

JAMIESON PARK FIRE REGIME MANAGEMENT PLAN



Report prepared for:
Warringah Council
(Project No. 57-14)

May 2006

Document Tracking

Item	Detail	Signature
Project Name	Warringah FMP Finalisation (Batch 1 & 2)	
Project Number	57 – 14	
Prepared by	PC	AP
Prepared by	DJ	CG
Approved by	SH	
Status	Final	
Version Number	2	
File location	G:\Current_Projects\Councils\Warringah\Warringah FMP Finalisation (Batch 1 & 2) (57-14)	
Date	19 May 2006	

Acknowledgements

This document has been prepared by and is copyright of Eco Logical Australia Pty Ltd. Eco Logical Australia wishes to thank the following people for their input into the project:

Warringah Council: Steve Atkins, Stuart Withington

Rural Fire Service: George Sheppard

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This report is based upon best practise management and ecological principles. Concerns have been raised that sufficient resources may not be available to implement this plan in its entirety.

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Glossary of Terms

APZ	An Asset Protection Zone (APZ) is an area around a development offering protection to reduce the bush fire hazard. It can consist of an Inner Protection Area (IPA) and an Outer Protection Area (OPA). Hazard reduction techniques can include slashing, raking, bush regeneration and burning.
Biodiversity fire regime thresholds	These thresholds are a range of appropriate fire frequency intervals, intensities and seasons to sustain the ecology of each vegetation community. Where fire regimes are outside the threshold, significant declines in species populations can be expected, particularly if the fire regime prevails over greater than 50% of the community area.
Ecosystem	An interactive system between living organisms (plants and animals) and their non living surroundings.
FEZ	Fire Exclusion Zones (FEZ) are areas that contain fire intolerant species. Fires in these areas should be avoided and quick fire suppression should occur in the case of fire.
Fine fuels	Bark, grass, leaves and twigs less than six millimetres in diameter.
Fire regime	The history of fire in a particular area, including the frequency, intensity and season of burning.
Fuel	Any material capable of being ignited and sustaining fire. Such as grass, live vegetation, leaf litter and bark. Generally measured in tonnes per hectare of dry weight.
Hazard reduction	Works designed to attain planned resource management objectives, primarily the reduction of fire threat. Activities include: <ul style="list-style-type: none"> • Manual and mechanical thinning of vegetation (NOT broad scale clearing) • Controlled burning of a predetermined area, carried out under specified weather and environmental conditions
Inter-fire period	The period of time between successive burns.
IPA	Inner Protection Areas (IPA) are parts of an Asset Protection Zone (APZ). They are designed to eliminate the threat of fire radiation to the development, and use techniques such as slashing, shrub clearing, and construction of barriers or hazard reduction burning to reduce fuel loads.

LMZ	Land Management Zones (LMZ) are broader areas of the landscape, which do not satisfy the criteria for Strategic Fire Management Zones (SFMZ) or Asset Protection Zones (APZ). Fire in these areas should be managed to meet conservation objectives for species, habitats, populations and cultural heritage values.
Minimum Fire Threshold	The minimum fire frequency permitted before a decline in biodiversity is expected.
Maximum Fire Threshold	The maximum fire frequency permitted before a decline in biodiversity is expected.
OPA	Outer Protection Areas (OPA) are parts of an Asset Protection Zone (APZ). They are designed to reduce the speed and intensity of an approaching bush fire. Techniques such as hazard reduction burning or selective shrub clearing are used to reduce fuel load.
Prescribed burning	A controlled burn to a predetermined area, carried out under specified weather and environmental conditions, designed to achieve planned resource management objectives.
Quick succession	Events occurring within five years of each other.
SFAZ	Strategic Fire Advantage Zones (SFAZ) are usually adjacent to, and compliment, Asset Protection Zones (APZ). They are managed to protect community assets and ecological sustainability.
Treatment Area	Area of land subject to removal or reduction of fuel by manual or mechanical means, or by prescribed burning.
Wildfire	An unplanned fire.

Executive Summary

Jamieson Park covers approximately 50 hectares and is located in Sydney's Northern Beaches district, approximately 25km from the centre of Sydney. The park supports a number of educational and recreational activities and contains a sailing club, car parking, a boat ramp, grassed recreational / picnic areas and walking tracks.

Surrounding land uses include Narrabeen Lagoon Water body, low density urban development, independent and assisted care for senior citizens (RSL War Veterans Retirement Village) and Cromer Golf Course.

The park contains six vegetation types that are listed as Endangered Ecological Communities (EECs). No threatened species have been recorded within the park. The current fire trail layout is sufficient to provide access primarily to fire break areas. Therefore, provided existing trails are maintained, no new trails are recommended.

The Management Plan divides the park into management zones which include Asset Protection Zones (APZ), Strategic Fire Advantage Zones (SFAZ), Fire Exclusion Zones (FEZ) and Land Management Zones (LMZ). Existing tracks, natural features and cleared areas have been used for fire management boundaries where available, with proposed management zones covering both Council managed and privately owned land.

The Plan contains a Prescribed Operations Schedule that specifies treatments, timing and other characteristics. It prescribes numerous hazard reduction burns between 2006 and 2013 as well as slashing, weed control and hand removal of fuels within areas of build up.

1 Introduction

Eco Logical Australia was contracted by Warringah Council in March 2004 to prepare a 10 year Fire Management Plan from 2006 – 2016 for Jamieson Park.

1.1 Reserve Outline

Jamieson Park is located in Sydney's Northern Beaches district, approximately 25km from the centre of Sydney on the southern shore of Narrabeen Lakes. The park is approximately 50 hectares in area, the majority of which is native vegetation. See Figure 1 for site location.

Internal park facilities include a sailing club, car park, boat ramp, grassed recreational / picnic areas and walking tracks.

Surrounding land uses include Narrabeen Lagoon Water body, low density urban development, independent and assisted care for senior citizens (RSL War Veterans Retirement Village) and Cromer Golf Course.

The park includes Crown land and land owned by the Department of Environment and Planning. The entire park is managed by Warringah Council. Applications have been lodged for the transfer of Crown land to Council, to be managed as Community Land under the Local Government Act 1993; transfer has not taken place as of time of writing. For further tenure information see the Jamieson Park Plan of Management (LandArc 2000).

1.2 Plan Objectives

- To provide recommendations for:
 - New fire management zones
 - Suitable alternatives for fuel management
 - Strategies to protect the existing infrastructure located within the park
 - Strategies to protect persons and property within, or immediately adjacent to the park
- Creation of:
 - Comprehensive fire history for the park
 - A plan that is acceptable to and can be implemented by Council and the NSW Rural Fire Service (RFS)
 - An ecologically based strategy for fuel management, incorporating the requirement for:
 - Mosaic burn patterns
 - Fire regimes in line with vegetation community thresholds, endangered ecological communities and identified threatened species, as well as locally or regionally significant species
 - A strategy to enable the effective planning of Hazard Reduction (HR) burns with regard to:
 - Endangered ecological communities

- Endangered populations
- Threatened, locally or regionally significant species
- Aboriginal sites and culturally significant features known to exist within the park
- Assets and infrastructure

1.3 Report Structure

The Fire Regime Management Plan for Jamieson Park comprises two separate documents:

- 1) This report
- 2) An A0 sized poster showing a series of relevant maps and tables

This report identifies the fire management framework, identifies and assesses fire related issues and risks within the park and provides an operational schedule and performance measures. It is intended that this written report is used in conjunction with the "Jamieson Park Fire Regime Management Poster" (Appendix 7, ELA 2006).

1.4 Assumptions

Vegetation fuel loads and structure were derived from Vegetation Mapping by P & J Smith (2003). Whilst limited opportunistic on-ground validation of vegetation communities was undertaken, it was assumed that this mapping was generally accurate.

Figure 1 Site Location



2 Legislative and Planning Instruments

Fire management activities on the site are constrained by numerous Acts, plans and guidelines. The most relevant documents are reviewed below.

'Warringah Local Government Area Hazard Reduction Guidelines' (Appendix 4), contains further information regarding required/recommended actions where significant impact is determined from proposed hazard reduction activities.

2.1 Local Government Act 1993

The NSW *Local Government Act 1993* provides for management of land within a Local Government Area. Under the Act plans of management must be prepared for 'community land'. The plans should address a variety of factors including biodiversity conservation and management. Councils must adopt a specific plan of management for community land affected by a recovery plan, threat abatement plan or containing critical habitat identified under the Threatened Species Conservation Act 1995.

Jamieson Park is managed as "Community land" under this Act and has a current Plan of Management (Landarc 2000).

2.2 Jamieson Park Plan of Management

This plan was adopted in 18 April 2000, as required under the *Local Government Act, 1993*, and provides a frame work for managing Jamieson Park including strategies and work schedules; it is due for review in 2005.

The plan contains bushfire management actions (See LandArc 2000, MS 4 of 13, for further details). These include:

- Integration of environmental and biodiversity programmes with the objectives of fire management policy
- Promotion of an inter-disciplinary approach to management, emphasizing flexibility in determination of fuel-free and fuel reduced zones. For example:
 - Implementation of a strategy based on specific site characteristics, including: use of mesic species where appropriate in damp cooler areas/below rock outcrops, rather than dry species
 - Selection of robust native species in highly disturbed sites

2.3 Management Strategy for Weed Control and Fire Management Access Zones¹

This document, created in 1996, sets out aims and objectives for the management of fire and weeds within the Warringah Council Local Government Area (LGA).

Fire management objectives include:

- Ensuring that fire management access zones are of dimensions that can be maintained in the long term

¹ Council has acknowledged this document is outdated and changes are required to bring it up to current standards.

- Ensuring that methods of construction and maintenance of fire management access zones are environmentally sensitive
- Carrying out of community education in conjunction with Fire Control, and of fire hazard reduction techniques
- Co-ordinating with Fire Control on the fire hazard reduction issues

These objectives have been considered during the creation of this plan.

2.4 Rural Fires Act 1997

The objectives of the *Rural Fires Act 1997* (RF Act) are to provide for:

- The prevention, mitigation and suppression of fires
- Coordination and prevention of bush fire fighting
- Protection of people and property from fires
- Protection of the environment

The RF Act requires the creation of a Bush Fire Co-ordinating Committee and a Bush Fire Risk Management Plan (outlined below).

Obligations are imposed on Council and other land management agencies to:

- Protect life and property
- Prevent fire from leaving land vested in or under its control
- Implement the provisions of Bush Fire Management Plans

2.5 Warringah Pittwater Bush Fire Risk Management Plan

Required under Section 52 of the RF Act, the Warringah Pittwater Bush Fire Risk Management Plan outlines the importance of bush fire management zones to assist in reducing bush fire risk and damage to assets. The plan also emphasises fire management priorities. Where areas are faced with an extreme bush fire risk, they will be given the highest management priority and allocation of resources.

