorphological features and natural phenomena and maintain natural landscapes
- conserve places, objects, features and landscapes of cultural value

- protect the ecological integrity of one or more ecosystems for present and future generations
- promote public appreciation and understanding of the park's natural and cultural values
- provide for sustainable visitor or tourist use and enjoyment that is compatible with conservation of natural and cultural values
- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of natural and cultural values
- provide for appropriate research and monitoring.

**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 or tourist 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 NPW Act.

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

- conserve biodiversity, maintain ecosystem functions, protect natural phenomena and maintain natural landscapes
- conserve places, objects and features of cultural value
- provide for the undertaking of uses permitted under other provisions of the NPW Act (including uses permitted under section 47J such as mineral exploration and mining), having regard to the conservation of the natural and cultural values of the state conservation area
- provide for sustainable visitor or tourist 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
- provide for appropriate research and monitoring.

The NPW Act requires a review of the classification of state conservation areas every five years in consultation with the Minister administering the *Mining Act 1992*. In the long term it is intended for Medowie and Karuah state conservation areas to become national park and so management will also be guided by the management principles of national parks where possible.

### **2.3 Specific management directions**

In addition to the general principles for the management of nature reserves, state conservation areas and national parks (see Section 2.2), the following specific management directions apply to the management of the parks:

- Identify and protect endangered ecological communities.
- Manage fire to protect life and property and maintain appropriate burn frequencies within ecological thresholds.
- Rationalise the network of vehicular roads and tracks.
- Provide sustainable camping opportunities in Karuah National Park.

### 3. Values

The location, landforms and plant and animal communities of an area have determined how it has been used and valued. Both Aboriginal and non-Aboriginal people place values on natural areas, including aesthetic, social, spiritual and recreational values. These values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. This plan of management aims to conserve both natural and cultural values. For reasons of document clarity, various aspects of natural heritage, cultural heritage, threats and ongoing use are dealt with individually in this plan, but their interrelationships are recognised.

#### 3.1 Geology, landscape and hydrology

The parks are characterised by undulating lowlands and low to steep hills on complex patterns of faulted and gently folded Carboniferous conglomerate, lithic sandstone, felspathic sandstone, and mudstone, with general elevations from 50 to 275 metres above sea level, and local relief between 40 and 150 metres. The Carboniferous system has been extensively deformed into a series of north-west trending folds, disrupted by north to north-east trending faults (Matthei 1995). This is evidenced in the parks by the north-south alignment of the Karuah and Williams river valleys and hill formations in Wallaroo National Park and Karuah Nature Reserve.

Wallaroo National Park in the west of the parks are dominated by Gilmore Hill (232 metres above sea level), with steep slopes on the western face above Williams River and long spurs on the eastern side. Soils are developed from sandstone and ignimbrites.

Karuah Hill (246 metres above sea level) dominates Karuah Nature Reserve in the east of the parks. This conical hill is similar to those near Shoal Bay, developing from carboniferous volcanic flows of rhyolite and dacitic ignimbrites, with occasional interbeds of sandstone and conglomerate (Matthei 1995).

Medowie State Conservation Area and Karuah National Park in the centre of the parks comprise flat to gently undulating terrain on relict sediments. Sediments of unknown age occur in this area. These undated sediments consist of an iron-bearing layer underlain by kaolinitic clays. Clay deposits can be over 25 metres deep. Mining of clay deposits occurs just outside Medowie State Conservation Area, north of Swan Bay Road. Drainage lines are narrow and deeply incised in the upper reaches, grading into moderately broad drainage plains.

Most of Medowie Nature Reserve and parts of Karuah National Park contain estuarine tidal flats vegetated by mangroves and saltmarsh. Almost all of Medowie Nature Reserve and parts of Medowie State Conservation Area, Karuah National Park and Karuah Nature Reserve were previously identified as wetlands worthy of protection under *State Environmental Planning Policy 14* before their reservation under the NPW Act.

The western fall of Gilmore Hill in Wallaroo National Park drains into the Williams River, while the remainder of the area of the parks drains to Port Stephens.

#### Issues

- Soil types high in clay content are widespread in the parks. Flat terrain in many parts of the parks makes it difficult to construct road drainage. In wet weather this combination of factors causes roads to deteriorate quickly from the effects of vehicular traffic. Roads often become impassable even to four-wheel drive vehicles in these conditions.

- When conditions are dry, sections of the roads often remain impassable until repaired by earthmoving machinery. These conditions are most common in parts of Karuah National Park and all of Medowie State Conservation Area. Rationalisation of the road network is needed throughout the parks for environmental protection, to ensure all access roads are safe and to reduce ongoing maintenance costs (see Section 3.5).
- Many of the minor tracks are significantly eroded, with potential for further erosion, resulting in sedimentation of creeks.
- There is also erosion at sites where small boats are launched at Tattersalls Camping Area and Double Wharf Day Use Area, requiring riverbank stabilisation works (see Section 3.5).

### **Desired outcomes**

- Soil erosion is minimised.
- Landscape and catchment values are protected.

### **Management response**

- 3.1.1 Restrict vehicle access in the parks to prevent damage during periods of wet weather and to ensure public safety.
- 3.1.2 Develop and implement a staged program for closure and rehabilitation of minor tracks.

## **3.2 Native biodiversity**

### **Native plants**

The parks support 16 vegetation communities, including two endangered ecological communities listed under the TSC Act: Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions, and Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion (see Table 2). Further surveys and mapping may identify additional vegetation communities, including threatened ecological communities such as Lower Hunter Spotted Gum – Ironbark Forest in the Sydney Basin Bioregion.

Available floristic data include mapping by the then Forestry Commission of NSW (FCNSW 1981), the Lower Hunter and Central Coast Regional Environmental Management Strategy Project (NPWS 2000), NPWS Comprehensive Regional Assessments (NPWS 1999) and the preliminary vegetation survey of Karuah and Wallaroo nature reserves (Bell 2002). A detailed list of native plant species for Wallaroo National Park has been compiled by McDonald (2004). Table 3 provides a list of threatened and significant plant species recorded in the parks.

Strategies for the recovery of threatened species, populations and ecological communities have been set out in a statewide *Threatened Species Priorities Action Statement* (DECC 2007). These actions are currently prioritised and implemented through the *Saving our Species* program which aims to maximise the number of threatened species that can be secured in the wild in New South Wales for 100 years (OEH 2013c). Individual recovery plans may also be prepared for threatened species to consider management needs in more detail. The *Priorities Action Statement* and any recovery plans (should they be prepared) will be used to guide management of threatened plants in the parks.

