FIRE MANAGEMENT STRATEGY

Ku-ring-gai Chase National Park

Lion Island Nature Reserve

Long Island Nature Reserve

Spectacle Island Nature Reserve

Mt Ku-ring-gai Aboriginal Area

Department of **Environment and Conservation** NSW

KU-RING-GAI CHASE NATIONAL PARK, LION ISLAND NATURE RESERVE, LONG ISLAND NATURE RESERVE, SPECTACLE ISLAND NATURE RESERVE AND MT KU-RING-GAI ABORIGINAL AREA

FIRE MANAGEMENT STRATEGY

Department of Environment and Conservation
National Parks and Wildlife Service
Sydney North Region

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

1 INTRODUCTION

1.1 Scope, Terms and Purpose

This document describes the strategies that the NSW National Parks and Wildlife Service (NPWS) plans to implement in Ku-ring-gai Chase National Park (NP), Lion Island Nature Reserve (NR), Long Island NR, Spectacle Island NR and Mt Ku-ring-gai Aboriginal Area (Map 1). This strategy has an operational life of 5 years between 2006 and 2010. If required, the operational life of the strategy may be shortened or extended if circumstances dictate.

The relationship between this document and other elements of the NPWS and Bush Fire Management Committee (BFMC) framework is summarised in Figure 1. The document has been prepared to ensure consistency with the policies and procedures detailed in the NPWS Fire Management Manual (NPWS 2006), the NPWS Strategy for Fire Management (NPWS 2003a), the Ku-ring-gai Chase National Park and Lion Island, Long Island and Spectacle Island Nature Reserves Plan of Management (POM) (NPWS 1999), the Sydney Basin Fire Management Strategy (NPWS 2003b), and Bush Fire Management Committee (BFMC) Risk Management and Operations Coordination Plans.

This strategy is a relevant plan in accordance with section 38 (4) and section 44 (3) of the *Rural Fires Act* 1997. The NPWS is seeking the cooperation of all fire authorities in adopting the strategies outlined within this document when responding to bushfires within these reserves.

In addition to this document, detailed map-based strategies will be prepared and reviewed annually. The map based strategies will be complemented by regional incident procedures (RIPs) that detail preparedness and response procedures for managing incidents such as bushfires, both as wildfires and as prescribed burns.

1.1.1 Fire Management Objectives

The primary objectives of fire management by the NPWS are to:

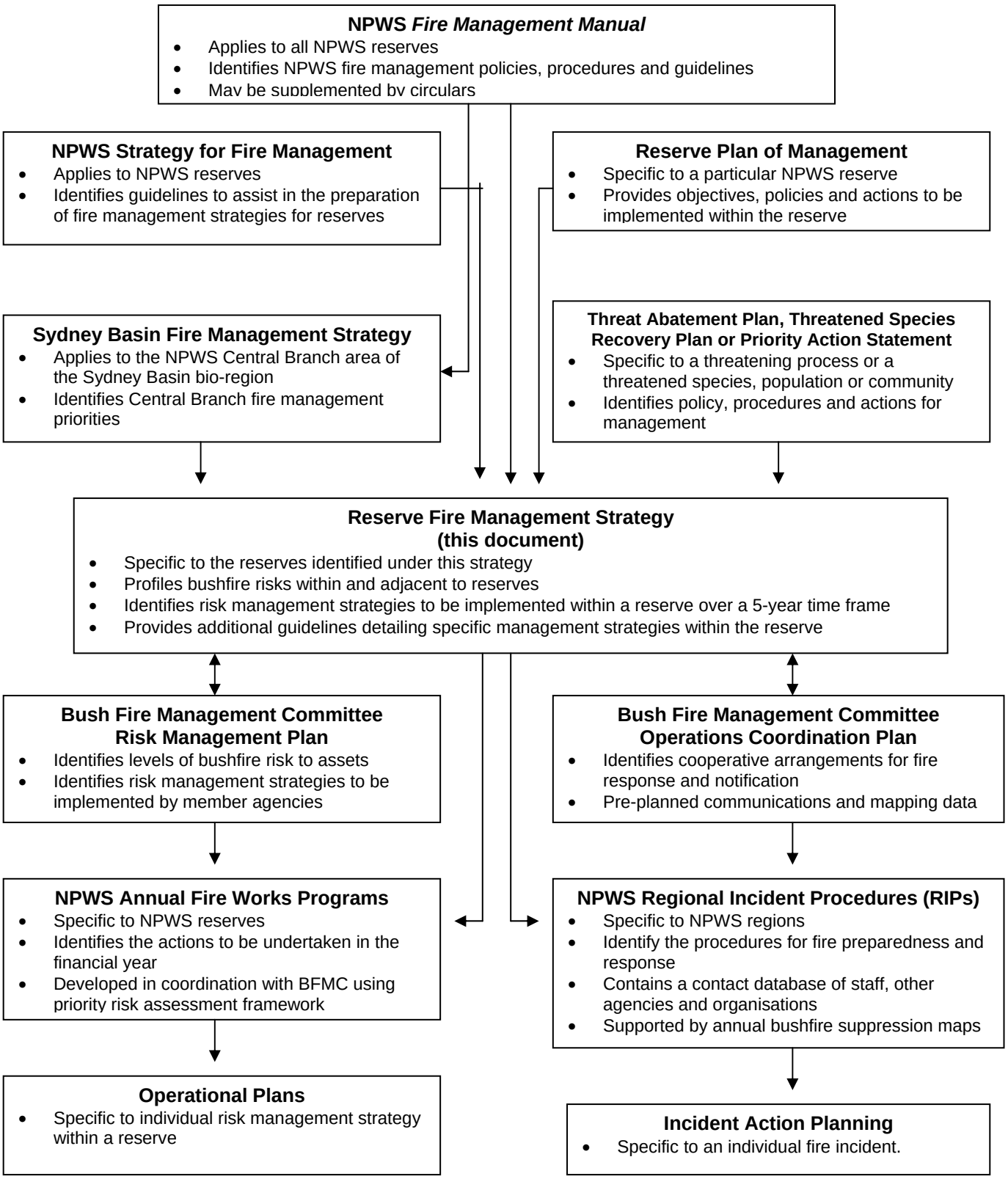
- protect life, property and community assets from the adverse impacts of fire
- develop and implement cooperative and coordinated fire management arrangements with other fire authorities, reserve neighbours and the community
- manage fire regimes within reserves to conserve and enhance natural and cultural heritage values
- protect Aboriginal sites known to exist within NSW and historic places and culturally significant features known to exist within reserves from damage by fire
- assist other fire agencies, land management authorities and landholders in developing fire management practices to conserve natural and cultural heritage across the landscape.