The plans are required to consider threatened species conservation and may restrict or prohibit the use of fire and other fire hazard reduction activities. This is particularly relevant for threatened species habitat.

The responsibility to implement asset protection is placed on the owners of the land subject to the bush fire threat. It is also Council's responsibility to ensure that the owners or occupiers of private property have taken the required steps to reduce bush fire hazards on their land. This can be enforced by the RFS through Section 66 of the RF Act.

Council is responsible for environmental assessment of land prior to commencing any fire management activities (on Council owned or managed land). This is achieved through issuing a Bush Fire Hazard Reduction Certificate, obtained under the *Environmental Planning and Assessment Act 1979* (EP&A Act), or through the Bush Fire Environment Assessment Code (RFS 2006).

2.6 Bush Fire Environment Assessment Code

This code provides a stream-lined environmental assessment process for use in determining applications for Bush Fire Hazard Reduction Certificates and provides standards for the conduct of HR works for areas zoned under the Bush Fire Risk Management Plan (WPBFMC 2000).

The code consists of and refers to standards and guidelines that relate to the conduct and planning of managed hazard reduction activities.

Requirements for the code are specified under Section 100J of the RF Act, including land restrictions and exclusions for environmentally sensitive areas (Sections 2 and 3, RFS 2006).

The land covered by Jamieson Park is zoned as a Land Management Zone (LMZ) under the Bush Fire Risk Management Plan (WPBFMC 2000). The park is not considered to be restricted or excluded land; as such the existing Bush Fire Environment Assessment Code (RFS 2006) does apply to this park.

2.7 Planning for Bush Fire Protection 2001

Planning for Bush Fire Protection (PBP), prepared by the Rural Fire Service and Planning NSW, is the key bush fire planning document for the state. The document identifies requirements and strategies for new developments to help protect them from bush fire hazards. It details the location and depth of asset protection zones, fire trails and perimeter roads, water supply and building standards in bush fire risk areas.

2.8 National Parks and Wildlife Act 1974

Aboriginal and cultural heritage sites are protected under this Act, as well as threatened flora, fauna and endangered ecological plant communities. The Department of Environment and Conservation (DEC) are named as the responsible authority under the Act, which extends to the protection of items outside the reserve system.

2.9 Environment Protection & Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) stipulates that approval from the Commonwealth Environment Minister is required if a development is likely to have a significant impact on matters considered to be of national environmental significance.

2.10 Environmental Planning and Assessment Act 1979

The NSW EP&A Act is the principal planning legislation for the state, providing a framework for the overall environmental planning and assessment of development proposals.

2.11 Threatened Species Conservation Act 1995

The NSW *Threatened Species Conservation Act 1995* (TSC Act) aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development or an activity (such as mechanical hazard reduction) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

The Atlas of NSW Wildlife (DEC 2004) was utilised to identify known threatened flora within 5km and threatened fauna within 10km of the park. Fire ecology requirements of those species have been considered.

2.12 Noxious Weed Act 1993

This Act requires Council to control noxious weeds and destroy notifiable weeds within areas under its control, and ensure private landholders do the same.

Management of noxious weeds observed within the park is required under this Act.

2.13 Rivers and Foreshores Improvement Act 1948

The NSW *Rivers and Foreshores Improvement Act 1948* (RFI Act) aims to provide effective controls on activities that could harm sensitive waterway and foreshore environments. The Act has provisions that require a permit for excavations, fill and other works within 40m of the top of the bank for rivers, estuaries and lakes as it is recognised that they can have significant detrimental environmental impacts on habitat, water quality, flooding and erosion. This Act exempts 'local authorities' from the need to obtain a permit.

A Part 3a permit would be required under the RFI Act for such works. The RFI Act is soon to be repealed and replaced by the *Water Management Act, 2002* but the provisions under this Act are likely to be similar to the RFI Act. A notable exception, however, is that 'local authorities' will no longer be exempt from the need to obtain a permit.

2.14 State Environmental Planning Policy 19 (SEPP 19) – Bushland in Urban Areas

SEPP 19 is designed to protect bushland in public open space zones and reserves, as part of preservation for natural heritage, or for recreational, educational and scientific purposes. It ensures that bush preservation is given a high priority when local environmental plans for urban development are prepared. Under SEPP 19 'bushland' means land on which there is vegetation that is either a remainder of the natural vegetation of the land or, if altered, still representative of the structure and floristic of the natural vegetation.

Future Hazard Reduction work must address this legislation.

3 Bushfire Risk

3.1 Bushfire History

Fire history mapping including both Wildfire and Hazard Reduction burning was supplied by Warringah Council and the NSW Rural Fire Service. Field validation, completed in January 2005, was undertaken to increase the reliability of the data. Spatial accuracy for data was found to be low, particularly for older fires.

Additional fire history data was assessed, including:

- Digital data from the Department of Environment and Conservation (incorporated into fire mapping, post site validation)
- Written fire history information derived from P & J Smith (1995) (incorporated into fire mapping, post site validation)
- Written data from the NSW Fire Brigade, consisting of records for Hazard Reduction burning over the last 5 years and unplanned vegetation fires for the past 10 years (provided to Council)

Fire history data from all sources ranged in date from 1952 to 2005.

Fire history mapping prior to 2000 was often not undertaken or consisted of approximate desktop estimates. As such past fire history data may be incomplete.

An analysis of available mapped fire history data showed that 86% of Jamieson Park has been burnt since 1952, with the most recent fire event occurring in 2003.

See "Jamieson Park Fire Regime Management Poster" (Appendix 7, ELA 2006) for a map of recorded fire history.

3.2 Fuel Load Assessment

An assessment of fuel loads has been undertaken in ArcView GIS using an extension to predict fuel loads based on vegetation type and time since fire. This software uses fuel accumulation curves for structural vegetation types prepared for NPWS (Conroy, 1994). This information was then analysed in relation to time since last fire to provide an estimate of fuel loads across the study area.

This information has been used to assist in the identification of priority areas for hazard reduction burns. As new fires occur and vegetation regenerates, fuel loads will vary.

Fuel modelling has been based on fire history data from 1952-1953 to 2004 -05 fire season and vegetation as mapped by P & J Smith (2003) Predicted fuel loads for the park are shown in Figure 3.

It should also be noted that high levels of weed infestation currently exist within the park, resulting in increased ground cover and fuel loads. This is most relevant for the Swamp Oak Forest community adjacent to the Sailing Club. This issue has been considered within the proposed management of Asset Protection Zones.

3.2.1 Limitations

The following are a basic list of the limitations of the fuel model:

- The model is based on topography, vegetation mapping and fire history. Any inaccuracies or gaps in this data will be persistent throughout the fuel model
- Current fire history records do not include any indication of fire intensity. The model assumes a starting fuel load of 0 tonnes per hectares. After any fire this is unlikely and in the case of a cool burn, much of the available fuel may remain
- Fire history records before the mid 1980s were not systematically recorded
- Years of drought and very poor ridge-top soil conditions may result in a much slower rate of vegetation growth and fuel accumulation
- Areas of cleared or highly disturbed vegetation were excluded from the fuel load assessment
- In some areas manual Hazard Reduction (HR) works have not been mapped. This has resulted in higher fuel load predictions than that which is actually on the ground

3.2.2 Algorithms

The following vegetation fuel classes are used:

- 1 = grass (not included in model at this stage)
- 2 = shrub / heathland
- 3 = woodland
- 4 = open forest
- 5 = rainforest (not included in model)
- 0 = cleared, disturbed, not vegetated, swamp, reedland, saltmarsh (Not included in model)

The following fuel accumulation algorithms are used:

Shrubland: $F = 40 - (e^{-0.01169 * t} * 36.6345)$

Woodland: $F = 22.3 - (e^{-0.1634 * t} * 16.878)$

Forests: $F = 23 - (e^{-0.112 * t} * 16.346)$

Where:

F = Fuel Load in tonnes/hectare

T = Time since last fire (in years)

3.3 Assets at Risk from Fire

3.3.1 Built and Cultural Assets

The park contains numerous built assets including Narrabeen Lakes Sailing Club and picnic areas. Protection of these assets has been incorporated within zone management requirements.

Known European and Aboriginal heritage sites have been identified from the Aboriginal Heritage Information Management System (AHIMS – DEC 2004) and Council data. This information has been provided in digital GIS format and is

intended to flag known cultural heritage issues for consideration during the HR planning process.

One Aboriginal heritage site (Rock engraving) has been recorded within the south western area of the park. Additionally three items of Aboriginal cultural heritage occur adjacent to the park and should not be affected by this plan.

The park also contains the ruins of a jetty associated with James Wheeler Estate, located on a small beach on the western side of the park. These ruins consist of sandstone blocks and are not considered to be at risk from fire management activities within the park.

3.3.2 Natural Heritage Assets

Information on natural heritage values has been sourced from the following:

- Atlas of NSW Wildlife (DEC 2004)
- Warringah Vegetation Mapping (P & J Smith 2003, supplied in digital format by Council)
- Warringah Natural Area Survey: Vegetation communities and Plant Species (P & J Smith 2003)
- Jamieson Park Plan of Management (LandArc 2000)

3.3.2.1 Vegetation Communities

The park contains 6 vegetation types that are listed as Endangered Ecological Communities (EECs) under the TSC Act. No EPBC Act listed communities occur within the park.

Table 1 contains a list of communities, their legal status in NSW, and their priority within Warringah LGA (P & J Smith 2003). See Figure 2 for vegetation communities and Appendix 1 for an explanation of vegetation priority.

Table 1 Vegetation Communities of Jamieson Park

Vegetation Community	State Legislative Status (TSC Act 1995)	LGA Priority
Angophora Woodland	Not listed	2
Bangalay Alluvial Forest	EEC - Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	1
Bangalay Slopes Forest	Not listed	1

Vegetation Community	State Legislative Status (TSC Act 1995)	LGA Priority
Estuarine Reedland	EEC - Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	1
Palm Woodland	EEC - Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	1
Peppermint-Angophora Forest	Not listed	3
Saltmarsh	EEC - Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions	1
Swamp Mahogany Forest	EEC - Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	1
Swamp Oak Forest	EEC - Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	1

3.3.2.2 Managed Regeneration Areas

Consideration should be given to the vulnerability of bush regeneration areas within the park at HR planning stage as well as, where possible, during wildfire response.

3.3.2.3 Threatened Flora and Fauna

A search of the Atlas of NSW Wildlife was conducted for:

- Threatened flora listed under the TSC Act 1995, and flora indicated by P & J Smith (2003) as being nationally, regionally or locally significant. Search area was within 5km of the Park; and
- Threatened fauna listed under the TSC Act 1995, and fauna indicated by P & J Smith (2005) as being nationally, regionally or locally significant. Search area was within 10km of the Park.