**Table 2: Vegetation communities recorded in the parks**

<b>Community</b>	<b>Park</b>
Estuarine Saltmarsh – Grassland	KNP, MSCA, MNR, KNR
Estuarine Mangrove Open/Closed Scrub	KNP, MSCA, MNR, KNR
Estuarine Fringing Swamp Oak Forest	KNP, MSCA, MNR, KNR
Spotted Gum – Ironbark Grassy Open Forest	MSCA, WNP, KNP, KNR
Forest Redgum – Narrow-leaved Ironbark Grassy Open Forest	WNP, KNP, KNR, KSCA
Grey Box – Narrow-leaved Ironbark Grassy Open Forest	WNP, KNP, KNR
Spotted Gum – Tallowood – White Mahogany Sheltered Open Forest	MSCA, WNP, KNP, KNR, KSCA
Blackbutt – White Stringybark – Ironbark Tall Open Forest	MSCA, WNP, KNP, KNR
Turpentine Moist Forest	KNP
Red Bloodwood – Smooth-barked Apple – Stringybark – Sydney Peppermint Heathy Open Forest	MSCA, WNP, KNP, KNR, KSCA, MNR
Red Bloodwood – Charmhaven Apple Heathy Open Woodland	KNP
Swamp Mahogany – Paperbark – Swamp Oak Alluvial Swamp Forest	KNP
Swamp Mahogany – Red Mahogany – Paperbark Riparian Sedge Forest	KNP, WNP
Red Mahogany – Charmhaven Apple – Paperbark Swamp Forest	KNP
Red Mahogany – Smooth-barked Apple – Sieber’s Paperbark Grassy Drainage Forest	KNP, WNP
Gallery Rainforest – Flooded Gum Forest	KNP, WNP
Weeping Lilly Pilly – Water Gum Riparian Rainforest	KNP
Swamp Mahogany – Lilly Pilly – Livistona Riparian Rainforest	KNP

Source: Bell (2002)

Key: KNP (Karuah National Park), WNP (Wallaroo National Park), MSCA (Medowie State Conservation Area), KSCA (Karuah State Conservation Area), MNR (Medowie Nature Reserve)

**Table 3: Threatened and significant plant species recorded in the parks**

<b>Common name</b>	<b>Scientific name</b>	<b>Status</b>
Charmhaven apple	<i>Angophora inopina</i>	Vulnerable * # ^
Elbow orchid	<i>Arthrochilus prolixus</i>	^
Netted bottle brush	<i>Callistemon linearifolius</i>	Vulnerable * ^
	<i>Eucalyptus fergusonii</i> ssp. <i>fergusonii</i>	^
Small-flower grevillea	<i>Grevillea parviflora</i> ssp. <i>parviflora</i>	Vulnerable * #
	<i>Macrozamia flexuosa</i>	^
Black-eyed Susan	<i>Tetratheca juncea</i>	Vulnerable * # ^

\* Status under TSC Act

# Species also listed as nationally threatened under the EPBC Act

^ Species considered a Rare or Threatened Australian Plant using criteria of Briggs and Leigh (1996)

Key actions listed in the *Priorities Action Statement* to recover species found in the parks include:

- Charmhaven apple (*Angophora inopina*): ensuring an appropriate fire regime (prevent frequent fires from impacting on populations) and habitat rehabilitation through weed removal
- netted bottle brush (*Callistemon linearifolius*): protecting populations from management actions (e.g. road maintenance), and ensuring an appropriate fire regime
- small-flower grevillea (*Grevillea parviflora* ssp. *parviflora*): ensuring that personnel planning and undertaking road maintenance are able to identify the species and are aware of its habitat, reinstating an appropriate fire regime, controlling weeds using methods that will not impact on the species (hand pull or cut and paint weeds), and mapping known populations and marking or fencing off sites during road maintenance activities
- black-eyed Susan (*Tetradlea juncea*): reinstating an appropriate fire regime which protects the species from frequent fire, and controlling weeds as required using methods that will not impact on the species (hand pull or cut and paint weeds).

Past timber extraction activity throughout much of the parks has produced a forest structure with a high proportion of immature trees and very few habitat trees. There is a need to investigate and, if appropriate, implement strategies to enhance the habitat values of the regrowth areas.

### **Native animals**

Key habitats and corridors mapping for forest-dependent animal species has been undertaken by NPWS to provide a landscape framework for conservation in north-east New South Wales (Scotts 2003). Key habitats are areas of predicted high conservation value for forest animals, mapped using fauna assemblage information (assemblages are groupings of conservation priority animal species with similar distributions). Corridors are areas mapped for their potential habitat values for resident populations or nomadic and migratory species and to provide overall landscape connectivity to facilitate wildlife movement. Almost 80% of the parks have been mapped as key habitat and 85% of the parks have been identified as part of a regional corridor.

In parts of the parks, fauna surveys have been conducted as part of the comprehensive regional assessment process leading up to the North East Regional Forest Agreement or as part of the environmental impact assessments and investigations undertaken for the construction of the Pacific Highway Karuah bypass. Karuah Nature Reserve, one of the least disturbed of the parks, will be prioritised for future fauna surveys.

Commonly sighted species in the parks include eastern grey kangaroo (*Macropus giganteus*), swamp wallaby (*Wallabia bicolor*), lace monitor (*Varanus varius*) and the yellow-tailed black-cockatoo (*Calyptorhynchus funereus*). A number of threatened species have been recorded in the parks (see Table 4).

The parks are also important for birds listed under the China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA) and Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA), with numerous migratory bird species recorded.

There is a single record of emus (*Dromaius novaehollandiae*) being sighted adjacent to the Pacific Highway in Medowie State Conservation Area in 1990. If present, they would be part

of the endangered emu population in the NSW North Coast Bioregion and Port Stephens Local Government Area, however there do not appear to be any recent sightings.

The *Priorities Action Statement* also identifies strategies and actions to promote the recovery of threatened animal species and populations and manage key threatening processes. The *Priorities Action Statement* and recovery plans will be used to guide management of threatened animals in the parks. Species for which recovery plans currently exist are indicated in Table 4.

**Table 4: Threatened and significant animal species recorded in the parks**

Common name	Scientific name	Legal status *
<b>Birds</b>		
Bush stone-curlew <sup>^</sup>	<i>Burhinus grallarius</i>	Endangered
Glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	Vulnerable
Varied sittella	<i>Daphoenositta chrysoptera</i>	Vulnerable
Swift parrot <sup>^</sup>	<i>Lathamus discolor</i>	Endangered #
Hooded robin (south-eastern form)	<i>Melanodryas cucullata cucullata</i>	Vulnerable
Turquoise parrot	<i>Neophema pulchella</i>	Vulnerable
Powerful owl <sup>^</sup>	<i>Ninox strenua</i>	Vulnerable
Grey-crowned babbler (eastern subsp.)	<i>Pomatostomus temporalis temporalis</i>	Vulnerable
Masked owl <sup>^</sup>	<i>Tyto novaehollandiae</i>	Vulnerable
<b>Mammals</b>		
Spotted-tailed quoll	<i>Dasyurus maculatus</i>	Vulnerable #
Little bentwing-bat	<i>Miniopterus australis</i>	Vulnerable
Eastern bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	Vulnerable
Eastern freetail-bat	<i>Mormopterus norfolkensis</i>	Vulnerable
Squirrel glider	<i>Petaurus norfolcensis</i>	Vulnerable
Brush-tailed phascogale	<i>Phascogale tapoatafa</i>	Vulnerable
Koala <sup>^</sup>	<i>Phascolarctos cinereus</i>	Vulnerable #
Long-nosed potoroo	<i>Potorous tridactylus</i>	Vulnerable #
Grey-headed flying-fox <sup>^d</sup>	<i>Pteropus poliocephalus</i>	Vulnerable #
Greater broad-nosed bat	<i>Scoteanax rueppellii</i>	Vulnerable

\* Status under the TSC Act

# Denotes species also listed as nationally threatened under the EPBC Act

<sup>^</sup> Recovery plan approved for the species

<sup>^d</sup> Draft recovery plan prepared for the species

## Issues

- Key threats to native species include fire, introduced species, erosion, stream degradation and inappropriate human activities (see Section 4). Protection of habitat and appropriate fire regimes are a major determinant of the distribution and abundance of native animals in the parks.

- There is a reduced number of habitat trees within the parks due to previous land use. This has significantly reduced the suitable habitat for a wide range of animal species that require tree hollows.
- Limited vegetation surveys have been undertaken to identify and map threatened species and ecological communities.
- The area surrounding the parks has been extensively cleared, which has resulted in a high loss of biodiversity and fragmentation of habitat in the region (see Section 4.3).