1.2 Strategy Implementation and Administration

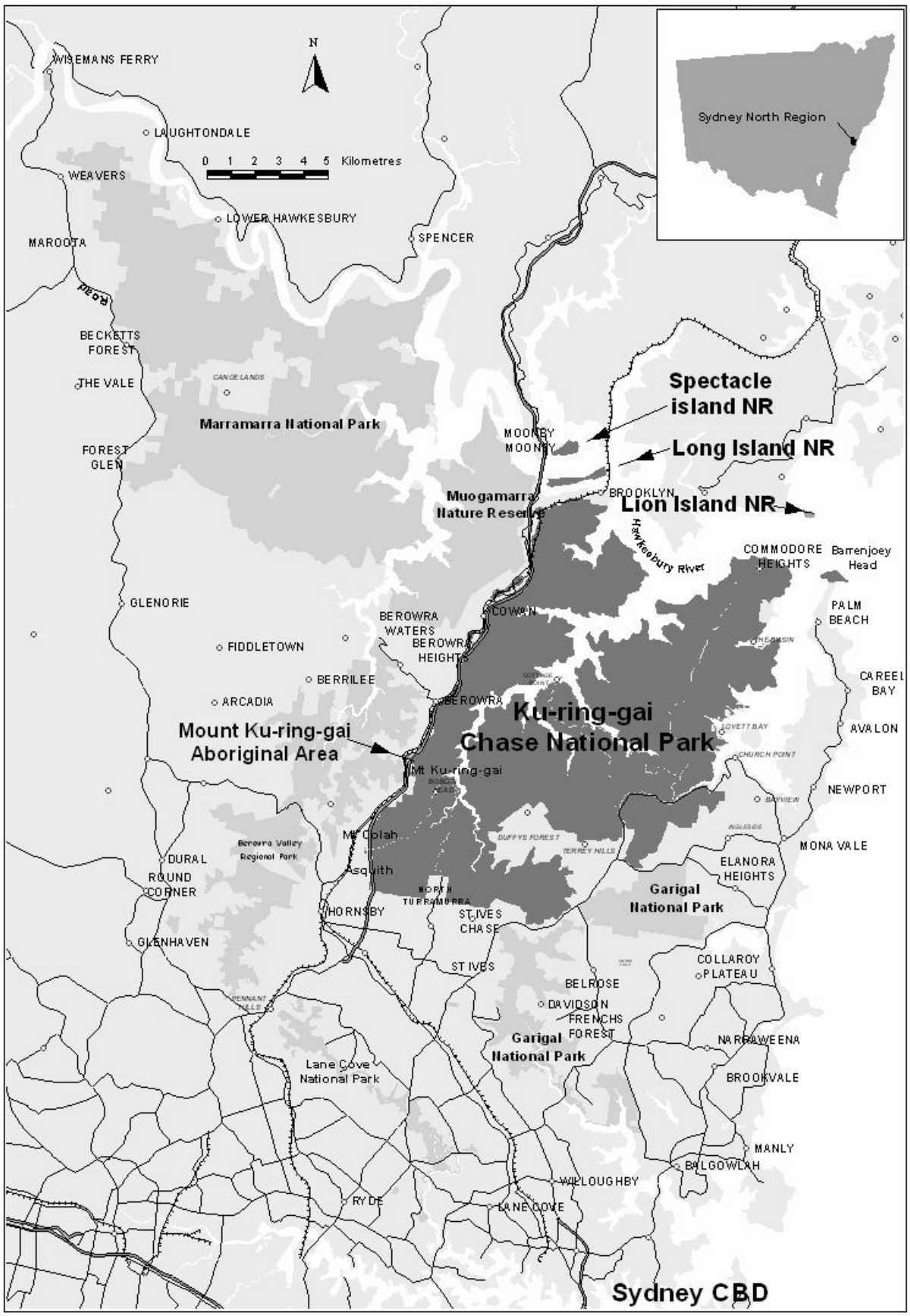
This strategy will be implemented through the development of annual works programs that identify specific strategies to be implemented. The annual work programs are funded each financial year by recurrent or capital budget allocations. Additional funding may also be sought through various grant schemes to implement specific strategies.

The implementation of the Strategies will be reviewed annually in accordance with NPWS performance indicators specified in the NPWS *Fire Management Manual* (2006).

Figure 1: Fire Management Planning Framework



Map 1: Location of the reserves



1.3 Description of the Reserves

1.3.1 Location and Terrain

This fire management strategy applies to Ku-ring-gai Chase NP, Barrenjoey Head (14 882 ha), Lion Island NR (11.8 ha), Long Island NR (67.9 ha), Spectacle Island NR (46.8 ha), and Mt Ku-ring-gai Aboriginal Area (0.5 ha). The reserves are located approximately 20 km to the north of Sydney CBD (Map 1).

In addition to NPWS reserves, this strategy also considers fuel, assets and fire control advantages that are outside but contiguous with or adjacent to those in the reserves. These areas include lands managed by Hornsby Council, Ku-ring-gai Council, Warringah Council, Pittwater Council, Gosford Council, the Department of Lands, the Metropolitan Local Aboriginal Land Council and various private landholders.

The reserves are split between the Hornsby–Ku-ring-gai BFMC area, the Warringah–Pittwater BFMC area and the Gosford BFMC area.

The terrain of the reserves is typical of Hawkesbury Sandstone geology, with plateau and ridgeline areas steeply sloping into drainage lines. The highest point in the National Park is about 200 m above sea level. Major geographical features include the extensive areas of water surrounding the National Park, and the Lambert Peninsula bounded by Pittwater to the east, the Hawkesbury River to the north and Cowan Water to the west. The Mt Ku-ring-gai Aboriginal Area is a narrow area of bushland bounded by the Pacific Highway and the main Northern Line. Lion Island NR, Long Island NR and Spectacle Island NR are located in the lower Hawkesbury River.

1.3.2 Fire Weather and History

Owing to the combination of climate, topography and vegetation, the Sydney region is one of the most bushfire-prone areas in the world. Periodically, every 5 to 12 years, drought conditions combine with hot, dry, north-westerly to south-westerly air streams to produce the potential for high-intensity, uncontrollable bushfires. Although bushfires may occur at any time of the year, the highest probability occurs in December and January.

NPWS fire history records for the reserves date back to 1943, although only the last 20 years' records are considered to have been accurately mapped. Different areas have been burnt at varying frequencies: some areas have been burnt 11 times since 1943, while others have not had a recorded fire.

Within Ku-ring-gai Chase NP, significant fires occurred in February 1946 (3850 ha, with 4 houses lost at The Basin), 1958 (4688 ha), November 1965 (4545 ha), December 1979 (5200 ha, with 14 houses, 37 sheds, 7 caravans and boats, and 23 stables lost, and 12 vehicles damaged), November 1980 (1226 ha), January 1983 (2900 ha, with 3 houses and 4 cars lost), December 1990 (935 ha, with 1 garden shed lost), January 1994 (11, 230 ha, with 29 houses lost and 90 houses damaged) and January 2004 (1400 ha). In all reserves, most bushfires have been started by human activities, in particular arson. Lightning is not a significant cause of fire ignitions.

Lion Island NR, Long Island NR and Spectacle Island NR have a history of infrequent fires.

1.3.3 Reserve Interface and Development Patterns

Settlement in the past has occurred along ridgetops and then gradually spread downslope, often with very little regard to the bushfire hazards intrinsic to these areas. As a result, much of Ku-ring-gai Chase NP is surrounded by residential areas, including Brooklyn, Cowan, Berowra, Mt Ku-ring-gai, Mt Colah, North Wahroonga, North Turramurra, St Ives Chase, Duffys Forest, Terrey Hills, Ingleside and Bayview. Also located adjacent to the National Park are several remote

communities, including Cottage Point, Elvina Bay, Lovett Bay, Coasters Retreat, The Basin, Currawong Beach and Great Mackerel Beach, which are generally accessible only by boat. Barrenjoey Head, on the eastern side of Pittwater, is close to homes too.