Species identified within the above proximity may be seen in Appendixes 2 – 3 and include:

- 41 threatened fauna species
- 46 national, regional or locally significant fauna species
- 7 threatened flora species
- 21 national, regional or locally significant flora species

No threatened species have been recorded within the park.

Fire requirements for threatened flora and fauna identified within the park were considered during creation of an operational schedule. These included requirements identified within relevant recovery plans for each species.

Protection of locally and regionally significant species, as well as threatened species identified as occurring outside the park, was aimed at maintaining the structure and floristic integrity of the plant communities within which they occur.

Additional management requirements for all species identified (see Appendix 2) should be considered during HR planning. This includes fire intensity, burn season, escape routes and internal burning boundaries to ensure protection of breeding areas and habitat.

Fire ecology requirements of threatened flora within 5km and threatened fauna within 10km of the park have been assessed and provided to Council within the Warringah Reserve Threatened Flora/Fauna Fire Ecology spreadsheets (ELA 2005a, ELA 2005b).

Additional information including species habitat distribution/condition and population age (for flora species) is required to enable effective HR planning. Field assessment is therefore advised at HR planning stage.

To assist in future management, it is recommended that Council obtain mapping of:

- Potential refuge areas for amphibians, reptiles and mammals (considering the existence of barriers such as fences)
- Distribution and abundance of habitat features for which protective measures can be implemented, including:
 - Ephemeral areas
 - Hollow bearing trees/ significant stands

Figure 2 Vegetation Communities

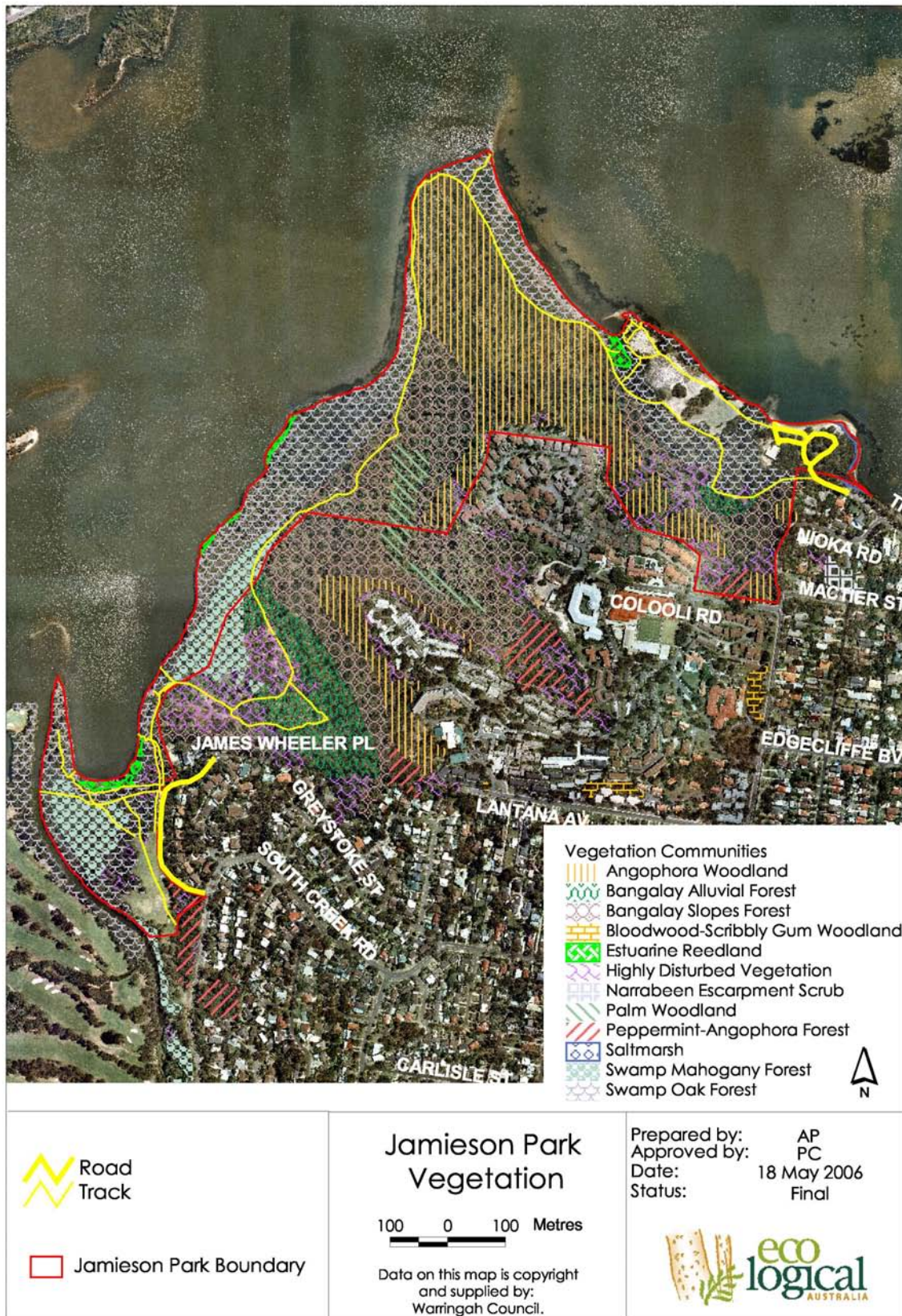
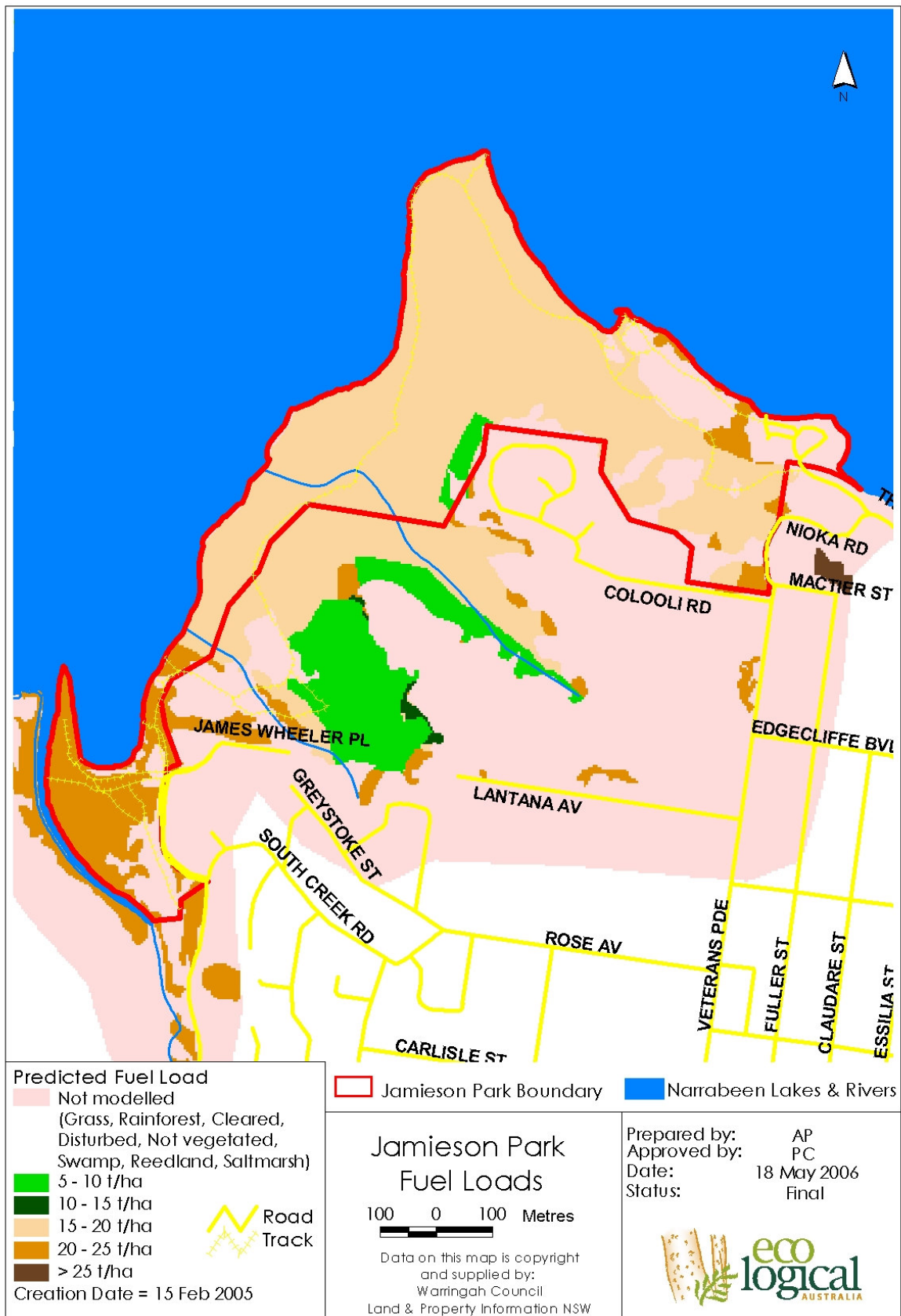


Figure 3 Predicted Fuel Loads



4 Fire Management Issues

4.1 Fire Management Boundaries

The park boundary used within this plan has been compiled from both cadastral and park management boundaries (as proposed by LandArc 2000). Areas where the park management boundary is seen to deviate outside of the cadastral boundary have been included.

Normally, a fire management plan would only apply to the subject park. In this case however, the RSL War Veterans Retirement Village is immediately adjacent to the park; an existing system of shared informal APZ's around the Village is currently being jointly managed by both Council and the Village administration. As a result of this existing arrangement, this plan includes some APZ areas outside Jamieson Park.

4.2 Management Responsibilities

Fire management within the areas is co-ordinated on a landscape scale by the Warringah Pittwater Bush Fire Management Committee (BFMC). This committee is responsible for providing a coordinated, agreed approach to major issues in preparing plans for operations, and bush fire risk management within the district and is made up of Warringah Council, DEC and other key stakeholders.

Overall management of the park is the sole responsibility of Warringah Council. The NSW Fire Brigade is responsible for fire suppression efforts in the park and for mapping any fires that occur.

This plan has divided the park into a number of different management zones. Zones which adjoin or include private/commercial properties may require landowner's cooperation. Council have no responsibility for land not under their management.

To reduce potential impacts from fire, the retirement dwellings adjacent to the park require the preparation of an evacuation plan.

4.3 Fire Trails and Tracks

The park has one main walking track which provides access from one end of the park to the other. Access to these tracks is provided from The Esplanade and James Wheeler Place. Numerous additional tracks are also present within the north eastern and southern sections of the park. Under the Park's Plan of Management (LandArc 2000), signage is required for these features.