### **Desired outcomes**

- All native plant and animal species and communities are conserved.
- Structural diversity and habitat values are restored in areas subject to past logging.
- There is improved knowledge of significant plants and animals, including their ecology and habitat requirements.

### **Management response**

- 3.2.1 Implement relevant actions in the *Priorities Action Statement* and recovery and threat abatement plans for threatened species and populations.
- 3.2.2 Undertake detailed vegetation mapping. Manage the parks to reduce adverse impacts on threatened species and communities.
- 3.2.3 Investigate and implement, if appropriate, management strategies to enhance the habitat values of regrowth areas.
- 3.2.4 Encourage surveys for threatened and significant plants and animals, giving priority to predicted habitat for threatened species and Karuah Nature Reserve.

### **3.3 Aboriginal heritage values**

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

The parks are within a landscape that is part of the identity, spirituality, connection and resource base of the Aboriginal people of the Worimi Nation. Prior to European settlement the Worimi People lived in an area from Port Stephens to Forster/Tuncurry and as far west as Gloucester. The Worimi Nation was made up of several nurras or local groups within the tribe and spoke dialects of the Kattang language.

An Aboriginal mission was established at Karuah in 1898. People from the mission were employed in fishing, oyster farming and timber-getting in the local area. The Karuah River and surrounds including Karuah National Park, continues to be an integral part of the culture of the Karuah Aboriginal community.

There are a number of recorded Aboriginal sites within the parks, particularly along the Karuah River. These sites include modified trees, artefacts, earth mounds, shell middens and a burial on the boundary of Karuah National Park.

The Aboriginal community has expressed interest in conducting culture camps and associated cultural activities in the parks, with a focus on Karuah National Park, or an area may be set aside for the exclusive use of the Aboriginal community to conduct cultural activities subject to an amendment to this plan of management.

While the NSW Government currently has legal responsibility for the protection of Aboriginal sites, NPWS acknowledges that local Aboriginal people have a right to be involved in decision-making processes concerning their own heritage. Consultation has traditionally occurred through the local Aboriginal land councils. The parks fall within the Worimi and Karuah local Aboriginal land councils.

### **Issues**

- The Aboriginal community has expressed interest in conducting culture camps and associated cultural activities in the parks, with a focus on Karuah National Park. Following appropriate consultation with the Aboriginal community, NPWS consent may be issued for short-term cultural activities, including camping. The designation of an area for the exclusive use by the Aboriginal community to conduct cultural activities would be subject to an amendment to this plan of management.

### **Desired outcomes**

- Aboriginal places and values are identified and protected.
- Aboriginal people are involved in management of the Aboriginal cultural values of the parks.
- Negative impacts on Aboriginal and historic heritage values are stable or diminishing.
- Karuah National Park provides opportunities for Aboriginal culture activities.

### **Management response**

- 3.3.1 Consult and involve the Karuah and Worimi local Aboriginal land councils, and other relevant Aboriginal community organisations, in the management of Aboriginal sites, places and values, including interpretation of places or values.
- 3.3.2 Undertake an archaeological survey and cultural assessment prior to all works with the potential to impact on Aboriginal or historic sites and places.
- 3.3.3 Encourage further research into the Aboriginal heritage values of the parks with the Karuah and Worimi local Aboriginal land councils.
- 3.3.4 Consult with the Aboriginal community to identify locations and reach agreement on operations of sites for cultural activities.
- 3.3.5 Issue consents as appropriate for short-term cultural activities, including camping.

### **3.4 Historic heritage values**

Heritage places and landscapes are made up of living stories as well as connections to the past which can include natural resources, objects, customs and traditions that individuals and communities have inherited and wish to conserve for current and future generations. Cultural heritage comprises places and items that may have historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance. NPWS conserves the significant heritage features of NSW parks and reserves.

Following the early European explorers, escaped convicts and cedar cutters, the Australian Agricultural Company established a base at Carrington on the northern shore of Port

Stephens in 1826. Robert Dawson, the initial chief agent, describes the settlement and relationships with the local Aboriginal people in detail (Dawson 1831). During this time, a convict-built road was established connecting Carrington with Karuah. Sections of this road, still in reasonable condition, are located in Karuah Nature Reserve.

Additional history of much of the parks is described in a booklet published by the Limeburners Creek Progress Association (1988). The earliest leasehold on the eastern side of the Williams River near Wallaroo National Park was advertised in 1838. The initial transport in the region was along the waterways. The earliest paddle steamer built in Australia, named *William the Fourth*, was constructed at Clarence Town in 1831. By 1840 a well-defined road linked the Australian Agricultural Company towns of Booral, Stroud and Gloucester to Raymond Terrace.

Karuah State Forest was the first in the area, dedicated in 1914, with Medowie and Wallaroo state forests dedicated in 1922. The previous management plan for the state forests in the area (FCNSW 1981) describes the history of forest management practices. The area was generally regarded as 'cut out' of high quality timber by the 1920s. Large trees considered to be of no commercial value were removed to create openings for regrowth from the 1920s. The opening of a Masonite plant in the late 1930s promoted the harvesting of low-quality timber. Pit props and other mining timber were first sold from the area in 1938, and this market expanded along with mining operations in the Hunter Valley. Round mining timber remained the main product harvested from the state forests prior to their dedication as conservation reserves. The most obvious indicators of the history of the timber industry in the parks are the road network and the structure of the forest. Other indicators include the timber-loading ramps on the banks of the Karuah River at Double Wharf and a pine plantation in Karuah National Park.

Several huts were built along the banks of the river in Karuah National Park. These were removed in the 1980s, however sections of concrete and old bricks remain in some locations. Other recorded historic sites in Karuah National Park include a set of yards at Witt Road, Hunter Jetty at Claybank Road, and Double Wharf at the end of Hobarts Road (NPWS 2003). The site of an early school in Medowie is located near Boundary Road in Medowie State Conservation Area, however no evidence remains of the school building. Historic sites in Wallaroo National Park include cattle yards on Ripleys and Callaghans trails, an old sawmill site, a post-and-rail fence line near Ten Mile Road, two bridges on Drews Road and a bridge on Ten Mile Road.

### **Issues**

- There are a number of historic sites, including sections of a convict-built road in Karuah Nature Reserve. The Karuah Progress Association has suggested re-establishing the convict road link between Karuah and Carrington (see Section 3.5).

### **Desired outcomes**

- Historic features are recorded and protected.

### **Management response**

3.4.1 Record historical sites and assess them for heritage value. Undertake works if necessary to retain any sites of high heritage value.

## **3.5 Visitor use**

The parks play a relatively low-key but locally significant role in providing a range of recreation opportunities including bushwalking, camping, four-wheel driving, motorbike riding, cycling/mountain biking, horse riding, boating and fishing. However, recreational use

of the parks has evolved in a relatively unplanned fashion and in some cases this has led to environmental damage. Recreational use of the park is currently at a moderate level although it is expected to increase in association with planned population growth at Kings Hill (north of Raymond Terrace) and at Medowie.

### **Access**

The extensive network of roads and trails in the parks was originally constructed to allow timber extraction and plantation establishment. Over the past decade, the existing network of roads and trails has contributed to the growing popularity of exploring the area by four-wheel drive or trail bike. Unfortunately, in some cases it appears the focus of these activities has changed from an interest in exploration to pursuing an 'adventure activity'. In many places, the damage due to the increased level and intensity of use suggests the attraction is increasingly the adventure activity rather than an appreciation of the location. Trail bike riding in particular has resulted in the unplanned and illegal development of extensive lengths of single-track, and in some cases four-wheel drive use seems to have sought to find challenging 'hill-climb' sites. Both of these types of recreational vehicle adventure activities have capacity to increase erosion, reduce local water quality, exacerbate the spread of weeds, and compromise the efficacy and safety of trails used for the management of fire within the parks.