Extensive areas of the western boundary of the National Park are bounded by the F3 Sydney-to-Newcastle Freeway and the main Northern Line.

1.3.4 Natural and Cultural Heritage

The vegetation survey of the reserve by Benson & Thomas (1985) identified 24 vegetation communities, ranging from heath, hanging swamps, woodland, open forest and tall open forest to temperate rainforest. The most common vegetation communities are highly flammable dry sclerophyll woodlands and heath- and shrublands, which occupy over 80% of the reserves. A list of vegetation communities found within the reserves along with their fire regime guidelines is presented in Appendix 1.

The reserves provide habitat for approximately 28 species of native mammals, 160 species of birds, approximately 20 species of reptiles. In particular, they provide habitat for 33 species of threatened flora (see Appendix 2), 28 species of threatened fauna (see Appendix 3) and 5 endangered ecological communities (EECs).

The soils within the reserves are vulnerable to sheet and gully erosion, particularly after high intensity wildfires.

The reserves have a long history of Aboriginal use and lie primarily within the Guringai tribal boundary and the Metropolitan Local Aboriginal Land Council administrative area. NPWS records show that the reserves and surrounding areas contain over 350 known Aboriginal heritage sites. Sites within the reserves include cave art, engravings (resembling emus, echidnas, fish, kangaroos, boomerangs, shields, footprints, people and mythical figures), grinding grooves, middens, stone arrangements, burial sites and occupation sites. Guidelines for the protection of Aboriginal cultural heritage values from damage by fire management activities are detailed in Appendix 4.

The reserves have a history of non-Aboriginal occupation dating back to 3 months after the original settlement at Sydney Cove in 1788. Features of significance include Barrenjoey Lighthouse, several houses, Brooklyn Dam, Beechwood Cottage at The Basin, the remains of a number of boat sheds along Cowan Creek, the Sphinx memorial at North Turramurra, Bobbin Head sea walls, shelter sheds, sandstone toilet blocks, a bus shelter, boatsheds, and Apple Tree Bay Road, along with gun emplacements, an observation post, searchlight stations, a trolley way, huts and other structures on West Head associated with military activities in WWII. Guidelines for the management of historic heritage values are detailed in Appendix 5.

1.3.5 Recreational Use and Facilities

The National Park provides an important recreational resource for northern Sydney, receiving approximately 2 million visitors each year. During the bushfire danger period there may be as many as 8000 visitors within the reserve, particularly near West Head lookout. Visitors also concentrate at Bobbin Head, Resolute picnic area, Illawong Bay, Apple Tree Bay, the Duckholes, Salvation Creek and opposite the Regional Office on Ku-ring-gai Chase Road. In addition, many visitors favour the Akuna Bay Marina, the Bobbin Head Marina or the Ku-ring-gai Motor Yacht Club at Cottage Point. At peak season, The Basin can be occupied with up to 600 campers. Many visitors may also be found on remote beaches, including America Bay, Refuge Bay, and Castle/Yeomans Bay. Many school groups utilise the Kalkari Discovery facilities on Ku-ring-gai Chase Rd and the Department of Education's Gibberagong Field Studies centre at Bobbin Head. Within the reserves there are also many walking tracks and fire trails used for walking and cycling

in locations surrounded by highly flammable vegetation, where escape from a bushfire would be slow or difficult.

1.3.6 Summary of Key Fire Issues

- Bushfires do and will continue to occur in the reserves owing to the combination of vegetation, climate, unplanned human-caused ignitions and occasional lightning strikes.
- Suspected arson is a major cause of bushfires within the National Park.
- There are a large number of community assets within and adjacent to the reserves that have been threatened or damaged in the past as a result of bushfires.
- A large proportion of existing assets and property do not conform to Australian Standards for both building construction and the establishment and maintenance of Asset Protection Zones on private property.
- The ability of residents to prepare for and take appropriate action during a bushfire is highly variable.
- During the bushfire danger period many visitors to the reserves may be located in areas surrounded by highly flammable vegetation and where escape from a bushfire would be slow or difficult.
- The reserves conserve natural and cultural heritage values that are vulnerable to inappropriate fire regimes and fire management activities.

2 BUSHFIRE RISKS

2.1 Introduction

This section identifies the assets and values within and adjacent to the reserves that are at risk from bushfire and summarises the factors contributing to risk. Where practicable, those features considered at risk of damage have been plotted on Map 2 (attached to the end of the document).

The risk assessment process used to develop this strategy is based on the Australian Standard for Risk Management AS/NZS 4360 (2004) and the NPWS *Strategy for Fire Management* (NPWS 2003). Those documents define risk as the chance of a bushfire happening that will affect the objectives of this strategy.

Determining risk as defined above requires a yearly bushfire risk analysis to be undertaken. The risk analysis process requires the systematic use of the best available information to determine how often specified bushfires may occur and the magnitude of their consequences. The process is undertaken in conjunction with the relevant BFMCs and requires expert advice, computer modelling and statistical analysis.

The results of the risk analysis enable the risk management strategies and controls described in section 3 to be appropriately applied.

2.2 Life and Property

Within and adjacent to the reserves there are many assets that may be damaged during a bushfire. Bushfire risk is a complex interaction between a number of variables, including:

- ignition sources and patterns in the landscape
- the ability of property owners, residents and visitors to take appropriate action in the event of a fire
- the adherence of properties to the building design and construction standards detailed in AS 3959
- the establishment and maintenance of adequate asset protection zones as described by *Planning for Bushfire Protection* (RFS 2001) within private lands
- the degree of isolation of communities and properties, potentially making them dangerous to reach by fire fighters and making effective protection difficult owing to a lack of services, particularly under severe conditions
- access for fire fighters to protect property during bushfires along perimeter roads, fire trails or walking tracks at the rear of private properties that may be used to form an interface control line (ICL)
- the adequate deployment and response times of fire fighting resources, both ground and air, to suppress fire and protect property
- the fire behaviour potential of the landscape based on the interaction of topography, vegetation type, fire history and fuel accumulation rates.

2.2.1 Property

Damage to property may result from direct flame contact, radiant heat or ember attack. It is an established fact that most destruction or damage to buildings in a bushfire is a direct result of poor preparedness and of the property being left unattended during a fire. Locations within and immediately adjacent to the reserves considered at risk from bushfires are listed in Table 1 and are marked on Map 2.