The park contains one vehicular fire trail in its north eastern section which provides access from The Esplanade to the Western Paddock. Additional vehicular access to the edges of the park is provided by bounding roads, including Rose Avenue, James Wheeler Place, Cutler Circuit and Snake Gully Road.

The current fire trail layout is sufficient to provide access to primarily fire break areas. To this effect no new trails are recommended. Existing trails must, however, be maintained.

Fire trail management should be undertaken in accordance with the Bush Fire Coordinating Committees' Policy (no. 1/03), Guidelines for the Classification of Fire Trails and Guidelines for Fire Trail Signage (BFCC 2003). Additionally a Fire Trail Register is maintained by the BFMC.

4.4 Introduced Species Management

Weed management

High levels of weed infestation were observed within the park. An example of this includes the Swamp Oak Forest community adjacent to the Sailing Club.

Interactions between fire and weed species include:

- Increased fuel levels, with some weed species being particularly flammable (Eg. Pampas grass)
- Decreased likelihood of effective burn intensities, due to fire retardant species (Eg. Privet and mesic species)
- Potential for weed mortality by fire;
- Encouraged proliferation of weeds, due to seed stimulation and ecological conditions post fire

To ensure appropriate weed management, weed control should be considered during HR planning. This should include:

- Removal of weed species over natives during creation of APZ areas
- An assessment of pre-fire weed preparation requirements. Factors to consider include weed type, species, moisture content and desired fire intensity

Management of weeds within APZ areas must incorporate ecological, stabilisation, and fire considerations.

Appropriate techniques are to be employed to prevent weed dispersal by equipment such as mowers, and the removal of dead vines from trees, as these features can act as wicks for fire to spread into canopy.

Feral fauna management

Fire may increase the impact of feral fauna species by a reduction in protective ground cover for prey species. Control of feral species should therefore be considered during HR planning works.

Control should target species such as rabbits, feral cats and foxes simultaneously to prevent increased predation on native species, particularly the Southern Brown Bandicoot (known to exist with the wider area).

No evidence of feral species were observed during field surveys.

4.5 Fire Management Zones

The Fire Management Zones used in this plan are based on those used in the Warringah Pittwater Bush Fire Risk Management Plan (WPBFMC 2000). These zones are briefly described below.

4.5.1 Asset Protection Zones (APZ)

Description

- Area surrounding a development and managed to reduce bush fire hazard
- Often has inner protection area (IPA) and outer protection area (OPA)
- APZ widths and fuel reduction treatment will be determined by slope and existing nature of assets
- Reduction techniques will include:
 - raking and slashing
 - bush regeneration, involving initial weed removal and long term weed management. This method should be combined with hand removal of ground fuels and manual removal of shrub and middle story layers
 - burning

Aims

- To protect human life and property
- To protect highly valued assets

Prescriptions

- APZ areas may be burnt as appropriate dependant on management issues

IPA:

- To maintain minimum ground fuel loads by raking and slashing to less than 40cm in height, with discontinuous shrub and canopy layers. Reduction techniques will include:
 - removal/ suppression of weeds
 - thinning of regrowth
 - hand removal
 - raking and slashing
 - Trees should not over-hang buildings

OPA:

- To maintain reduced ground fuel loads and maintain understorey to less than 50cm in height. Reduction techniques will include:
 - removal/ suppression of weeds
 - thinning of regrowth
 - hand removal
 - raking and slashing

4.5.2 Land Management Zone (LMZ)

Description

- Broader areas of the landscape, incorporating those areas not satisfying the criteria for inclusion in Strategic Fire Management Zones or Asset Protection Zones
- Reduction techniques will include:
 - burning
 - weed control

Aims

- Protection of natural and cultural heritage values
- Maintenance of ecological processes

Prescription

- Fire management to meet conservation objectives for species, habitats, populations and cultural heritage values, including:
 - control of breaches in minimum fire thresholds and address maintenance of fire age (vegetation age) mosaic, including maximum fire thresholds
 - implementation of cultural heritage and threatened species management within areas where cultural heritage and threatened species sites are known or likely to occur

4.5.3 Strategic Fire Advantage Zones (SFAZ)

Description

- Usually adjacent to and complementing asset protection zones
- Managed to protect community assets and ecological sustainability
- Reduction techniques will include:
 - burning
 - manual fuel reduction techniques such as raking, slashing, hand removal of ground fuels and manual removal of shrub and canopy layers; emphasis placed on weed species where appropriate
 - weed control

Aims

- To restrict fire movement into and out of parks
- Reduce the speed and intensity of fire
- Reduce the potential for spot fire development

Prescription

- A general prescription for maximum fire fuel loading within a range of 8 – 18 tonnes per hectare
- To be managed consistently with the following applications:
 - to provide fuel reduced areas which enable the protection of assets by fire fighters when Asset Protection Zones are not in place
 - to complement Asset Protection Zones where insufficient protection is provided
 - to provide fuel reduced zones in areas of high ignition potential (eg. along roads, rail lines, power lines etc.) to slow the development of fires, reduce their spread, and provide for safe suppression
 - to provide strategically located fuel reduced areas to reduce the vulnerability of assets susceptible to fire
 - to attain a fire regime consistent with the requirements for the preservation of biodiversity within vegetation communities

4.5.4 Fire Exclusion Zones (FEZ)

Description

- Areas containing fire intolerant species and assets

Aims

- To exclude fires (both wildfires and hazard reduction burning) due to the presence of fire intolerant assets, including:
 - fire intolerant vegetation communities
 - riparian buffers
 - cultural/historic sites

Prescription

- Exclude fire and undertake rapid suppression of unplanned fires to maintain fire intolerant species and assets

4.6 Biodiversity Fire Regime Thresholds

Biodiversity fire regime thresholds are intended to ensure there is no loss of biodiversity through senescence or insufficient recruitment as a result of fires being too frequent. Additionally, varying inter-fire periods across the landscape ensure greater heterogeneity of lifecycles and growth stages, enhancing habitat value.

Minimum and maximum inter-fire periods have been defined for vegetation communities known to occur within the park. These are shown in Table 3.

Revegetation areas within the park have not been included within this assessment process. Due to the potentially young age of these communities it is noted that

prescribed biodiversity thresholds may have detrimental effects. These factors need to be considered during future HR planning conducted prior to burning.

An evaluation of fire history and biodiversity fire regime thresholds for mapped vegetation communities has been undertaken for the entire park. The current fire threshold status and resultant ecological fire requirements for vegetation within the park have been determined and may be seen in Figures 4 and 5 respectively. An explanation of these categories can be seen in Table 2.

The information above has been considered in determining the operation schedule (see Section 5).

Where the minimum inter-fire threshold has not been reached (i.e. it has not been burnt too frequently), an indication of the number of burns permitted within the life of the plan has been provided.

Fire should be excluded from areas where the minimum inter-fire threshold has been reached.

Where the minimum inter-fire threshold has been exceeded (that is, it has been burnt too frequently), strategies to facilitate recovery should be implemented. These may include:

- Immediate response and rapid suppression in the event of a wildfire, to minimise the burnt area
- Use of prescribed burning to reduce the threat of wildfire whilst maintaining varying fire ages

When identifying if an area has breached, reached or not reached its minimum inter-fire threshold the precautionary approach was adopted. It was not possible, with the data available, to identify whether a fire had occurred at the start or end of a calendar year (some fires are recorded by fire season, which actually occurs over 2 calendar years). Therefore, when calculating the minimum inter-fire threshold, areas on the fringe of the threshold were included. For example, if an area had a minimum threshold of >2 fires in <5 years, and was burnt in 1999 and 2004, we would identify this area as having reached its minimum threshold, even though the fires may have actually occurred 6 years apart (E.g. January 1999 and December 2004). This precautionary approach means areas for future burning were not identified if they were on the verge of reaching their minimum threshold.

Where frequent fire is identified in a Recovery Plan as a threatening process, relevant pre-existing Threat Abatement Plans should be implemented.

Table 2 Ecological Threshold and Ecological Fire Requirement Explanation

Ecological Thresholds	Explanation	Ecological Fire Requirements
Threshold breached	This includes areas of vegetation where fire frequency has either been too infrequent, or too frequent for the maintenance of optimum biodiversity, as recommended within vegetation community fire thresholds.	<p>• Actions for areas will depend upon whether the minimum threshold (i.e. burnt too frequently) or the maximum threshold (i.e. not burnt frequently enough) has been reached.</p> <p><u>Minimum threshold breached:</u> Suppression priority. Exclude prescribed burning for a minimum of 10 years in forest, heathland / tall shrubland and woodland.</p> <p>For other community types prevent successive fires until community is within threshold.</p> <p><u>Maximum threshold breached:</u> Prescribed burning to be undertaken ensuring sufficient areas of old age class communities are left within the park. Managed as for Prescribed Fire Management Zone (see Section 5.1).</p>
Threshold reached	This includes areas of vegetation where fire occurrence has reached the limit of identified vegetation community fire thresholds.	<p><u>Minimum threshold reached:</u> Prevent successive fires until community is within threshold.</p> <p><u>Maximum threshold reached:</u> Monitor vegetation community to determine age distribution. Prescribed burning may be undertaken, ensuring sufficient areas of old-age class communities are left within the park. Managed as for Prescribed Fire Management Zone (see Section 5.1).</p>
Threshold not reached	This includes areas of vegetation where fire has occurred at a frequency within the identified vegetation community fire thresholds.	An indication of the number of fires permitted within the life of the plan before threshold is reached is provided.

Ecological Thresholds	Explanation	Ecological Fire Requirements <ul style="list-style-type: none"> • Actions for areas will depend upon whether the minimum threshold (i.e. burnt too frequently) or the maximum threshold (i.e. not burnt frequently enough) has been reached.
Nearing maximum, no fire recorded	This includes areas of vegetation where a fire has not been recorded in the data provided. Area should be managed to ensure that a mosaic of fire ages within the area exist.	Prescribed burning to be undertaken, ensuring sufficient areas of old age class communities are left within the park. Managed as for assigned fire management zone - see Section 5.1).
Threshold not reached (reached >10 years ago)	This includes areas of vegetation where a fire has occurred at a frequency within the identified vegetation fire thresholds, however the threshold was reached in the past (i.e. >10 years ago).	An indication of the number of fires permitted within the life of the plan before threshold is reached is provided.
Threshold not reached (breached >10 years ago)	This includes areas of vegetation where a fire has occurred at a frequency within the identified vegetation fire thresholds, however the threshold was breached in the past (i.e. >10 years ago).	An indication of the number of fires permitted within the life of the plan before threshold is reached is provided.
Not addressed	This includes water bodies and areas mapped as highly disturbed or cleared vegetation. These areas have no identified vegetation community fire thresholds.	Not applicable.