As identified in Section 3.1, soil types high in clay content are widespread in the parks (Matthei 1995) and, together with the flat terrain in many parts of the parks, make it difficult to construct road drainage. If used in wet weather, this combination of factors causes roads to deteriorate quickly from the effects of vehicular traffic. Roads often become impassable even to four-wheel drive vehicles in these conditions. When conditions dry, sections of the roads often remain impassable until repaired by earthmoving machinery. These conditions are most common in parts of Karuah National Park, the lower areas of Wallaroo National Park and all of Medowie State Conservation Area.

Rationalisation of the road and trail network in the parks are needed for environmental protection, to ensure safe access and to reduce ongoing maintenance costs, while still maintaining appropriate access for recreation opportunities and fire management. Map 2 shows the proposed park road and management trail network in the parks. The park road network provides access to the key visitor destinations, including camping and day use areas.

The extensive network of roads and trails in Wallaroo National Park and the adjoining Wallaroo State Forest has also attracted increasing numbers of mountain bike riders in recent years. In a regional context, Wallaroo National Park and the adjoining Wallaroo State Forest provide an alternative mountain biking opportunity to existing sites at Glenrock State Conservation Area (near Newcastle) and Awaba Mountain Bike Park in Olney State Forest (near Cooranbong).

### **Mountain biking**

Mountain biking is a legitimate recreational pursuit when managed appropriately and within the scope of objectives for national parks. It will be permitted on designated trails in Wallaroo National Park in the future in line with the *NPWS Cycling Policy* (OEH 2011a) and the *Sustainable Mountain Biking Strategy* (OEH 2011b). There is potential to develop a series of short and longer distance (upwards of 30–40 kilometres) mountain biking loops in Wallaroo National Park, which incorporate a mixture of existing roads or trails and single-track, while not compromising the park's natural and cultural values.

## **Day use**

There is also an opportunity to develop a day use area at the 'Common' as part of the rehabilitation of the site and as a means of encouraging recreational use of the site. The 'Common' is a large open area in Wallaroo National Park at the junction of Nine Mile Road and Lone Pine Road. Part of the area is within the adjoining Wallaroo State Forest. The site has been heavily degraded by vehicle activity and is regularly used as a dumping site for stolen motor vehicles.

## **Horse riding**

Horse riding is a popular recreational activity that has cultural associations for many Australians. The NPWS *Strategic Directions for Horse Riding in NSW National Parks* (OEH 2012b) provides a process for providing riding opportunities in eight priority regions in New South Wales, including the Lower North Coast Region. Horse riding opportunities in numerous national parks in the region are being progressed in accordance with the *Lower North Coast Region Horse Riding Work Plan 2013* (OEH 2013b). Within the parks recreational horse riding is undertaken on parts of the road and trail network by a small number of riders and typically includes use of adjoining state forest and public roads.

## **Camping**

There is a history of camping and day use along the Karuah River in Karuah National Park. Current camping capacity in the park will be maintained by consolidating and expanding opportunities at Tattersalls Camping Area and continuing to provide for camping at Little Mountain.

## **Walking**

There are no designated walking tracks in the parks, however the road and management trail network in the parks provides over 50 kilometres of walking opportunities.

The Karuah Progress Association has suggested re-establishing the convict road link between Karuah and Carrington by building a new bridge across Yalimbah Creek. The route crosses a variety of tenures, including Karuah Nature Reserve, Port Stephens – Great Lakes Marine Park, Crown Road Reserve and private property. The concept of re-establishing a bridge is generally supported. However, to be viable, the support of all landholders and land managers is required. A potential walking route north of Gilmore Trail in Wallaroo National Park to a location overlooking Clarence Town has also been identified.

## **Visitor information**

Visitor information is an important aspect of park management in that it enhances visitor experience and understanding while promoting appropriate use. Installing and maintaining directional, interpretive and regulatory signage is therefore important. Interpretive and promotional themes particularly relevant to the parks include Aboriginal cultural values, past logging history and the diversity of native plants and animals. Low-key interpretive facilities are needed at key visitor access locations in Karuah and Wallaroo national parks.

## **Issues**

- The network of roads and trails was originally constructed to allow timber extraction and plantation establishment. Current recreational use has developed using this network. Vehicle access to Medowie State Conservation Area is ecologically unsustainable, and is characterised by severe erosion of trails from use in wet weather. The 'Common' in Wallaroo National Park is heavily degraded from vehicle use. Part of the site is within Wallaroo State Forest.

- The network of roads and trails in Wallaroo National Park has attracted increasing numbers of mountain bike riders in recent years. There is potential to develop a series of short and longer distance (upwards of 30–40 kilometres) mountain biking loops, which incorporate a mixture of existing roads or trails and single-track and potential new single-track routes.
- Camping occurs along the river in Karuah National Park. No facilities are provided and existing camp grounds are not well defined. A number of locations are also used as day use areas. These sites need to be rationalised.
- Small boats are launched at Tattersalls Camping Area and Double Wharf Day Use Area. Stabilisation works are required to reduce erosion at the launch sites.
- There are currently no designated walking tracks in the parks, however the road and management trail network can be used for walking.
- A potential walking route north of Gilmore Trail in Wallaroo National Park to a location overlooking Clarence Town has been identified.
- The convict-built road in Karuah Nature Reserve (see Section 3.4) is a potential walking track, but this would require a new bridge to connect with Karuah and the support of adjoining landholders and land managers.
- Signposting of roads and boundaries in the parks are insufficient. There are no existing interpretation facilities.
- There is a need to inform the local community and park neighbours of the values and regulations for management of the parks.

#### **Desired outcomes**

- Visitor access is appropriate and ecologically sustainable.
- Environmental impacts of visitor use activities are sustainable.
- There are enjoyable, safe and ecologically sustainable horse riding and cycling networks which link to opportunities outside the parks.
- Current camping capacity is maintained.
- Camping is permitted at Tattersalls and Little Mountain camping areas.
- There are a small number of designated walking tracks leading to key features in the parks.
- Visitors are aware of the values and recreational opportunities in the parks, and can easily find their way to facilities.
- The local community is aware of the significance of the parks, park management programs and regulations.

#### **Management response**

- 3.5.1 Allow public vehicular access on the park roads shown on Map 2. However, access may be restricted to prevent damage during periods of wet weather or to ensure public safety. Tracks and trails not shown on Map 2 will be closed and rehabilitated.
- 3.5.2 Allow horse riding only on the park roads and management trails shown on Map 2, with the exception of: Tattersalls Road; Claybank Trail (Karuah National Park) and trails in Karuah Nature Reserve. Horse riding is not permitted in these three locations due to environmental and access issues. Suitable parking sites and turn around sites for horse floats are shown on Map 2, however overnight camping with horses is not permitted within the parks. Group rides involving more than 20 riders will require

consent. Install horse-friendly barriers on gated management trails where horse riding is permitted.