Table 1: Locations of property within and immediately adjacent to the reserves considered at risk

Map ID (See Map 2)	Location	Tenure
T1	Church Point community	private
T2	Brooklyn community	private
T3	Bayview	private
T4	Ingleside community	private
T5	Mt Ku-ring-gai community (east side)	private
T6	North Turramurra community (west side)	private
T7	North Wahroonga community	private
T8	St Ives Chase community	private
T9	Terrey Hills community (north side)	private
T11	Duffys Forest community	private
T12	North Turramurra community (east side)	private
T13	Terrey Hills community (south side)	private
T14	Tumbledown Dick community (north side)	private
T15	Akuna Bay Marina	private
T16	Empire Marina (previously Halvorsen Marina)	private
T17	Coasters Retreat	private
T18	Cottage Point community	private
T19	Currawong Beach community	private
T20	Elvina Bay	private
T21	Great Mackerel Beach community	private
T22	Lovett Bay community (south side)	private
T23	Towlers Bay Youth Hostel	private
T24	Towlers Bay	private
T25	Ku-ring-gai Wildflower Gardens	private
T26	St Ives Showground	private
T27	Terrey Hills Gun Club	private
T28	Kalkari Discovery Centre and lower Hawkesbury area office	NPWS
T29	Mt Colah works depot	NPWS
T30	Bobbin Head picnic area	private
T31	Apple Tree Bay	NPWS
T32	Sydney North Region office	NPWS
T33	The Basin	NPWS
T34	Resolute picnic area	NPWS
T35	West Head	NPWS
T36	Duckholes picnic area	NPWS
T37	Duckholes visitor entry station	NPWS
T38	West Head interpretive facility	private
T39	NPWS Apple Tree Flat house	NPWS
T40	NPWS lower Hawkesbury house	NPWS
T41	NPWS Mt Colah house	NPWS
T42	NPWS house—The Lodge	NPWS
T43	Mt Colah visitor entry station	NPWS
T44	NPWS North Turramurra house	NPWS
T45	Sphinx memorial	NPWS
T46	Bobbin Head house	NPWS
T47	North Turramurra visitor entry station	NPWS
T48	Salvation picnic area	NPWS
T49	General San Martin Drive visitor entry station	NPWS
T50	Barrenjoey Lighthouse	NPWS
T51	Palm Beach house	NPWS
T52	Little Shark Rock Point	NPWS
T53	Houseboat Bay	NPWS
T54	Illawong Bay visitor entry station	NPWS

2.2.2 Utilities and Infrastructure

Within and adjacent to the reserves there are a variety of public and private utilities that are considered at risk from bushfires, including:

- Energy Australia powerlines and substations
- TransGrid powerlines and substations
- Sydney Water infrastructure
- public transport infrastructure, including the F3 Sydney-to-Newcastle Freeway and the main Northern Line
- telecommunications infrastructure
- DEC managed transmission lines, water pipelines and sewage pumping stations.

These assets in some circumstances are located in areas remote from access and where effective protection would be difficult and dangerous for crews under severe conditions.

2.2.3 Visitor and Public Safety

During the bushfire danger period, many visitors to the reserves may be located in areas surrounded by highly flammable vegetation and where escape from a bushfire would be slow or difficult. The risk to visitors is greatest during total fire bans, park fire bans or periods of extended fire danger. High visitation areas and situations where visitors are considered at risk from bushfires include:

- the Kalkari Discovery Centre
- Barrenjoey lookout
- West Head lookout
- Illawong Bay
- Akuna Bay
- Bobbin Head
- Apple Tree Flat
- The Basin Camping Area
- popular access trails and tracks to remote areas of the reserves.

2.3 Natural Heritage Risks

Natural heritage features at risk are detailed in Table 2 and are marked on Map 2.

Table 2: Natural heritage features at risk

Natural heritage feature	Description of risk
Threatened flora (Appendix 2)	• The 33 species of threatened flora may be subject to adverse fire regimes or inappropriate fire management activities • In particular, locally restricted populations of *Haloragodendron lucasii*, *Persoonia mollis* ssp. *maxima* and *Grevillea caleyi* are of major concern
Threatened fauna (Appendix 3)	• The 28 species of threatened fauna may be subject to adverse fire regimes or inappropriate fire management activities • In particular, populations of the Southern Brown Bandicoot (*Isodon obesulus*) are of major concern
Endangered ecological communities (Appendix 1)	• On shale on lateritic ridgetops in the Duffys Forest, Terrey Hills and St Ives areas • Pittwater Spotted Gum on Narrabeen Shales from Towlers Bay to Elvina Bay • Sydney Coastal River Flat Forest along Cowan Creek upstream of Bobbin Head • *Themeda* grassland on sea cliffs and coastal headlands found on Barrenjoey Headland
Significant vegetation communities (Appendix 1)	• Mt Murray Anderson, Shark Rock Ridge, Windybanks Ridge, Govetts Ridge, Salvation Creek Loop, The Basin catchment area and Towlers Bay • Closed forest, low closed forest, tall open forest, open forest (*E. paniculata–E. pellita* assoc.) and open forest (*E. capitellata* assoc.) • Low woodland (*E. camfieldii* assoc.) north of Elvina Bay Trail, where *Grevillea caleyi* has

Natural heritage feature	Description of risk
	been recorded • Vegetation islands on sandstone rock outcrops • Diatreme vegetation at Smiths Crater and Campbells Crater • West Head dyke vegetation communities • Hanging swamp communities associated with *Eucalyptus leuhmanniana*, particularly on the Lambert Peninsula • Vegetation containing rainforest species at Cicada Glenn Creek, along major creek lines and the western edge of Pittwater
Bush regeneration sites	• Over 25 bush regeneration sites within and adjacent to the reserves may be damaged by fires and fire management activities
Soil landscapes	• Areas vulnerable to rock fall where slopes exceed 18°
Water catchments	• Cowan Creek catchment, including Coal and Candle Creek • Kierans Creek catchment • Pittwater catchment

Natural heritage features may be placed at risk as a result of adverse fire regimes, inappropriate fire management activities and pest species invasion. The potential impact of these factors on natural heritage features within the reserves is outlined below.

2.3.1 Adverse fire regimes

Fire regimes are defined by the combination of several parameters, including fire frequency, fire intensity, season, the size of fire (or the proportion of the landscape they burn) and patchiness. Certain combinations of these parameters can produce adverse fire regimes and pose a high risk to natural heritage features.

Fire frequency has been identified as a key threatening process, as it disrupts key life cycle processes in plants and animals. The primary risk from high fire frequency is a reduction in the abundance of a species to the point where it may become locally extinct. Alternatively, the exclusion of fire for an extended period of time may lead to the senescence of plants and their seed banks and the succession of other communities.

Evaluating the fire interval status for vegetation communities (Appendix 1), flora (Appendix 2) and fauna (Appendix 3) assists with the identification of adverse fire regimes. Table 3 outlines the fire interval status within a vegetation community on the basis of the fire interval history of an area. Of particular significance are areas where greater than 50% of a vegetation community or species habitat experiences adverse regimes that are either too frequent (over-burnt) or too infrequent (long-unburnt). In these areas, if the trend in fire regimes continues, there will be a serious decline in the abundance of sensitive species. Areas that are identified as over-burnt, vulnerable and long-unburnt have been marked on Map 2 as having adverse fire regimes.

Table 3: **Fire interval status of vegetation communities**

Fire interval status	Explanation of fire interval status
50% of a community over-burnt	If more than 50% of a vegetation community becomes over-burnt, there is an extreme risk that sensitive species may be pushed to local extinction. These areas are a high priority for fire exclusion until species populations can recover.
Over-burnt	If a community is burnt at intervals less than the appropriate minimum threshold two or more times in succession, the vegetation is considered over-burnt. In these areas, species populations sensitive to short fire intervals may experience a decline in abundance to a point where they risk local extinction.
Vulnerable	If a community has experienced at least one interval less than the appropriate minimum fire interval and is currently at an age less that the minimum interval, the community is considered vulnerable to a fire. If a fire occurs, the vegetation community will become over-burnt.