Figure 4 Vegetation Fire Threshold

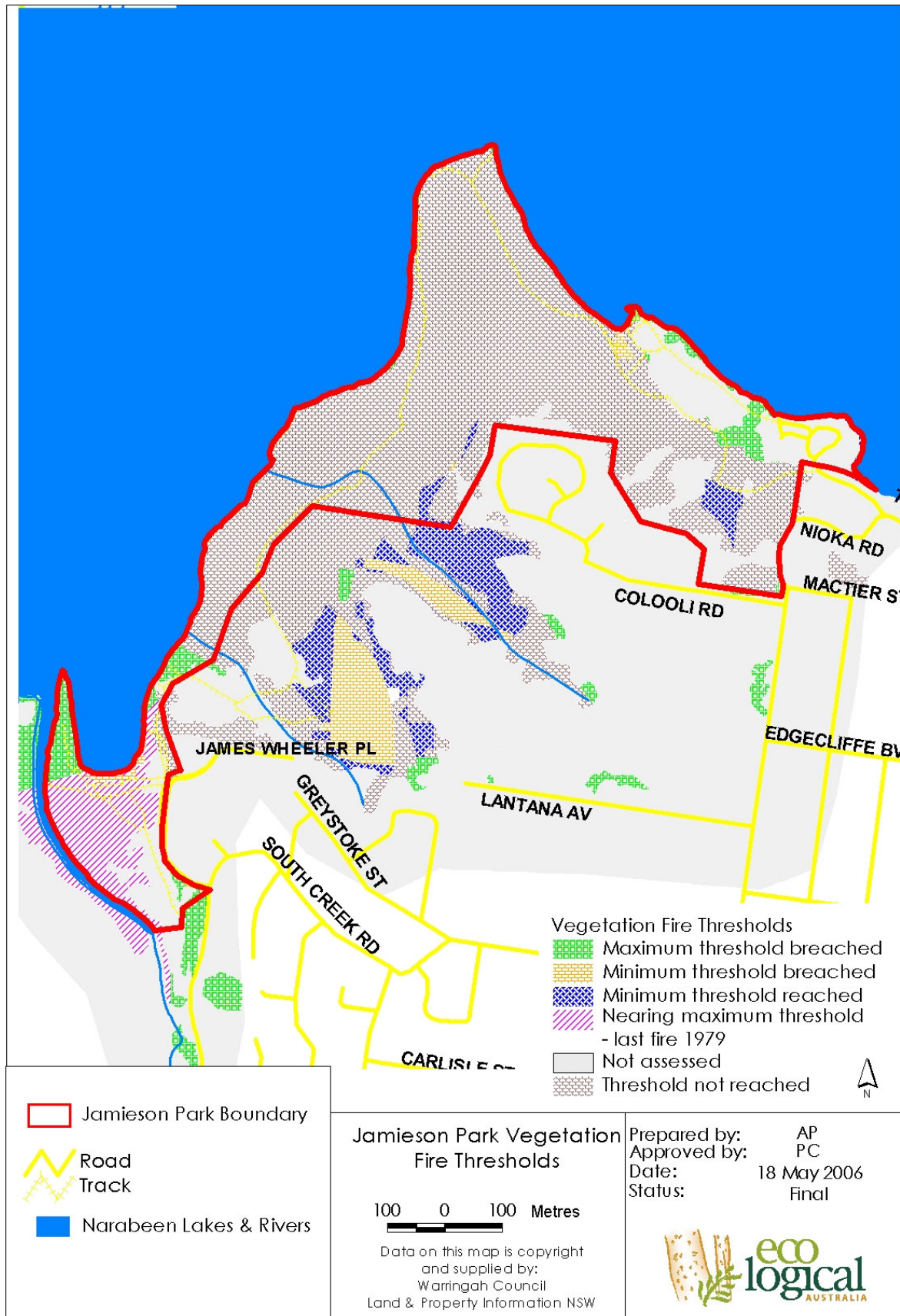


Figure 5 Ecological Fire Requirements

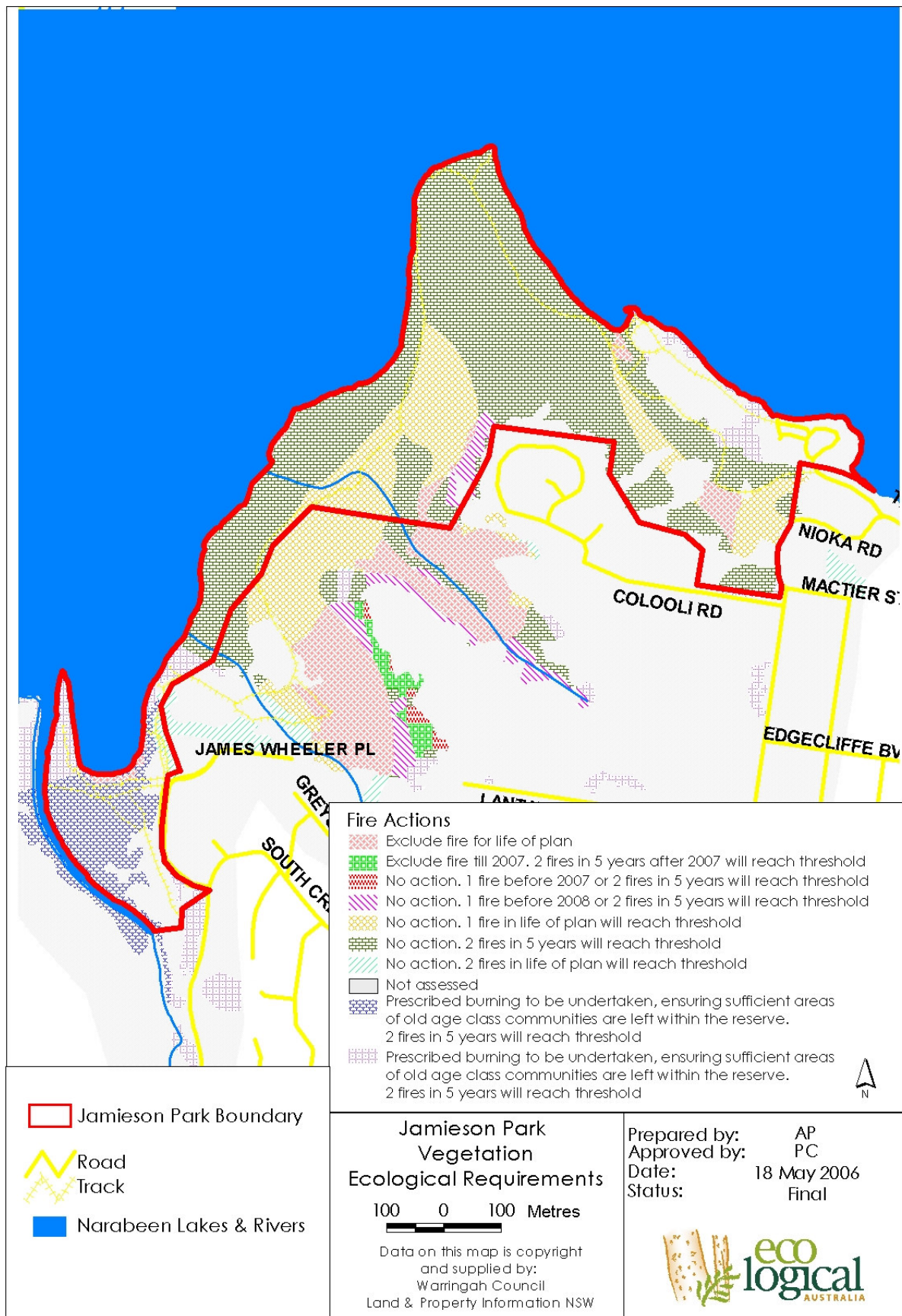


Table 3 Biodiversity Fire Regime Thresholds for Vegetation Communities identified within the Jamieson Park

Vegetation community	Priority	Minimum Fire Interval	Maximum Fire Interval	Fire Restrictions	Reference
Angophora Woodland	2	> 2 successive fires in < 5yr intervals	>30	Decline predicted if successive fires occur which totally scorch or consume the tree canopy. Avoid successive fires of intensity sufficient to scorch or consume dominant tree crown	(Bradstock NPWS 1996 cited in Conacher Travers Pty Ltd 2002), (WPBFMC 2000)
Bangalay Alluvial Forest	1	> 2 in 25 yrs	-		(WPBFMC 2000)
Bangalay Slopes Forest	1	> 2 in 25 yrs	-		(WPBFMC 2000)
Estuarine Reedland	1	No fires acceptable	No fires acceptable		
Palm Woodland	1	> 2 successive fires in < 5yr intervals	>30	Decline predicted if successive fires occur which totally scorch or consume the tree canopy. Avoid successive fires of intensity sufficient to scorch or consume dominant tree crown	(Bradstock NPWS 1996 cited in Conacher Travers Pty Ltd 2002), (WPBFMC 2000)

Vegetation community	Priority	Minimum Fire Interval	Maximum Fire Interval	Fire Restrictions	Reference
Peppermint-Angophora Forest	3	> 2 successive fires in < 5yr intervals	>30	Decline predicted if successive fires occur which totally scorch or consume the tree canopy. Avoid successive fires of intensity sufficient to scorch or consume dominant tree crown	(Bradstock NPWS 1996 cited in Conacher Travers Pty Ltd 2002), (WPBFMC 2000)
Saltmarsh	1	No fires acceptable	No fires acceptable		
Swamp Mahogany Forest	1	> 2 successive fires in < 5yr intervals	>30	Decline predicted if successive fires occur which totally scorch or consume the tree canopy. Avoid successive fires of intensity sufficient to scorch or consume dominant tree crown	(Bradstock NPWS 1996 cited in Conacher Travers Pty Ltd 2002), (WPBFMC 2000)
Swamp Oak Forest	1	> 2 successive fires in < 5yr intervals	>30	Decline predicted if successive fires occur which totally scorch or consume the tree canopy. Avoid successive fires of intensity sufficient to scorch or consume dominant tree crown	(Bradstock NPWS 1996 cited in Conacher Travers Pty Ltd 2002), (WPBFMC 2000)

5 Operational Schedule

The operational schedule is explained below and is made up of the:

- Prescribed Fire Management Zones
- Prescribed Works Schedule

This may be seen in:

- Figure 6 and 7
- Table 4
- The "Jamieson Park Fire Regime Management Poster" (Appendix 7, ELA 2006)

5.1 Prescribed Fire Management Zones

The following fire management zones have been applied (see Figure 6, Section 4.5):

- Asset Protection Zones (APZ)
- Land Management Zones (LMZ)
- Strategic Fire Advantage Zones (SFAZ)
- Fire Exclusion Zones (FEZ)

SFAZ and LMZ have been divided up into fire management zones, to ensure the maintenance of fire age mosaic and required threshold regimes.