- 3.5.3 Allow cycling/mountain biking on park roads and management trails shown on Map 2.
- 3.5.4 Undertake a review and assessment of potential mountain biking trail loops in Wallaroo National Park. The review will address the planning, development and management criteria identified in the *NPWS Cycling Policy*, and will include consideration of: opportunities and demand for mountain biking across the region; appropriateness of the site; environmental impacts; ecological sustainability; provision of a quality experience for riders; balancing competing visitor demands; availability of resources to provide and maintain the trails; and visitor safety.
- 3.5.5 Following consultation with local mountain biking groups, prepare a strategy for the development and management of a sustainable mountain biking trail network in Wallaroo National Park and place this document on public exhibition. Assess comments from the public exhibition and implement the strategy. Mountain biking will be managed in accordance with the *NPWS Cycling Policy* and *NPWS Sustainable Mountain Biking Strategy*.
- 3.5.6 Monitor roads and trails, including mountain biking trails, for environmental impacts. Roads and trails may be closed temporarily due to track conditions or for visitor safety.
- 3.5.7 Expand Tattersalls Camping Area and upgrade to include a toilet, fireplaces and site designation.
- 3.5.8 Improve site designation at Little Mountain Camping Area and install a toilet.
- 3.5.9 Improve site designation at Double Wharf Day Use Area and install a toilet and signs stating that camping is not permitted.
- 3.5.10 Undertake stabilisation works at the small boat launching sites at Tattersalls Camping Area and Double Wharf Day Use Area to reduce erosion.
- 3.5.11 Manage the 'Common' as a day use area in conjunction with the Forestry Corporation of NSW. Control vehicle access and implement bush regeneration to restore the degraded area.
- 3.5.12 Investigate and develop a walking track north of Gilmore Trail to a location overlooking Clarence Town in Wallaroo National Park.
- 3.5.13 Investigate and develop a walking track along the old convict-built road in Karuah Nature Reserve, subject to gaining the support of adjoining landholders and land managers.
- 3.5.14 Improve park signage including replacement of park identification signage where required. Develop interpretation panels for Hobarts Road, Tattersalls Camping Area, Lone Pine Road and the 'Common'.
- 3.5.15 Organise media releases, educational material and contact with neighbours and community organisations.

## 4. Threats

### 4.1 Pests

Pest species are plants and animals that have negative environmental, economic and social impacts and are most commonly introduced species. Pests can have impacts across the range of park values, including impacts on biodiversity, cultural heritage, catchment and scenic values.

NPWS prepares regional pest management strategies which identify pest species across that region's parks and priorities for control, including actions listed in the *Priorities Action Statement* (see Section 3.2), threat abatement plans, and other strategies such as the *NSW Biodiversity Priorities for Widespread Weeds* (NSW DPI & OEH 2011).

The NPWS *Regional Pest Management Strategy 2012–17, Lower North Coast Region* (OEH 2012a) identifies pest species and priority programs for the parks. The overriding objective of the pest management strategy is to minimise adverse impacts of introduced species on biodiversity and other park and community values while complying with legislative responsibilities. The strategy also identifies where other site- or pest-specific plans or strategies need to be developed to provide a more detailed approach.

#### Weeds

Weeds can be listed as noxious weeds, weeds of national significance and environmental weeds. The *Noxious Weeds Act 1993* places an obligation upon public authorities to control noxious weeds on land they occupy to the extent necessary to prevent such weeds spreading to adjoining lands.

Principal weeds of concern within the parks include lantana (*Lantana camara*), blackberry (*Rubus fruticosus* agg.), coral tree (*Erythrina crista-galli*) and pine trees (*Pinus* spp.). Control of lantana and blackberry along roads and drainage lines has been undertaken in Wallaroo National Park for over five years. Many other weed species have been recorded in the parks (McDonald 2004), but most are not considered weeds of environmental concern in this context.

Prior to its reservation, Karuah National Park was managed as state forest and there are approximately 16 hectares of remnant pine tree plantation. NPWS has assessed plantations on NPWS estate in northern New South Wales and has developed options for their management (NPWS 2010). Removal of mature trees and eradication of wildings is recommended as a high priority for the plantation in Karuah National Park.

#### Pest animals

Pest animals in the parks and on adjoining land are of concern because they have the potential to have detrimental effects on native animal communities through competition for resources, predation, disturbance and transmission of diseases. Pest animals can also impact on native vegetation and have the potential to have an adverse economic impact on neighbouring properties.

Pest animal species recorded in the parks include the fallow deer (*Dama dama*), European red fox (*Vulpes vulpes*), dog (*Canis lupus familiaris*), cat (*Felis catus*) and rabbit (*Oryctolagus cuniculus*).

Wild dogs (*Canis lupus* spp.) have been recorded in the parks. Wild dogs, including dingos, have been declared as pest animals throughout New South Wales under the *Local Land Services Act 2013*. Hence NPWS has a statutory obligation to control wild dogs on its estate.

The level of predation on koalas by wild dogs was identified as a significant threat by the Port Stephens Vertebrate Pest Animal Management Committee. In response, a coordinated program of wild dog control is carried out in the Port Stephens Local Government Area. Annual wild dog baiting has been undertaken in Karuah National Park, Wallaroo National Park and Medowie State Conservation Area for more than 10 years.

### **Desired outcomes**

- Weeds and pest animals are controlled and where possible eliminated.
- Appropriate pest management techniques are implemented.
- The impact of weeds and pest animals on native species and neighbouring land is minimised.

### **Management response**

- 4.1.1 Implement pest control activities in accordance with the NPWS Regional Pest Management Strategy. Priority will be given to lantana, blackberry, pine trees, wild dogs and foxes.
- 4.1.2 Monitor noxious and significant environmental weeds. Treat any new outbreaks where possible.
- 4.1.3 Undertake control programs for wild dogs and foxes.
- 4.1.4 Seek the cooperation of neighbours in implementing weed and pest animal control programs. Undertake control programs in cooperation with park neighbours.
- 4.1.5 Remove mature pine trees and wildlings in Karuah National Park.

## **4.2 Fire**

The primary objectives of NPWS fire management are to protect life, property, community assets and cultural heritage from the adverse impacts of fire, while also managing fire regimes in parks to maintain and enhance biodiversity. NPWS also assists in developing fire management practices that contribute to conserving biodiversity and cultural heritage across the landscape and implements cooperative and coordinated fire management arrangements with other fire authorities, neighbours and the community (OEH 2013a).

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

There is a history of wildfires in Wallaroo National Park and Medowie State Conservation Area threatening property along Twelve Mile Creek and Swan Bay under the influence of west or north-west winds.

A fire management strategy for these parks has been prepared and is updated regularly (OEH 2015). This strategy outlines the key assets within and adjoining the parks including sites of natural and cultural heritage value, fire management zones which may include asset protection zones, and fire control advantages such as management trails and water supply points.

NPWS maintains cooperative arrangements with surrounding landowners and Rural Fire Service brigades and is actively involved in the Lower Hunter Bush Fire Management Committee. Cooperative arrangements include approaches to fuel management, support for

neighbours' fire management efforts and information sharing. Hazard reduction programs, ecological burning proposals and fire trail works are submitted annually to the Lower Hunter Bush Fire Management Committee.

### **Desired outcomes**

- Life, property and natural and cultural values are protected from fire.
- Fire regimes are appropriate for conservation of native plant and animal communities.
- Negative impacts of fire on natural and cultural heritage values are stable or diminishing.

### **Management response**

- 4.2.1 Implement any fire management strategies for the parks, including hazard reduction activities and trail maintenance.
- 4.2.2 Participate in the Lower Hunter Bush Fire Management Committee. Maintain cooperative arrangements with local Rural Fire Service brigades and fire control officers, Forestry Corporation of NSW and surrounding landowners in regard to fuel management and fire suppression.
- 4.2.3 Manage the parks to protect biodiversity in accordance with the fire regimes and thresholds identified in the fire management strategies.
- 4.2.4 Avoid the use of heavy machinery for fire suppression other than where appropriate on existing fire management trails or on old timber snigging trails which remain clearly delineated. No new trails are to be constructed.
- 4.2.5 Avoid the use of fire retardants in the parks.
- 4.2.6 Rehabilitate areas disturbed by fire suppression as soon as practical after the fire.
- 4.2.7 Encourage further research into the ecological effects of fire in the parks, particularly the fire response of significant plant species.