Fire interval status	Explanation of fire interval status
Recently burnt	Vegetation that has an age class less than the appropriate minimum fire interval is considered recently burnt. Once an area is burnt, it takes several years for the plant species there to develop the regenerative mechanisms that will enable their populations to persist through the next fire. If a second fire occurs before the appropriate minimum interval, the community will become vulnerable.
Within thresholds (OK)	Vegetation communities with an age greater than the minimum interval and less than the maximum interval are considered to be 'OK' or within interval thresholds. If a fire occurs, the vegetation will become recently burnt.
Long-unburnt	Where the age of a vegetation community is greater that the maximum fire interval for the community, the community is considered long-unburnt or under-burnt. If fires continue to be excluded, a decline in biodiversity may result through the senescence of plants and their seed banks. Long unburnt areas are, however, ecologically significant, as there are relatively few areas represented.

Other elements of fire regimes, including the season of fire occurrence, fire intensity, fire patchiness and the scale of individual fires, may also affect natural heritage features. When viewed in isolation, each element of the fire regime has a distinct effect. The greatest risk to conservation results from adverse combinations of fire regime elements that can combine to produce a synergistic or cumulative effect. For example, areas treated by regular prescribed burns are potentially exposed to a regime of repeated low intensity fires that occur outside the typical bushfire season and are usually small and patchy in nature. These areas are also predisposed to a higher fire frequency because they are often re-burnt by summer wildfires.

2.3.2 Inappropriate fire management activities

Inappropriate fire management activities associated with fire suppression operations, hazard reduction programs or fire trail maintenance may have an adverse impact on natural heritage features. The magnitude of an impact is dependent on the type of activity, the extent of the impact, the nature and sensitivity of the environment, and the rehabilitation costs.

2.3.3 Pest species invasion

The establishment of pest and weed species as a result of fire regimes and fire management activities presents a significant risk to natural heritage values. The following factors are considered to influence the risk of pest species invasion:

- nutrients and seed sources entering reserves along fire trails, drainage lines and the urban interface
- dumping of rubbish by neighbours into a reserve, resulting in the establishment of many exotic species and contributing to fuel loads
- the presence of feral animals such as foxes and rabbits within or adjacent to areas of disturbance.

Pest species within the reserves are managed in accordance with the *Sydney North Region Pest Management Strategy 2002*.

2.4 Cultural Heritage Risks

Culturally important places, sites and objects of both Aboriginal and non-Aboriginal origin occur throughout the reserves and face a significant risk of damage from adverse fire regimes and inappropriate fire management activities.

2.4.1 Aboriginal cultural heritage values

According to the Aboriginal Heritage Information Management System (AHIMS) database, over 50 Aboriginal sites have been recorded in the reserves. Owing to the sensitivity of the sites, they have not been identified in this strategy or marked on Map 2. The location of sites is available through AHIMS at all NPWS offices.

Various factors influence the risk of damage to Aboriginal cultural heritage values:

- High-intensity wildfires may cause the death of scar trees, reduce tree stability or damage the scar. Fire may also lead to a decline in tree health and promote rot or destroy dead trees.
- Wildfire may permit soil erosion, resulting in artefact movement and damage to archaeological deposits or a build-up of soil that can lead to chemical weathering.
- Art sites may be damaged from smoke staining, which may lead to chemical weathering, particularly if protective vegetation is removed. Intense heat may also cause exfoliation of the rock surface.
- Vehicle traffic, including fire appliances, bulldozers, slashers or tritters, may damage sites.

Guidelines for the management of Aboriginal heritage features are detailed in Appendix 4.

2.4.2 Historic heritage values

According to the Historic Heritage Information Management System (HHIMS) database, 159 sites have been recorded within the reserves. Major sites at risk from bushfires are listed in Table 4 and marked on Map 2: Bushfire Risks. The location of sites is available through HHIMS at all NPWS offices.

Table 4: Historic heritage features at risk

Map ID	Description
HS1	Barrenjoey Lighthouse and historic beach cottages
HS2	Beechwood cottage complex at The Basin
HS3	Brooklyn Dam
HS4	Hungry Beach fortifications
HS5	West Head battery complex
HS6	Bobbin Head complex
HS7	Spectacle Island fishing shack sites

The following factors contribute to the risk of damage to historic heritage features:

- Bushfires may directly remove or destroy combustible material such as timber structures.
- High-intensity fires may permit soil erosion, which may lead to displacement of foundations, artefact movement and damage to archaeological deposits.
- Vehicles or bulldozers may physically damage features.
- Fire may damage or destroy vegetation with historical significance.
- High-intensity fire may also cause the spalling of rock artefacts.

Guidelines for the management of historic heritage features are detailed in Appendix 5.

3 BUSHFIRE RISK MANAGEMENT STRATEGIES

3.1 Introduction

This section presents the strategies and controls that can be used to protect the assets and values at risk that were identified in section 2. The development of these strategies is premised on the understanding and acceptance that unplanned bushfires do and will continue to occur. Significantly, research and experience have shown that no one management option is effective in isolation, and optimal outcomes are achieved only through a multifaceted approach involving the community and all relevant stakeholders.

Given the large number of assets within and around the reserves it is not possible to implement strategies and controls for all assets and values every year in all locations. The results of the annual bushfire risk analysis will be used to identify and prioritise those assets most at risk and therefore in greatest need of active fire management strategies. It is important to acknowledge that after risk management strategies and controls have been implemented in preparation for the fire season, a residual level of risk to many assets and features will still remain.

The strategies are implemented in consultation with local BFMCs, land management agencies, Rural Fire Service (RFS) brigades, park neighbours and other stakeholders. The cooperation of the community is critical to the success of many strategies. In particular, the NPWS must work with BFMCs to encourage neighbours to accept responsibility for the management of fuels on their properties, to prepare and maintain their properties in accordance with AS 3959, and to develop personal action plans that can be activated in the event of a bushfire.

Where possible, the fire management strategies to be implemented within the reserves are illustrated in Maps 3A–3F. In many instances, features on the maps extend beyond the boundaries of the reserves onto other land tenures. In these circumstances, the strategies identified apply only to NPWS-managed lands. The implementation of any strategies that involve multiple land tenures will require endorsement by relevant agencies or landholders and the relevant BFMCs.

3.2 Bushfire Prevention

Bushfires do and will continue to occur, primarily because of unplanned human-caused ignitions. The major cause of unplanned ignitions is arson. Fires also start accidentally, from abandoned campfires, the arcing of powerlines, plant and machinery, motor vehicle accidents and escaped prescribed burns. Arson and other human-caused ignitions generally occur close to developed areas and along access tracks and trails. Lightning strikes are the only natural cause of ignitions and contribute to fewer than 1% of recorded ignitions. The pattern of lightning strikes is highly variable and depends on the path taken by storms and the amount of associated precipitation.