Where possible, existing tracks, natural features and cleared areas have been used for fire management boundaries. In other cases vegetation communities boundaries based on identified fire regimes have been used. This has led to the location of some management zones outside the park boundaries.

Prescribed APZ and selected SFAZ widths may be seen in Table 4.

These areas include both Council owned land and private property, so cooperation of all landowners will be required for the successful implementation of this plan.

5.2 Prescribed Works Schedule

The prescribed works schedule lists the actions required by Council to facilitate implementation of this Plan's objectives.

Prescribed burning within **LMZ** has been proposed for selected areas where biodiversity fire regime thresholds are near to or have been exceeded (that is, if the vegetation has not been burned for a long time and is in danger of senescing and losing biodiversity values). Assessed threshold explanation, status and proposed action status can be seen in the following:

- Sections 4.6
- Figure 4, 5
- Table 2

In order to maintain **SFAZ** within prescribed fuel load limits whilst maintaining ecological integrity:

- Dominant vegetation types were identified within each SFAZ
- The maximum prescribed fuel load for each SFAZ was then entered into the fuel accumulation model to provide a guide for required burn year
- The burn year was evaluated against identified ecological fire thresholds (see 4.6) and known threatened species fire intervals (see ELA 2005a and ELA 2005b)

Whilst it is considered outside the Jamieson Park boundary, areas of RSL War Veterans land to the south of the park have been identified as having breached their ecological fire thresholds (see Section 4.6, Figure 4 and 5). These area however may require APZ work, to be determined by a bush fire management plan.

Due to practicality and potential ecological impacts, Council has requested SFAZ 7 and APZ 2 should be burnt once in 2006. This may result in A small area breaching it minimum threshold and then fuel exceeding ELA's recommended fuel prescription for maximum fine fuel loading within a range of 8 – 18 tonnes per hectare.

Figure 6 Prescribed Fire Management Zones

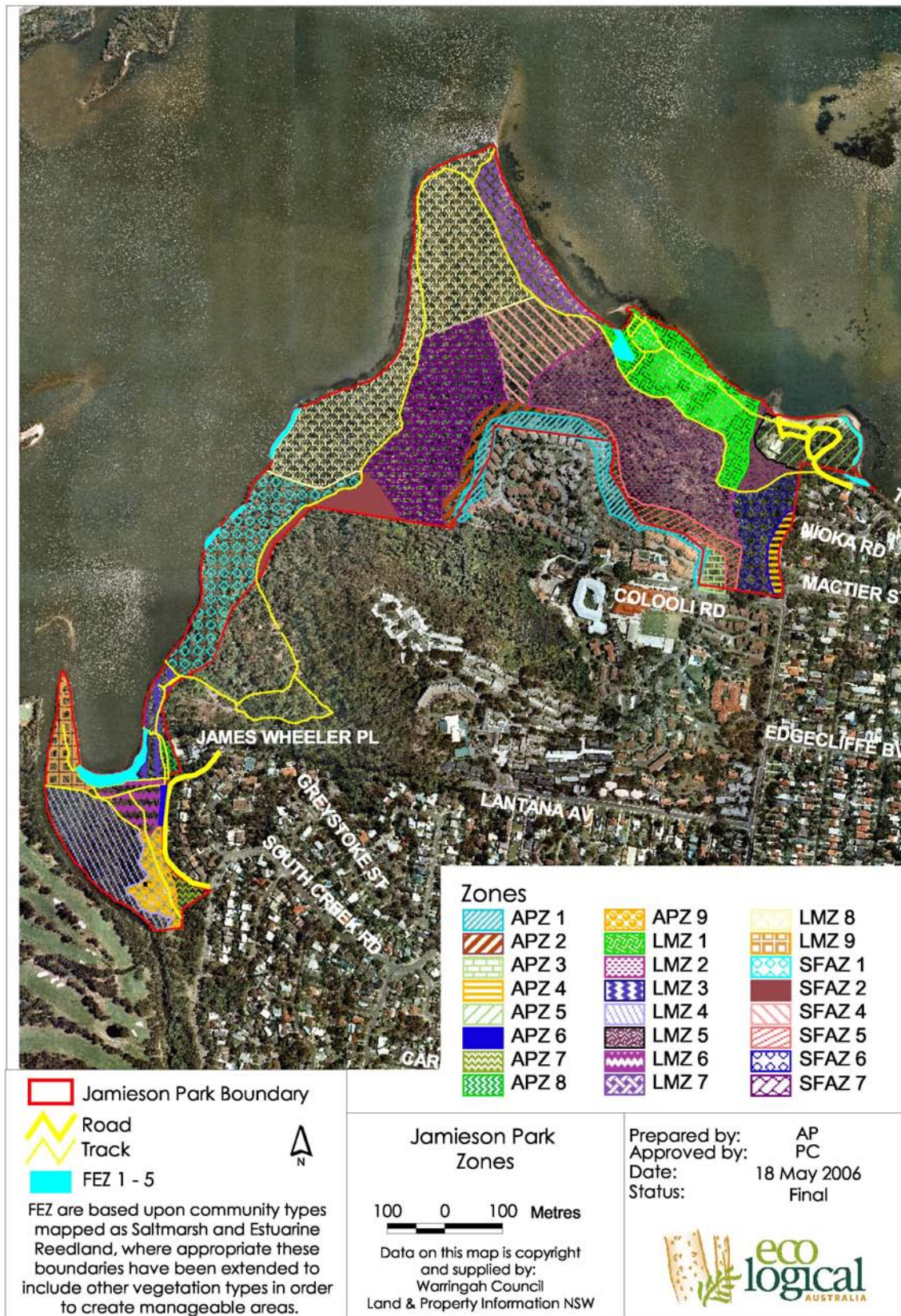


Figure 7 Prescribed Works Schedule

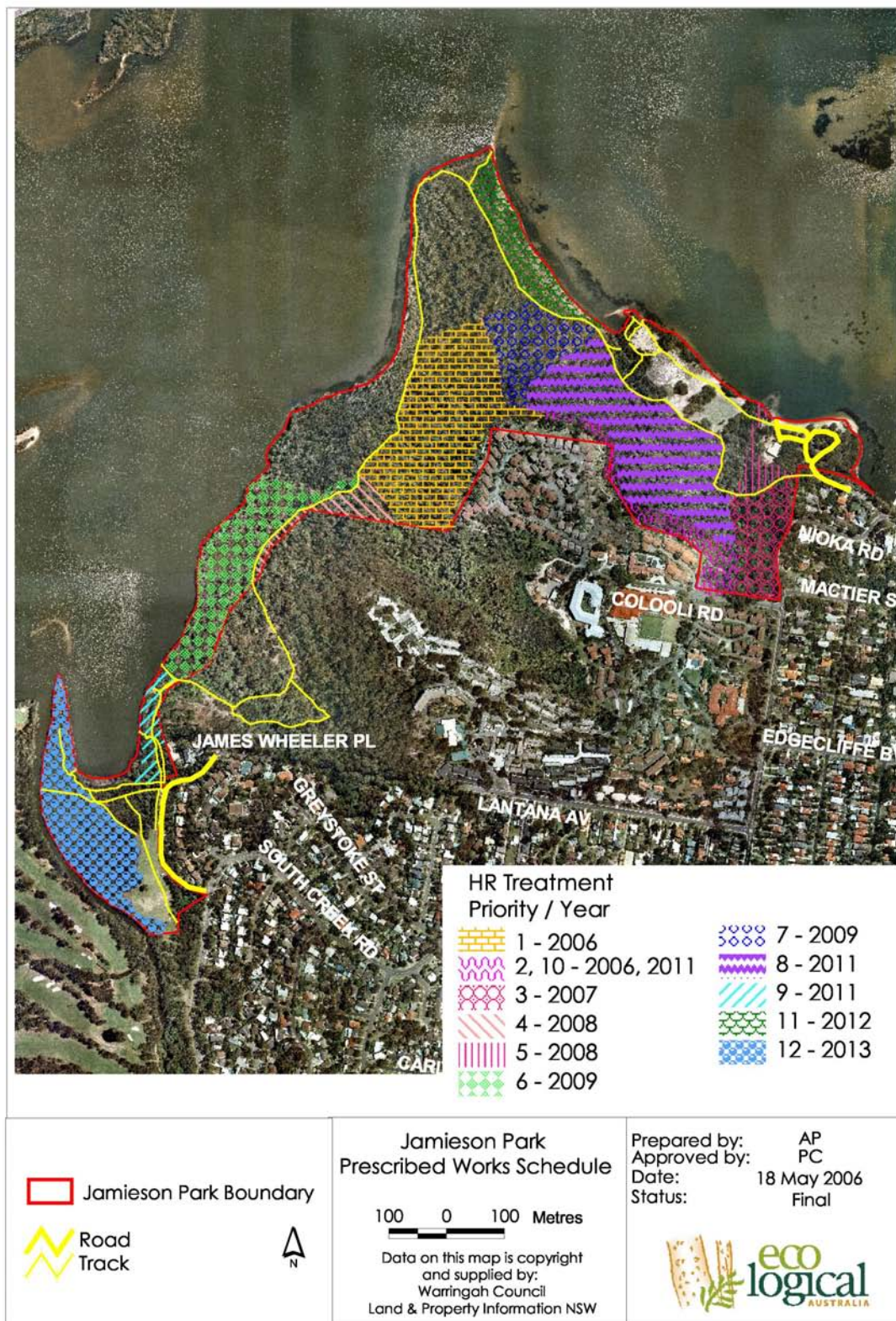


Table 4 Operation Schedule for Jamieson Park

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
APZ 1	APZ - IPA	Slashing to meet prescription	Management with adjacent land holder is required	-	Subject to Council's FMAZ program priorities ♦	-	-	-	Crown Land CCM Warringah Council, RSL War Veterans' Retirement Village	Applied to logical boundary. Width varies from 6m to 32m. Total average IPA / OPA / SFAZ width of 40m along the western to northern eastern edge. Total average IPA, OPA and SFAZ width 70m within the eastern edge
APZ 2	APZ - OPA	Initial weed removal and long term weed suppression, hand removal of fuels within areas of build up. Treatment to be undertaken for Priority 2 - Manual	Management with adjacent land holder is required	1	2006	-	-	-	Crown Land CCM Warringah Council, RSL War Veterans' Retirement Village	Width varies from 11m to 25m. Total average IPA and OPA width - 40m
APZ 3	APZ - OPA	Initial weed removal and long term weed suppression, hand removal of fuels within areas of build up. Treatment to be undertaken for Priority 2 & 10 - Manual	Management with adjacent land holder is required	2, 10	2006, 2011	-	-	-	Crown Land CCM Warringah Council, RSL War Veterans' Retirement Village	Applied to logical boundary. Width varies from 2m to 45m. Total average IPA, OPA and SFAZ width 70m within the eastern edge