### **4.3 Isolation, fragmentation and climate change**

The area surrounding the parks has been extensively cleared, which has resulted in a high loss of biodiversity and fragmentation of habitat in the region. Long-term conservation of biodiversity depends upon the protection, enhancement and connection of remaining habitat across the landscape, incorporating vegetation remnants on both public and private lands. Nearby vegetated areas contribute to the habitat values of the parks and provide ecological corridors to other vegetated areas. Maintaining the integrity of the remaining habitat within the parks and, where possible, linking this to adjacent vegetated areas to facilitate wildlife corridors is important in ensuring long-term viability of the parks' biological values.

Climate change has been listed as a key threatening process under the TSC Act. Projections of future changes in climate for the Hunter region include higher temperatures, increased temperature extremes and higher evaporative demand in all seasons (DECCW 2010). Sea level rise is likely to continue and will be coupled with increased flooding. Changes in rainfall are more difficult to simulate for the coastal areas of this region, however it is anticipated that runoff and stream flow are likely to increase in summer and autumn and decrease in spring and winter. Short-term droughts are likely to become more severe while medium and long-term droughts will be less severe. Higher temperatures and changes to rainfall patterns will more likely than not lead to increased fire frequency, but the return period of fires is

considered to remain within the current domain of acceptable fire intervals. Changes to fuel availability are uncertain.

Climate change may significantly affect biodiversity by changing population size and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration and pressure from feral animals. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates.

Programs to reduce the pressures arising from other threats, such as habitat fragmentation, invasive species, bushfires, pollution and urban expansion, will help reduce the severity of the effects of climate change.

### **Desired outcomes**

- The values of the parks as part of a regional corridor for wildlife movement are maintained.
- The effects of climate change on natural systems are reduced.

### **Management response**

- 4.3.1 Encourage neighbouring landholders to maintain and enhance the integrity of native vegetation on their lands to improve wildlife connectivity across the landscape.
- 4.3.2 Continue existing fire, pest and weed management programs to increase the park's ability to cope with future disturbances, including climate change.

## **5. Management operations and other uses**

In order to protect the values of the parks, to provide opportunities for visitors and to facilitate management operations it is important to build and maintain appropriate infrastructure. Infrastructure may also be provided in the parks by other authorities or for other purposes authorised under the NPW Act.

### **5.1 Access**

There is a high density of road development in the parks from previous land use. A number of roads and trails within the parks have been identified as necessary for public access or management purposes such as weed control and fire management.

However, many of the minor tracks that remain from logging operations are not appropriate for public or management vehicular access. Many are in poor condition, overgrown and are not required for ongoing management purposes. The rehabilitation of these tracks is important to minimise erosion, reduce ongoing maintenance costs and improve habitat condition.

There are a number of neighbours whose only access to their properties is through the parks. The corridors of several roads, specifically Winters and Mine Hill trails, and Witt Road in Karuah National Park, have been retained as Crown land vested in the Minister administering the NPW Act under Part 11 of the NPW Act. This was to ensure a continuation of access arrangements to neighbouring private lands. While not part of the reserved area of park, these roads are still subject to the provisions of this plan and the NPW Regulation.

Pets and livestock may be transported by vehicle using trails that provide the only access to private property as long as they are on route to this property and are kept within the vehicle.

Ongoing access to private property may be formalised through a licence arrangement.

#### **Desired outcomes**

- Public park roads, management trails and Part 11 lands are provided as necessary for fire and pest management, private property access and other management purposes.

#### **Management response**

- 5.1.1 Maintain the roads and management trails shown on Map 2.
- 5.1.2 Install gates and/or signs to restrict unauthorised access to management trails.
- 5.1.3 Close and actively regenerate all other tracks.
- 5.1.4 Grant licences where appropriate to allow continued access to private property under section 153C of the NPW Act.

### **5.2 Other management facilities**

#### **Quarries**

The parks contain existing quarries at Quarry Trail, Mines Hill Trail, Baldy Knob Road and adjacent to the Bucketts Way (see Map 2). These quarries provide a valuable gravel resource used to maintain roads and management trails in the parks. Planning is required to ensure that use of the quarries does not inhibit future stabilisation and rehabilitation. NPWS

will prepare a quarry management and rehabilitation plan and an environmental assessment prior to extracting gravel from these quarries.

### **Desired outcomes**

- Management facilities and operations adequately serve management needs and have minimal impact.
- NPWS can continue to source gravel from the parks for road and trail maintenance.

### **Management response**

5.2.1 Undertake an environmental assessment and, if ongoing use is acceptable, prepare quarry management and rehabilitation plans for quarries at Quarry Trail, Mines Hill Trail, Baldy Knob Road and adjacent to the Bucketts Way.

## **5.3 Non-NPWS uses and operations**

### **Utilities**

The parks contain a number of existing powerlines and associated access trails that pre-date reservation of the parks. Energy Australia has a number of powerlines traversing the parks. These powerlines are not covered by a formal easement. In accordance with the *Electricity Supply Act 1995* a network operator can operate and use the existing powerlines whether or not there is a formal easement in place, however an easement for the powerlines could be granted under section 153(1) of the NPW Act.

Clearings and vehicle trails along the powerlines have significant environmental and visual impacts. No access or maintenance agreement currently exists with Energy Australia but the company must comply with the NPW Act and Regulations when carrying out any maintenance or replacement work and will require NPWS consent for certain works.

A number of new infrastructure projects are proposed for the parks. A powerline east of Taylors Road in Medowie State Conservation Area is proposed by Energy Australia, and a gas pipeline under the powerline east of East Seaham Road in Wallaroo National Park is proposed by AGL. These projects are subject to appropriate environmental assessment and approval under the NPW Act.

### **Trig stations**

The Karuah trigonometrical station is located on top of Karuah Mountain in Karuah Nature Reserve. An agreement between NPWS and the former Central Mapping Authority (now Land and Property Information, part of the Department of Finance, Services and Innovation) provides a continued right of access to the station for survey purposes, subject to environmental impact assessment. It is not accessible by vehicle.

### **Mining and mineral interests**

Exploration for minerals and petroleum, as well as mining and petroleum production, are permissible uses within state conservation areas. Karuah and Medowie state conservation areas are currently covered by a petroleum exploration licence and have previously been covered by mineral exploration licences (DECC 2008).

The NSW Department of Industry (Resources and Energy) is the lead authority for mining and petroleum activities, including mineral exploration and mine site rehabilitation. NPWS and the Department of Industry work together to ensure that exploration and production proposals in state conservation areas comply with all statutory requirements, including any necessary environmental impact assessments and approvals.

**Desired outcomes**

- Existing and proposed non-park infrastructure is managed to minimise impacts on natural and cultural values.

**Management response**

- 5.3.1 Liaise with Energy Australia to ensure any maintenance and replacement works comply with the NPW Act and Regulation.
- 5.3.2 Formalise licences for existing powerlines and access trails in accordance with section 153 of the NPW Act.
- 5.3.3 Liaise with gas pipeline and powerline proponents to minimise impacts on natural and cultural values in the parks.
- 5.3.4 Continue to authorise access for use and maintenance of the Karuah trigonometrical station in accordance with existing or future formal agreements between NPWS and Land and Property Information.
- 5.3.5 Ensure that any applications for mining or exploration in the state conservation areas are subjected to environmental impact assessment and conditions on approvals.

## 6. Implementation

In this table, the following priorities are used:

- **High** priority activities are imperative to achieve the objectives and desired outcomes. They must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.
- **Medium** priority activities are necessary to achieve the objectives and desired outcomes but are not urgent.
- **Low** priority activities are desirable to achieve the objectives and desired outcomes but can wait until resources become available.
- **Ongoing** activities are undertaken on an annual basis or in response to an issue that arises.