The following strategies for bushfire prevention may be implemented by the NPWS within the reserves:

- Fire investigators will cooperate with police, RFS and NSW FB to investigate all suspicious ignitions within the reserves and to thoroughly investigate unknown causes.
- Close all or part of the reserves during total fire bans, park fire bans, periods of extended fire danger or if bushfires occur adjacent to the reserves in order to control the risk of arson or accidental fires and to ensure public safety.
- Install and maintain locked fire trail gates where necessary and maintain key registers with other agencies and organisations in order to control access.
- Undertake patrols and promote cooperative surveillance programs on days of very high and extreme fire danger to manage the risk of arson and other accidental ignitions.

- Support the implementation of fire prevention education.
- Maintain up-to-date Forest Fire Danger signage at all major public entrances to the reserves in order to promote public awareness, particularly on days of very high and extreme fire danger.
- Utilise lightning detection systems, rainfall radar, ground detection networks and fixed-wing aircraft or helicopters for aerial surveillance after the passage of storms to identify the location of fires started by lightning strikes.
- Replace wood or fuel barbecues with gas barbecues in accordance with plans of management in order to minimise the risk of fires starting from abandoned cooking fires.
- Liaise with permit issuing authorities (e.g. RFS and councils) to ensure neighbours obtain appropriate hazard reduction certificates and fire permits in order to minimise the potential for fires escaping private property.
- Liaise with infrastructure authorities to determine appropriate prevention strategies for potential ignition sources associated with their operations and assets in or adjacent to the reserves.
- Ensure that prescribed burns are planned to appropriate agency standards, are directed by appropriately trained and experienced staff, and are undertaken within defined weather prescriptions in order to prevent fire escapes.
- Ensure thorough mop-up and patrol of perimeter of wildfires and prescribed burns during or before the onset of extreme weather conditions with the assistance of heat sensing technology to identify hot spots in order to minimise the potential for reignition of fires.

3.3 Bushfire Suppression

Fire suppression relates to all actions or operations undertaken to contain and control a bushfire, from the time it is detected until it is extinguished. The control and suppression of bushfires is given the highest priority over all other activities. During fire suppression, the protection of life and property has the highest priority, followed by the protection of natural and cultural heritage features.

The following strategies for bushfire suppression may be implemented within the reserves:

3.3.1 Incident preparedness

- Prepare annual RIPs in order to maintain a contact database of NPWS staff, other fire agencies and support agencies or organisations, and detailed procedures relating to preparedness and management of bushfires.
- Participate with the relevant BFMC in the development and annual review of Section 52 operations coordination plans in order to document cooperative agreements for the coordination of the first response to a fire, notification of a fire, agency resources and fire suppression guidelines.
- Prepare emergency management plans for major visitor precincts within the reserves to ensure clear directions for the evacuation of visitors to safe refuges and to locate visitors in remote areas of the reserves.
- Maintain appropriate levels of protective equipment, vehicles, equipment and other materials to ensure the safety of fire fighters and the ability to respond to bushfire ignitions.
- Develop resource dispatch strategies for different bushfire scenarios in order to increase the probability of first attack success and the protection of assets and features at risk.
- Undertake multi-agency incident-management team exercises in order to review response strategies, to identify high risk fire scenarios, and to develop close working relationships and understanding between agencies and other organisations.

3.3.2 Response

- Maintain cooperation and communication with the RFS, NSW FB and other support agencies to ensure adequate and effective resource dispatch for the suppression of bushfires on or adjacent to the reserves in order to minimise the spread of fire.
- Ensure that fire suppression activities within the reserves take into consideration the standard operational guidelines detailed in Appendix 6 in order to minimise environmental impacts on the reserves.
- Remain prepared and modify work programs according to the level of fire danger in order to maintain appropriate response time to ignitions.
- Develop media and public relations strategies to engender community confidence in and support for bushfire management.
- Manage bushfires in accordance with the incident control system to ensure coherent command and control and the safety of fire fighters and the community.
- Use sufficient aircraft to attack inaccessible fires in order to minimise the spread of fires and to protect assets and features at risk.
- Deploy remote-area fire-fighting teams to suppress lightning-induced fires identified by aerial reconnaissance in order to minimise the size of fires before the passage of severe fire weather.
- Report fire suppression activities through the Bushfire Risk Information Management System and in NPWS geographic information systems so as to maintain a record of all fires.

3.3.3 Recovery

- Rehabilitate damage resulting from fire suppression operations as the operation winds down.
- Where necessary, prepare rehabilitation plans to facilitate recovery from operations with significant impacts.
- Where necessary, implement pest control programs to prevent the invasion and spread of pest species.

3.4 Prescribed Burning

Prescribed burning is the controlled use of fire under specified environmental and weather conditions to a predetermined area with the aim of reducing fire risk under adverse conditions.

3.4.1 Fire management zones and units

The prescribed burning program for the Reserves is based on a mapping process that divides the bushland landscape into distinct operational units bounded by fire containment lines such as fire trails, walking tracks, hand tool lines, watercourses and the bushland–property boundary. The mapping process has been undertaken in consultation with land management and fire management agencies in order to incorporate relevant local knowledge and ground-truthed information. In many instances, individual units may extend beyond the boundaries of the reserves onto other land tenures. In these circumstances, NPWS will facilitate, through the relevant BFMC, cooperative agreements for the management of the unit.

The location of Fire Management Zones and units within the reserves are illustrated in Maps 3A–3F. Each fire management unit is identified on the maps by a unique map code that can be used to obtain details of the feature in the Fire Management Zones and units register in Appendix 7.

Once the operational units have been identified, the zoning system in Table 5 has been used to specify the broad land management objectives for each unit within the reserves.

Table 5: Fire Management Zones

Zone type	Management objective	General location of zone
Asset Protection Zones (APZ)	• To protect all human lives from bushfires • To protect residential areas, utilities, camping areas, day use areas, cultural heritage sites and other built assets	• Adjacent to assets, in accordance with *Planning for Bush Fire Protection*
Strategic Fire Advantage Zones (SFAZ)	• To reduce fire intensity and spotting distance so as to assist in the control and containment of bushfires • To reduce the probability of bushfires being ignited adjacent to assets • To complement APZs and to strengthen existing fire control lines. • To restrict the movement of bushfires between fire management zones. • To restrict the movement of bushfires from other land onto NPWS lands and from NPWS lands onto neighbouring land • To break up large continuous areas of high potential for bushfire and to reduce the probability of large landscape-scale bushfires	• Adjacent to economic assets • In areas with a proven history of bushfire ignitions • Adjacent to existing fire control advantages or in linked fire control advantages • Adjacent to APZs • Other strategic areas for controlling the spread of bushfires
Heritage Management Zones (HMZ) (or Land Management Zones in s.52 risk plans)	• To maintain and enhance biodiversity by preventing the extinction of species which occur naturally within the reserves • To protect Aboriginal sites, historic heritage sites and other culturally significant features from fire • To promote awareness of the values that may be threatened by bushfires or inappropriate fire regimes within the HMZ	• Core areas of reserve not satisfying the criteria for inclusion in APZs or SFAZs and being managed consistent with the principles outlined in the *National Parks and Wildlife Act* 1979

3.4.2 Assessment intervals

Each fire management unit has been assigned an interval (as per Table 6) at which the need for prescribed burning will be subject to a risk assessment to determine the priority for inclusion in the annual Prescribed burning program.