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
APZ 4	APZ	Initial weed removal and long term weed suppression, hand removal of fuels within areas of build up. Treatment to be undertaken for Priority 3 - Burning	Management with adjacent land holder is required	3	2007	-	-	-	Crown Land CCM Warringah Council	20m
APZ 5	APZ	Slashing to meet prescription	Management with adjacent land holder is required	-	Subject to Council's FMAZ program priorities ♦	Road, tracks, car park, sailing club	Estuarine Complex - Swamp Oak Forest	-	Crown Land CCM Warringah Council	Applied to appropriate boundaries
APZ 6	APZ	Initial weed removal and long term weed suppression, hand removal of fuels within areas of build up	-	-	Subject to Council's FMAZ program priorities ♦	-	-	-	Crown Land CCM Warringah Council	Applied to logical boundary. Width varied from 7 - 11m. Based on 35m from built assets
APZ 7	APZ	Initial weed removal and long term weed suppression, hand removal of fuels within areas of build up	-	-	Subject to Council's FMAZ program priorities ♦	-	-	-	Crown Land CCM Warringah Council	Applied to appropriate boundaries
APZ 8	APZ	Initial weed removal and long term weed suppression, hand removal of fuels within areas of build up	Management with adjacent land holder is required	-	Subject to Council's FMAZ program priorities ♦	Tracks	-	-	Crown Land CCM Warringah Council	Applied to logical boundary. Width varied from 6 - 23m. Based on 40m from built assets

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
APZ 9	APZ	Slashing to meet prescription	-	-	Subject to Council's FMAZ program priorities ♦	Tracks	Estuarine Complex - Swamp Oak Forest	-	Crown Land CCM Warringah Council	Applied to appropriate boundaries
FEZ 1	FEZ	Exclude fire/quick suppression		-	-	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland	-	Crown Land CCM Warringah Council	-
FEZ 2	FEZ	Exclude fire/quick suppression		-	-	-	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland	-	Crown Land CCM Warringah Council	-

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
FEZ 3	FEZ	Exclude fire/quick suppression		-	-	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland	-	Crown Land CCM Warringah Council	-
FEZ 4	FEZ	Exclude fire/quick suppression		-	-	-	Coastal saltmarsh - Saltmarsh	-	Crown Land CCM Warringah Council	-
FEZ 5	FEZ	Exclude fire/quick suppression		-	-	-	Coastal saltmarsh - Saltmarsh	-	Crown Land CCM Warringah Council	-
LMZ 1	LMZ	-		-	-	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland & Bangalay Alluvial Forest	-	Crown Land CCM Warringah Council	-

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
LMZ 2	LMZ	Burning	-	8	2011	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland & Bangalay Alluvial Forest	-	Crown Land CCM Warringah Council	-
LMZ 3	LMZ	Burning	Management with adjacent land holder is required	9	2011	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland & Swamp Mahogany Forest	-	Crown Land CCM Warringah Council	-
LMZ 4	LMZ	Burning	-	12	2013	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Swamp Mahogany Forest	Rock engraving	Crown Land CCM Warringah Council	-

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
LMZ 5	LMZ	Burning	-	5	2008	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Bangalay Alluvial Forest	-	Crown Land CCM Warringah Council	-
LMZ 6	LMZ	-	-	-	-	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Swamp Mahogany Forest	-	Crown Land CCM Warringah Council	-
LMZ 7	LMZ	Burning	-	11	2012	Tracks	Estuarine Complex - Swamp Oak Forest	-	Crown Land CCM Warringah Council	-
LMZ 8	LMZ	-	-	-	-	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland	-	Crown Land CCM Warringah Council	-

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
LMZ 9	LMZ	Burning	-	12	2013	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Swamp Mahogany Forest	-	Crown Land CCM Warringah Council	-
SFAZ 1	SFAZ	Burning	Management with adjacent land holder is required	6	2009	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Estuarine Reedland, Swamp Mahogany Forest, Bangalay Alluvial Forest	-	Crown Land CCM Warringah Council	-
SFAZ 2	SFAZ	Burning	Management with adjacent land holder is required	4	2008	Tracks	Swamp sclerophyll forest - Palm Woodland; Swamp sclerophyll forest - Swamp Mahogany Forest & Bangalay Alluvial Forest	-	Crown Land CCM Warringah Council	-

Name	Zone Type	Treatment	Management	HR Treatment Priority*	HR Treatment Year	Assets	Threatened Species and Endangered Ecological Communities	Aboriginal or Cultural Sites	Land Tenure	Zone Widths
SFAZ 4	SFAZ	Burning	-	7	2009	Tracks	Estuarine Complex - Swamp Oak Forest	-	Crown Land CCM Warringah Council	-
SFAZ 5	SFAZ	Treatment to be undertaken for Priority 2 - Manual & Priority 10 - Burning	Management with adjacent land holder is required	2, 10	2006, 2011	-	-	-	Crown Land CCM Warringah Council, RSL War Veterans' Retirement Village	40m
SFAZ 6	SFAZ	Burning	Management with adjacent land holder is required	3	2007	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Bangalay Alluvial Forest	-	Crown Land CCM Warringah Council	-
SFAZ 7	SFAZ	Burning	Management with adjacent land holder is required	1	2006	Tracks	Estuarine Complex - Swamp Oak Forest; Swamp sclerophyll forest - Palm Woodland	-	Crown Land CCM Warringah Council	-

* Year of burn may vary due to weather and environmental conditions and resource availability

◆ Fire Management Access Zone (FMAZ) priorities dependent on available funds

Note:

- No significant species recorded in park
- Three items of Aboriginal cultural heritage occur adjacent to the park and should not be affected by this plan

6 Performance measures

6.1 Environmental Assessment of Scheduled Works

All works proposed within the fire management plan will be assessed for environmental and heritage impacts at the HR planning stage. This will be conducted either under the EP&A Act, or through an REF or under the Bush Fire Environmental Assessment Code (See Section 2.6). The "Warringah Local Government Area Hazard Reduction Guidelines" (Appendix 4) may be used to assist this process.

6.2 Monitoring Fire Regimes and Changes to Biodiversity

Fire records should be updated as fire incidents occur.

Alteration to fire threshold status resultant from fire occurrences after June 2005 should be assessed annually and at the beginning of HR planning to determine potential management requirements.

This assessment should involve a comparison of required and actual vegetation community and threatened species thresholds and requires:

- Updated fire records
- Determination of fire age
- Consideration of required threshold
- Assessment of current threshold status

Assessment of vegetation community threshold status was undertaken in 2005 (see Section 4.6) and is included within:

- Figure 4,5
- Digital data provided to Council

6.3 Fire Management Plan Review

The goal of this plan is to guide the management of fire in Jamieson Park for the next 10 years and to provide a sustainable balance between asset protection and ecosystem management.

Prescribed works schedule assessment

Assessment of the prescribed works schedule (Section 5.2) and the Warringah Reserve Threatened Flora/Fauna Fire Ecology spreadsheets (ELA 2005a, ELA 2005b) should be undertaken on an annual basis and during HR planning. This should include:

- Incorporation of additional developments in the management of native flora and fauna with respect to fire
- Alterations in fire thresholds (see Section 6.2)

Fire management plan evaluation

It is recommended that an evaluation of this plan be conducted at the end of 10 years. The evaluation should involve stakeholder (RFS and DEC) assessment and include:

Quantitative assessment:

- Minimum fire thresholds not exceeded
- Number of hectares burnt outside ecological threshold for HR and wildfires
- Maintenance of a mosaic of fire age (vegetation age)
- Maintenance of fuel free and fuel reduced APZ's
- All activities proposed within the Prescribed Work Schedule accepted by the NSW Rural Fire Service (RFS)

Qualitative assessment:

- Provision of effective and user friendly instructional guidelines to enable other planning processes. Including:
 - proficient/successful HR planning
 - prevention of fire damage to infrastructure
 - prevention of fire damage to threatened, locally or regionally significant species, endangered populations or endangered ecological communities
 - protection of Aboriginal and culturally significant sites from fire damage
 - visit current social attitudes to determine success of proposed management strategies
 - evaluate feasibility and practicality of prescribed operational schedule

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Appendix 1 – Vegetation Priority Explanation

Priority 1	EEC (under <i>TSC Act 1995</i>), or represent potentially important habitat for threatened flora or fauna species (listed under <i>TSC Act 1995</i>). Particularly if the community is absent or poorly represented in Garigal and Ku-ring-gai Chase National Parks.
Priority 2	Important for conservation of biodiversity at the local level. Communities with a restricted distribution in the Warringah LGA and are absent or poorly represented in Garigal and Ku-ring-gai Chase National Parks. Stands of these communities warrant first priority if they support populations of threatened fauna or flora species.
Priority 3	Communities that are well represented in Garigal and Ku-ring-gai Chase National Parks and common in Warringah. Stands of these communities warrant first priority if they support populations of threatened fauna or flora species.

Source: P & J Smith 2003

Appendix 2 – Known Threatened Flora Within 5km and Threatened Fauna Within 10km of Jamieson Park

Table 1: Known threatened flora within 5km of Jamieson Park*

Scientific Name	Common Name
<i>Acacia bynoeana</i>	Bynoe's Wattle
<i>Chamaesyce psammogeton</i>	
<i>Genoplesium baueri</i>	
<i>Grevillea caleyi</i>	
<i>Microtis angusii</i>	
<i>Syzygium paniculatum</i>	
<i>Tetradlea glandulosa</i>	