**Table 5: Management responses**

Management response	Priority
<b>3.1 Geology, landscape and hydrology</b>	
3.1.1 Restrict vehicle access in the parks to prevent damage during periods of wet weather and to ensure public safety.	Medium/Ongoing
3.1.2 Develop and implement a staged program for closure and rehabilitation of minor tracks.	High
<b>3.2 Native biodiversity</b>	
3.2.1 Implement relevant actions in the <i>Priorities Action Statement</i> and recovery and threat abatement plans for threatened species and populations.	High
3.2.2 Undertake detailed vegetation mapping. Manage the parks to reduce adverse impacts on threatened species and communities.	High
3.2.3 Investigate and implement, if appropriate, management strategies to enhance the habitat values of regrowth areas.	Medium
3.2.4 Encourage surveys for threatened and significant plants and animals giving priority to predicted habitat for threatened species and Karuah Nature Reserve.	Medium
<b>3.3 Aboriginal heritage</b>	
3.3.1 Consult and involve the Karuah and Worimi local Aboriginal land councils, and other relevant Aboriginal community organisations, in the management of Aboriginal sites, places and values, including interpretation of places or values.	High
3.3.2 Undertake an archaeological survey and cultural assessment prior to all works with the potential to impact on Aboriginal or historic sites and places.	Ongoing
3.3.3 Encourage further research into the Aboriginal heritage values of the parks with the Karuah and Worimi local Aboriginal land councils.	Medium
3.3.4 Consult with the Aboriginal community to identify locations and reach agreement on operations of sites for cultural activities.	High
3.3.5 Issue consents as appropriate for short-term cultural activities, including camping.	High

Management response	Priority
<b>3.4 Historic heritage</b>	
3.4.1 Record historical sites and assess them for heritage value. Undertake works if necessary to retain any sites of high heritage value.	Medium
<b>3.5 Visitor use</b>	
3.5.1 Allow public vehicular access on the park roads shown on Map 2. However, access may be restricted to prevent damage during periods of wet weather or to ensure public safety. Tracks and trails not shown on Map 2 will be closed and rehabilitated.	High
3.5.2 Allow horse riding only on the park roads and management trails shown on Map 2, with the exception of: Tattersalls Road; Claybank Trail (Karuah National Park) and trails in Karuah Nature Reserve. Suitable parking sites and turn around sites for horse floats are shown on Map 2, however overnight camping with horses is not permitted within the parks. Group rides involving more than 20 riders will require consent. Install horse-friendly barriers on gated management trails where horse riding is permitted.	High
3.5.3 Allow cycling/mountain biking on park roads and management trails shown on Map 2.	High
3.5.4 Undertake a review and assessment of potential mountain biking trail loops in Wallaroo National Park. The review will address the planning, development and management criteria identified in the <i>NPWS Cycling Policy</i> , and will include consideration of: opportunities and demand for mountain biking across the region; appropriateness of the site; environmental impacts; ecological sustainability; provision of a quality experience for riders; balancing competing visitor demands; availability of resources to provide and maintain the trails; and visitor safety.	High
3.5.5 Following consultation with local mountain biking groups, prepare a strategy for the development and management of a sustainable mountain biking trail network in Wallaroo National Park and place this document on public exhibition. Assess comments from the public exhibition and implement the strategy. Mountain biking will be managed in accordance with the NPWS Cycling Policy and NPWS Sustainable Mountain Biking Strategy.	High
3.5.6 Monitor roads and trails, including mountain biking trails, for environmental impacts. Roads and trails may be closed temporarily due to track conditions or for visitor safety.	High
3.5.7 Expand Tattersalls Camping Area and upgrade to include a toilet, fireplaces and site designation.	High
3.5.8 Improve site designation at Little Mountain Camping Area and install a toilet.	Medium
3.5.9 Improve site designation at Double Wharf Day Use Area and install a toilet and signs stating that camping is not permitted.	High
3.5.10 Undertake stabilisation works at the small boat launching sites at Tattersalls Camping Area and Double Wharf Day Use Area to reduce erosion.	High