The determination of an appropriate interval for a unit is based on a consideration of a number of variables:

- **Zone type**—generally units that are zoned as SFAZs or APZs will be considered for treatment more frequently than HMZs (or land management zones in BFMC s.52 risk management plans).
- **Fire history**—the known history and frequency of bushfires within the unit indicate the likelihood of future events and can be used to determine the prescribed burning intervals.
- **Proximity to assets at risk**—influences the frequency of prescribed burning to maintain reduced fuel loads and to modify vegetation structure adjacent to assets.
- **The strategic value of the zone or unit**—influences the priorities for strategically locating prescribed burns in the landscape to provide an advantage during a fire suppression operation.
- **Fuel accumulation rates**—known rates of fuel accumulation are used to identify fire interval thresholds to manage fuels within certain levels.
- **Known and modelled fire behaviour**—the characteristics of fuel, aspect and terrain are assessed to determine the required fire intervals to manage likely fire behaviour.
- **Ecological requirements**—are considered to ensure that appropriate fire regime requirements are maintained for vegetation communities (Appendix 1), threatened flora (Appendix 2), threatened fauna (Appendix 3), Aboriginal heritage (Appendix 4), historic heritage (Appendix 5) and pest species management.

Table 6: Intervals for assessing fire management units

Assessment interval (yrs)	General location	Strategy
1–2	Typically adjacent to existing high risk properties and assets.	• Assess requirement to undertake prescribed burn or manual or mechanical treatment between 1 and 2 years since last treatment
5–10	Typically adjacent to existing high risk properties and assets in areas with twin trail systems.	• Assess requirement to undertake prescribed burn between 5 and 10 years after fire to reduce the quantity and alter the structure of fire fuel in bushland adjacent to assets
7–12	Typically adjacent to existing high risk properties and assets in areas with high strategic value in the containment of fires.	• Assess requirement to undertake prescribed burn between 7 and 12 years after fire in order to break up large continuous areas with high potential for bushfire and to reduce the probability of large landscape-scale bushfires
8–14	Typically located in areas with high strategic value in the containment of fires.	• Assess requirement to undertake prescribed burn between 8 and 14 years after the last fire.
10–15	Typically located on easterly and southerly aspects in strategic locations adjacent to assets	• Assess requirement to undertake prescribed burn within 10–15 years of last fire. • Opportunistically burn during unplanned bushfires
12–20	Typically located in areas where there is a low risk to life and property and the area is of little strategic value	• Assess requirement to undertake prescribed burn between 12 and 20 years after fire • Opportunistically burn during unplanned bushfires
15–30	Typically located in core areas of the reserve where there is a low risk to life and property and the area is of little strategic value	• Assess requirement to undertake prescribed burn between 15 and 30 years after fire or opportunistically burn during unplanned bushfires
20–60	Specifically for vegetation types that require very long fire intervals and where there are no assets directly at risk. Generally expected to be burnt only by Unplanned bushfire events	• Assess requirement to undertake prescribed burn between 20 and 60 years after fire • Opportunistically burn during unplanned bushfires • Assess opportunity for research into long-unburnt vegetation
> 60	Typically located in areas with fire-sensitive vegetation. Generally expected to be burnt only by major bushfires	• Assess requirement to undertake prescribed burn more than 60 years after fire • Exclude fire where possible • Assess opportunity for research into long-unburnt vegetation

The database maintained by the NPWS contains detailed information about the history of works and fires within each unit. By analysing the time since the last fire in relation to the interval assessment guidelines, staff can identify a range of possible treatment years. The range provides the basis for triggering the consideration of specific units in the annual burn program. Each year, units that are under assessment will be subject to a risk analysis undertaken in consultation with the relevant BFMC. Based on the priorities established by the analysis, units to be included in the annual hazard reduction program are then identified.

The assessment of fire regimes through mapping of the locality and characteristics of all fires will be continuous so that strategies for prescribed burning can be annually reviewed, refined and adjusted. Depending on the circumstances, there may be a role for both prescribed fire and fire-exclusion in parts of the reserves at different times in the future.

3.4.3 Strategic fire management

The strategic arrangement of prescribed burns is an important consideration in the development of annual hazard reduction programs. Major considerations in the strategic arrangement of prescribed burns include the following;

- Prioritising burns adjacent to assets in known high-risk locations, particularly on exposed ridgetops on dry aspects, in order to reduce fuel loads and likely fire intensity.

- Identifying terrain elements that may be considered for a prescribed burn in order to break up large continuous areas of fuels that may facilitate the spread of a fire under adverse conditions.
- Locating prescribed burns at strategic points within valley systems to create an area of reduced fuel (a 'valley plug'), which may assist in reducing the potential for bushfires to spread.
- Where possible, planning prescribed burns to ensure that an interval of 1 to 3 years is maintained between adjacent burns to provide suitable habitat for flora and fauna to recolonise recently burnt areas. Some flexibility with this requirement may be considered in the development of prescribed burning patterns in asset interface areas.
- Arranging burns in a mosaic pattern across the landscape to ensure that an appropriate age class distribution is maintained among vegetation communities within the reserves. This is particularly significant when considering the island-like nature of isolated sections of the reserves that are surrounded by developed lands.
- Evaluating annual prescribed burning programs to ensure that no more than 50% of vegetation communities or significant flora or fauna habitat has an age class younger than the minimum fire interval threshold. This evaluation also considers the interrelated effects of other components of fire regimes such as intensity, season of burning and the potential effects of unplanned bushfires.
- Determining the appropriate scale or size of prescribed burns to ensure adequate protection for assets and to reduce the intensity of bushfires; for example, several units may be combined and burnt at the same time.

3.4.4 Season

The preferred season for prescribed burns is late summer early autumn (i.e. February–April) or spring (i.e. August to October), before the onset of the fire danger period. During these periods, specific synoptic and weather conditions enable burns to be conducted safely within identified containment lines.

A major factor in the determining the preferred season of burn is the known fuel moisture dynamics of the burn area. Aspect and topographic position dominate fuel moisture retention within a burn area. Areas with moist aspects facing the east or south are generally scheduled during late summer and autumn to enable appropriate fuel moisture levels to be achieved. The relatively dry northerly and westerly aspects may be opportunistically burnt at any time of the year. However, burns on these aspects are generally planned for early spring, before the onset of the fire season, given the tendency of these aspects to dry rapidly in the approach to summer. Winter burns are generally not successful because of high fuel moisture levels, which result in a poor burn with high levels of scorch in aerial fuels and patchy consumption of ground fuels. If there are extended dry periods during winter, then winter burning may be considered.

The optimal season of burn for the conservation of most species is late summer to early autumn. However, it is generally not safe for fire fighters to conduct prescribed burning operations during this time owing to the occurrence of high to Extreme Forest Fire danger levels. It is recognised that some spring burns may interfere with the breeding season of some plants and animals within the burn area.