***Source:** DEC 2004 ***No** threatens species recorded within the Park

Table 2: Known threatened fauna within 10km of Jamieson Park*

Scientific Name	Common Name
<i>Botaurus poiciloptilus</i>	Australasian Bittern
<i>Calidris alba</i>	Sanderling
<i>Calidris tenuirostris</i>	Great Knot
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo
<i>Cercartetus nanus</i>	Eastern Pygmy-possum
<i>Charadrius leschenaultii</i>	Greater Sand Plover
<i>Charadrius mongolus</i>	Lesser Sand Plover
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll
<i>Diomedea exulans</i>	Wandering Albatross
<i>Esacus neglectus</i>	Beach Stone-curlew
<i>Gygis alba</i>	White Tern
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher
<i>Haematopus longirostris</i>	Pied Oystercatcher
<i>Heleioporus australiacus</i>	Giant Burrowing Frog
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)
<i>Ixobrychus flavicollis</i>	Black Bittern
<i>Lathamus discolor</i>	Swift Parrot
<i>Litoria aurea</i>	Green and Golden Bell Frog
<i>Macronectes giganteus</i>	Southern Giant-Petrel
<i>Macronectes halli</i>	Northern Giant-Petrel
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat
<i>Neophema pulchella</i>	Turquoise Parrot
<i>Ninox strenua</i>	Powerful Owl
<i>Pandion haliaetus</i>	Osprey
<i>Phascolarctos cinereus</i>	Koala
<i>Phoebastria fusca</i>	Sooty Albatross
<i>Pseudophryne australis</i>	Red-crowned Toadlet
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox
<i>Ptilinopus magnificus</i>	Wompoo Fruit-Dove
<i>Ptilinopus superbus</i>	Superb Fruit-Dove
<i>Puffinus assimilis</i>	Little Shearwater
<i>Puffinus carneipes</i>	Flesh-footed Shearwater
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat
<i>Sterna albifrons</i>	Little Tern
<i>Sterna fuscata</i>	Sooty Tern
<i>Thalassarche cauta</i>	Shy Albatross
<i>Thalassarche melanophrys</i>	Black-browed Albatross
<i>Tyto novaehollandiae</i>	Masked Owl
<i>Varanus rosenbergi</i>	Rosenberg's Goanna
<i>Xanthomyza phrygia</i>	Regent Honeyeater

***Source:** DEC 2004 ***No threatens species recorded within the Park**

Appendix 3 – Known Significant Flora Within 5km and Significant Fauna Within 10km of Jamieson Park

Table 1 Known significant flora within 5km of Jamieson Park*

Scientific Name	Common Name	Significance
<i>Angophora crassifolia</i>		Nationally significant species
<i>Angophora hispida</i>	Dwarf Apple	Biogeographically significant
<i>Arthrochilus prolixus</i>		Threatened in northern Sydney
<i>Boronia fraseri</i>		Nationally significant species
<i>Boronia thujona</i>		Biogeographically significant
<i>Callistemon salignus</i>	Willow Bottlebrush	Threatened in Warringah
<i>Crocea saligna</i>		Biogeographically significant
<i>Darwinia procera</i>		Nationally significant species
<i>Eucalyptus luehmanniana</i>	Yellow-top Ash	Nationally significant species
<i>Eucalyptus robusta</i>	Swamp Mahogany	Threatened in northern Sydney
<i>Eucalyptus stricta</i>	Mallee Ash	Threatened in northern Sydney
<i>Gonocarpus salsoloides</i>		Nationally significant species
<i>Grevillea speciosa</i>	Red Spider Flower	Biogeographically significant
<i>Lomandra brevis</i>		Nationally significant species
<i>Lomandra fluviatilis</i>		Nationally significant species
<i>Melaleuca thymifolia</i>		Threatened in northern Sydney
<i>Melichrus procumbens</i>	Jam Tarts	Threatened in northern Sydney
<i>Persoonia pinifolia</i>	Pine-leaved Geebung	Biogeographically significant
<i>Plantago hispida</i>		Threatened in northern Sydney
<i>Rulingia hermanniifolia</i>		Nationally significant species
<i>Scaevola calendulacea</i>		Threatened in northern Sydney

***Source:** DEC 2004 ***No significant species recorded within the Park**

Table 2 Known significant fauna within 10km of Jamieson Park*

Scientific Name	Common Name	Significance
<i>Anous stolidus</i>	Common Noddy	Migratory
<i>Antechinus swainsonii</i>	Dusky Antechinus	Threatened in northern Sydney
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory
<i>Arenaria interpres</i>	Ruddy Turnstone	Migratory
<i>Boiga irregularis</i>	Eastern Brown Tree Snake	Threatened in northern Sydney
<i>Calidris ruficollis</i>	Red-necked Stint	Migratory
<i>Charadrius bicinctus</i>	Double-banded Plover	Migratory
<i>Chlidonias leucopterus</i>	White-winged Black Tern	Migratory
<i>Diplodactylus vittatus</i>	Eastern Stone Gecko	Threatened in northern Sydney
<i>Egretta sacra</i>	Eastern Reef Egret	Migratory
<i>Eudyptula minor</i>	Little Penguin	Threatened in northern Sydney
<i>Furina diadema</i>	Red-naped Snake	Threatened in northern Sydney
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Migratory
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler	Migratory
<i>Heteroscelus incanus</i>	Wandering Tattler	Migratory
<i>Hirundapus caudacutus</i>	White-throated Needletail	Migratory
<i>Lialis burtonis</i>	Burton's Snake-lizard	Threatened in Warringah
<i>Limnodynastes dumerilii</i>	Bullfrog	Threatened in northern Sydney
<i>Limnodynastes tasmaniensis</i>	Spotted Marsh Frog	Threatened in northern Sydney
<i>Limosa lapponica</i>	Bar-tailed Godwit	Migratory
<i>Litoria freycineti</i>	Freycinet's Frog	Threatened in northern Sydney
<i>Monarcha melanopsis</i>	Black-faced Monarch	Migratory
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory
<i>Notechis scutatus</i>	Mainland Tiger Snake	Threatened in northern Sydney
<i>Numenius madagascariensis</i>	Eastern Curlew	Migratory
<i>Origma solitaria</i>	Rockwarbler	Biogeographically Significant
<i>Philomachus pugnax</i>	Ruff	Migratory
<i>Phyllurus platurus</i>	Broad-tailed Gecko	Biogeographically Significant
<i>Plegadis falcinellus</i>	Glossy Ibis	Migratory
<i>Pluvialis squatarola</i>	Grey Plover	Migratory
<i>Pogona barbata</i>	Eastern Bearded Dragon	Threatened in Warringah
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	Threatened in northern Sydney
<i>Pseudophryne bibronii</i>	Bibron's Toadlet	Threatened in northern Sydney
<i>Puffinus griseus</i>	Sooty Shearwater	Migratory
<i>Puffinus pacificus</i>	Wedge-tailed Shearwater	Migratory
<i>Puffinus tenuirostris</i>	Short-tailed Shearwater	Migratory
<i>Rattus lutreolus</i>	Swamp Rat	Threatened in northern Sydney
<i>Rhipidura rufifrons</i>	Rufous Fantail	Migratory
<i>Sericornis magnirostris</i>	Large-billed Scrubwren	Threatened in northern Sydney
<i>Stercorarius longicaudus</i>	Long-tailed Jaeger	Migratory
<i>Stercorarius pomarinus</i>	Pomarine Jaeger	Migratory
<i>Sterna caspia</i>	Caspian Tern	Migratory
<i>Sterna hirundo</i>	Common Tern	Migratory
<i>Sterna paradisaea</i>	Arctic Tern	Migratory
<i>Tringa nebularia</i>	Common Greenshank	Migratory
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Migratory

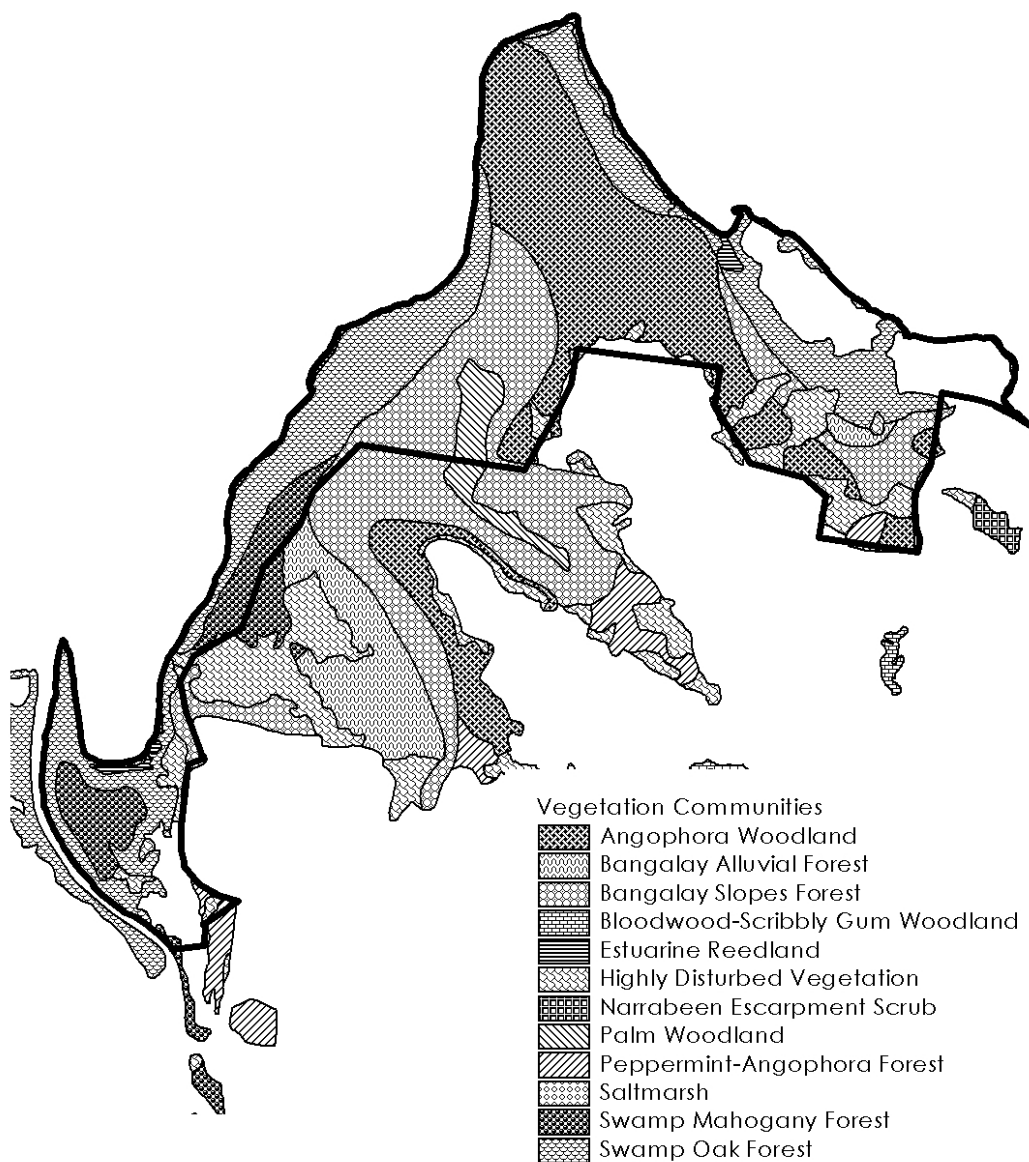
*Source: DEC 2004 *No significant species recorded within the Park

Appendix 4 – Warringah Local Government Area Hazard Reduction Guidelines

Appendix 5 – Fire Management Plan Methodology

Appendix 6 –Vegetation Community Overlay

 Jamieson Park Boundary



Appendix 7 – Jamieson Park Fire Regime Management Poster