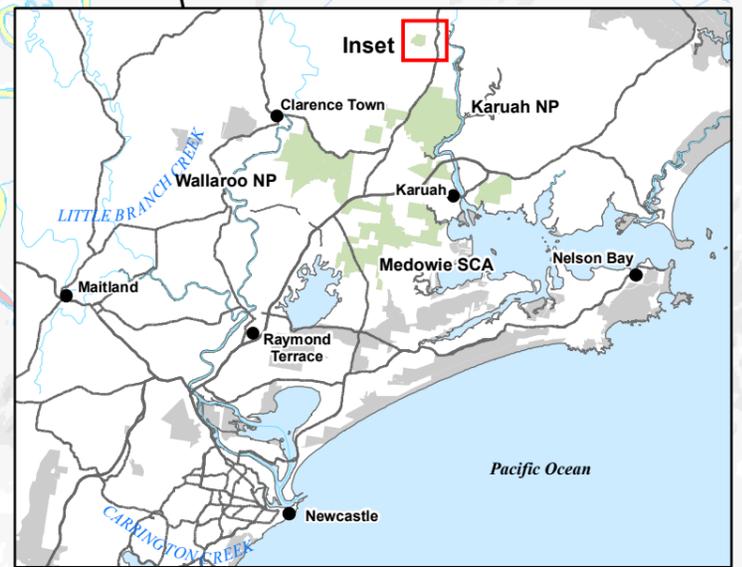
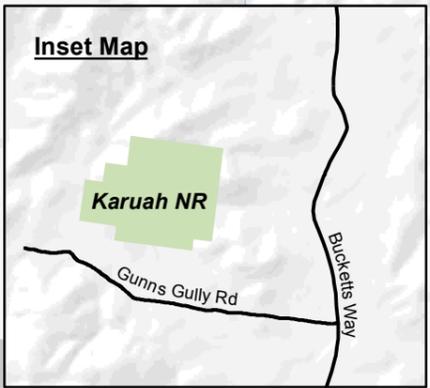
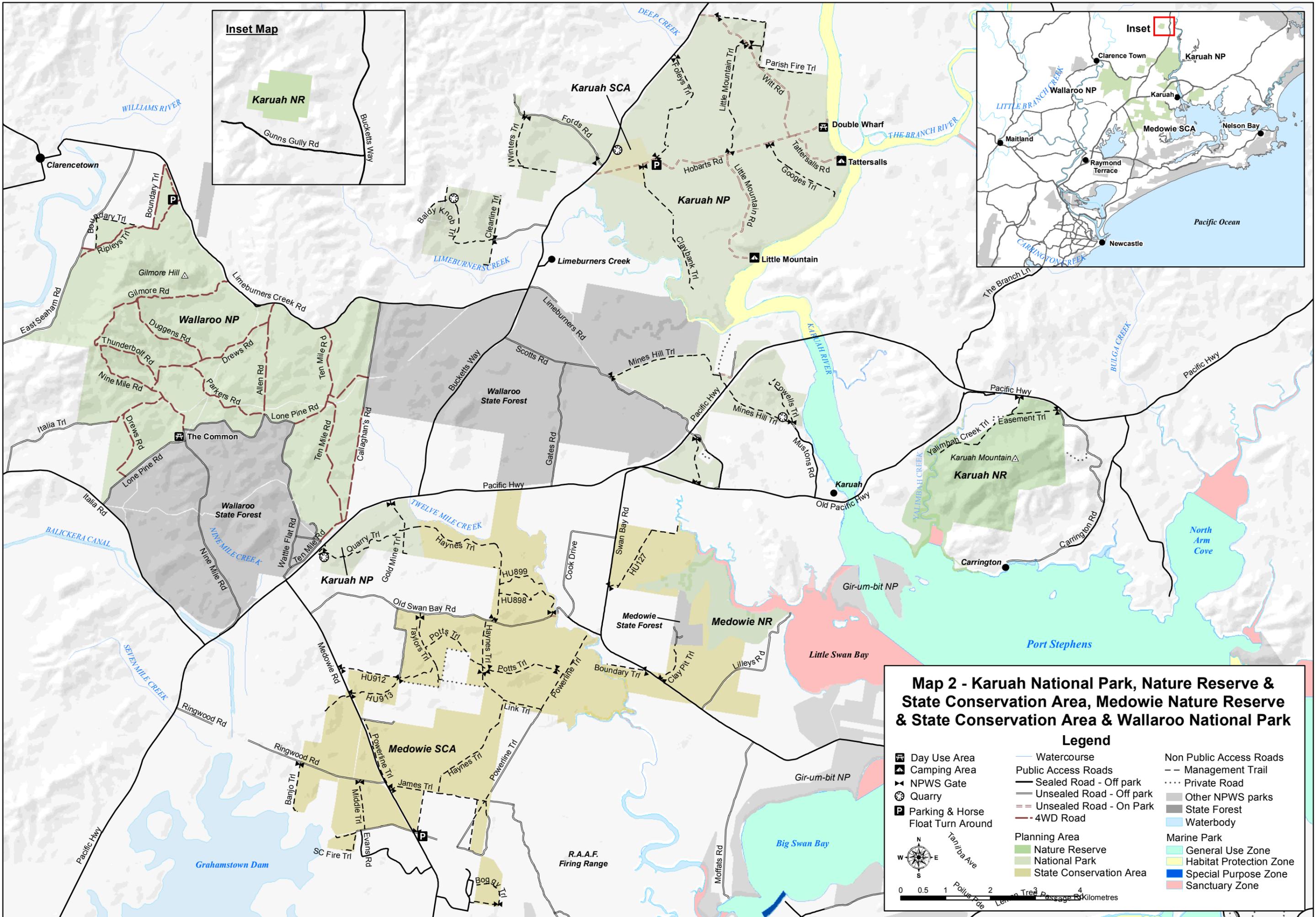
<b>Management response</b>	<b>Priority</b>
3.5.11 Manage the 'Common' as a day use area in conjunction with the Forestry Corporation of NSW. Control vehicle access and implement bush regeneration to restore the degraded area.	High
3.5.12 Investigate and develop a walking track north of Gilmore Trail to a location overlooking Clarence Town in Wallaroo National Park.	Medium
3.5.13 Investigate and develop a walking track along the old convict-built road in Karuah Nature Reserve, subject to gaining the support of adjoining land holders and land managers.	Low
3.5.14 Improve park signage including replacement of park identification signage where required. Develop interpretation panels for Hobarts Road, Tattersalls Camping Area, Lone Pine Road and the 'Common'.	Medium
3.5.15 Organise media releases, educational material and contact with neighbours and community organisations.	Medium
<b>4.1 Pests</b>	
4.1.1 Implement pest control activities in accordance with the NPWS Regional Pest Management Strategy. Priority will be given to lantana, blackberry, pine trees, dogs and foxes.	High
4.1.2 Monitor noxious and significant environmental weeds. Treat any new outbreaks where possible.	High
4.1.3 Undertake control programs for wild dogs and foxes.	High
4.1.4 Seek the cooperation of neighbours in implementing weed and pest animal control programs. Undertake control in cooperation with park neighbours.	Medium
4.1.5 Remove mature pine trees and wildlings in Karuah National Park.	High
<b>4.2 Fire</b>	
4.2.1 Implement any fire management strategies for the parks, including hazard reduction activities and trail maintenance.	High
4.2.2 Participate in the Lower Hunter Bush Fire Management Committee. Maintain cooperative arrangements with local Rural Fire Service brigades and fire control officers, Forestry Corporation of NSW and surrounding landowners in regard to fuel management and fire suppression.	High/ Ongoing
4.2.3 Manage the parks to protect biodiversity in accordance with the fire regimes and thresholds identified in the fire management strategies.	High
4.2.4 Avoid the use of heavy machinery for fire suppression other than where appropriate on existing fire management trails or on old timber snigging trails which remain clearly delineated. No new trails are to be constructed.	High
4.2.5 Avoid the use of fire retardants in the parks.	High

<b>Management response</b>	<b>Priority</b>
4.2.6 Rehabilitate areas disturbed by fire suppression as soon as practical after the fire.	High
4.2.7 Encourage further research into the ecological effects of fire in the parks, particularly the fire response of significant plant species.	Medium
<b>4.3 Isolation, fragmentation and climate change</b>	
4.3.1 Encourage neighbouring landholders to maintain and enhance the integrity of native vegetation on their lands to improve wildlife connectivity across the landscape.	Medium/ Ongoing
4.3.2 Continue existing fire, pest and weed management programs to increase the park's ability to cope with future disturbances, including climate change.	Ongoing
<b>5.1 Access</b>	
5.1.1 Maintain the roads and management trails shown on Map 2.	High
5.1.2 Install gates and/or signs to restrict unauthorised access to management trails.	High
5.1.3 Close and actively regenerate all other tracks.	High
5.1.4 Grant licences where appropriate to allow continued access to private property under section 153C of the NPW Act.	High
<b>5.2 Other management facilities</b>	
5.2.1 Undertake an environmental assessment and, if ongoing use is acceptable, prepare quarry management and rehabilitation plans for quarries at Quarry Trail, Mines Hill Trail, Baldy Knob Road and adjacent to the Bucketts Way.	Medium
<b>5.3 Non-NPWS uses and operations</b>	
5.3.1 Liaise with Energy Australia to ensure any maintenance and replacement works comply with the NPW Act and Regulation.	Ongoing
5.3.2 Formalise licences for existing powerlines and access trails in accordance with section 153 of the NPW Act.	Medium
5.3.3 Liaise with gas pipeline and powerline proponents to minimise impacts on natural and cultural values in the parks.	High
5.3.4 Continue to authorise access for use and maintenance of the Karuah trigonometrical station in accordance with existing or future formal agreements between NPWS and Land and Property Information.	Ongoing
5.3.5 Ensure that any applications for mining or exploration in the state conservation areas are subjected to environmental impact assessment and conditions on approvals.	High

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### Map 2 - Karuah National Park, Nature Reserve & State Conservation Area, Medowie Nature Reserve & State Conservation Area & Wallaroo National Park

#### Legend

<ul style="list-style-type: none"> <li> Day Use Area</li> <li> Camping Area</li> <li> NPWS Gate</li> <li> Quarry</li> <li> Parking &amp; Horse Float Turn Around</li> </ul>	<ul style="list-style-type: none"> <li> Watercourse</li> <li> Public Access Roads</li> <li> Sealed Road - Off park</li> <li> Unsealed Road - Off park</li> <li> Unsealed Road - On Park</li> <li> 4WD Road</li> </ul>	<ul style="list-style-type: none"> <li> Non Public Access Roads</li> <li> Management Trail</li> <li> Private Road</li> <li> Other NPWS parks</li> <li> State Forest</li> <li> Waterbody</li> </ul>
<ul style="list-style-type: none"> <li> Planning Area</li> <li> Nature Reserve</li> <li> National Park</li> <li> State Conservation Area</li> </ul>	<ul style="list-style-type: none"> <li> Marine Park</li> <li> General Use Zone</li> <li> Habitat Protection Zone</li> <li> Special Purpose Zone</li> <li> Sanctuary Zone</li> </ul>	

0 0.5 1 2 3 4 Kilometres