3.4.5 Environmental assessment

All prescribed burns are subject to site-specific environmental assessment by the NPWS, either by a review of environmental factors or in accordance with the *Bushfire Environmental Assessment Code*. In addition, an assessment is undertaken by the NPWS to assess the cumulative impacts of hazard reduction regimes on populations and communities within the landscape. The management requirements for vegetation communities (Appendix 1), threatened flora (Appendix 2), threatened fauna (Appendix 3), Aboriginal heritage (Appendix 4), and historic heritage (Appendix 5) within each fire management zone are considered during assessments.

3.4.6 Cooperative management

Annual programs for reserves are developed in conjunction with the relevant BFMCs. Priorities for annual programs are based on a risk assessment undertaken in accordance with the Australian Standard for Risk Management, AS/NZS 4360 (2004). An adaptive management approach is used to re-prioritise proposals annually in order to ensure that the program treats areas with the greatest risk.

In many instances the proposed containment boundaries of prescribed burns extend beyond the boundaries of the reserves onto other land tenures. In the development of this Strategy, all attempts have been made to ensure the accuracy of tenures identified in the Fire Management Zone register in Appendix 7. Where discrepancies are identified, NPWS will negotiate the appropriate management responsibilities on a case by case basis with the relevant parties. In circumstances where joint responsibilities are identified, NPWS will facilitate cooperative agreements for the management of the burn. Generally, prescribed burns are undertaken with the assistance of the RFS, NSW FB and other land management agencies and, in some instances, private landholders.

All prescribed burns require a plan of operations to be prepared in accordance with the NPWS *Fire Management Manual* (2005) and the *Prescribed Burning Joint Guiding Principles* (2001) to ensure best practice in operations.

3.4.7 Integrated pest species management

Prescribed burning activities may lead to pest species invasions. Where necessary, control programs may be integrated with prescribed burning programs. This may include pre- and post-burn treatment techniques.

3.5 Fire Breaks

Fire breaks are manually or mechanically reduced areas of bush fire fuels, typically along the boundary between a reserve and neighbours which aim to enable safe fire fighter access under moderate conditions and compliment preparedness works undertaken by neighbours.

3.5.1 Fire management zoning

For the purposes of this *Fire Management Strategy*, fire breaks are considered a Strategic Fire Advantage Zone (see Table 5). It is important to note that fire breaks should not considered an Asset Protection Zone, as the management standards do not meet the required standards for an Asset Protection Zone as defined by *Planning for Bushfire Protection* (2001).

The locations of fire breaks within the reserves are illustrated in Maps 3A–3F. Each fire break is identified on the maps by a unique map code that can be used to obtain details of the feature in the Fire Break register in Appendix 8.

3.5.2 Fire break establishment

Fire breaks may be established in areas where an Asset Protection Zone cannot be practically established or where the requirements of *Planning for Bushfire Protection* (2001) have not been implemented on neighbouring properties. Table 7 outlines the strategies for the establishment of fire breaks that may be implemented within the reserves.

Table 7: Fire break management strategies

Strategy	Description	Application
Under-scrubbing	• Scrub mulchers, slashers or brush cutters are used to remove or thin understorey vegetation • The debris is either mulched, burnt on site or removed • While some smaller trees may be removed, larger canopy trees are generally not disturbed	• Generally applied in SFAZs • May be used to strengthen other fire control advantages such as access trails and roads
Trittering, slashing/ mowing	• All shrub and ground fuels are removed with mechanical mowers, slashers or tritters • Generally used in the maintenance of existing fire breaks	• Generally applied in SFAZs • May be used to strengthen other fire control advantages such as access trails and roads
Selective tree removal	• Selected trees are removed to reduce the continuity of tree canopies so as to reduce the chance of crown fire development	• In locations where there exists a high risk of crown fire development adjacent to access • In locations where trees impede access for fire fighters
Pest control	• Programs to reduce the abundance and distribution of target species	• In locations where priority pest species are present
Pile burns/ strip burns/ vegetation raft burns	• Vegetation debris is piled and burnt in specific locations • Strip burns may be undertaken along the length of a fire break • In raft burns, under-scrubbed vegetation is formed into a raft elevated off the ground which is then burnt	• In locations where fuel cannot be removed from the site

In many areas, the presence of cliffs, escarpments and slopes over 18° create a situation where there may be no physical or practical means or establishing a fire break. In these circumstances, NPWS with work with BFMCs to encourage neighbours to undertake other appropriate measures to prepare their properties.

The establishment of new fire breaks will be subject to an environmental assessment either by a review of environmental factors or in accordance with the *Bushfire Environmental Assessment Code*. In addition, the cumulative impacts of fire breaks on the reserves will be assessed.

3.5.3 Fire break maintenance

Fire breaks managed by NPWS may be maintained at intervals of between 6 and 18 months, depending on the priority established by the risk assessment process. Where practical, the maintenance of fire breaks will be incorporated into prescribed burning or access maintenance programs.

3.5.4 Cooperative management

In many instances, fire breaks extend beyond the boundaries of the reserves onto other land tenures. Where joint responsibilities are identified, NPWS will encourage landowners and land management agencies to develop cooperative agreements for the management of the fire break through the relevant BFMC.

3.5.5 Integrated pest species management

Fire break management activities may lead to pest species invasions. Pest control requirements will be taken into consideration with scheduled works and may incorporate a combination of pre- and post-treatment control programs.

3.6 Fire Management Access

Access trails, roads and other routes enable access to different parts of the reserve. Access infrastructure is essential for undertaking fire management operations and activities, including direct attack of low-intensity fires, back-burning to contain high-intensity fires, and conducting hazard reduction burning.

3.6.1 Vehicular access trails

The location of Trails within the reserves are illustrated in Maps 3A–3F. Each trail is identified on the maps by a unique map code that can be used to obtain details of the feature in the trail register in Appendix 9.

3.6.2 Access trail operational accessibility

A database of the current accessibility of trails by different categories of fire appliances is detailed in the fire trail register in Appendix 9, as described in Table 8. Information on the accessibility of access infrastructure is essential during fire management operations in order to ensure the safety of fire fighters. When access trails are maintained or access impediments are identified, the access classification in the database is updated.

Table 8: Operational accessibility classifications for vehicular access trails

Access classification	Description
Public road	• Any major or minor public road accessible by two-wheel-drive vehicles
Cat 1 heavy tanker	• 4WD trail capable of being used by heavy Cat 1 tanker
Cat 7–9 light tanker	• 4WD trail capable of being used by Cat 7–9-type tanker (no heavy tanker access)
Closed trail	• Any trail that is closed but still has strategic value for use as a control line or strategic advantage and may be reopened for hazard reduction burns or the containment of wildfires
Walking track	• Walking track with no vehicle access
Hand tool line	• Hand tool line created by foot crews; generally 1–2 m wide. Generally rehabilitated after use.
Unclassified	• Trail or track of unknown accessibility. Survey required to determine classification

3.6.3 Access trail management standards

The proposed management standard for access trails within the reserves is based on the Bush Fire Coordinating Committee (BFCC) Policy 2001/03 standards for fire trails, summarised in Table 9. This classification system provides the basis for the development of maintenance regimes for existing trails and the standards for proposed upgrades to trails. The classification of trails has been undertaken in consultation with the relevant BFMCs and is consistent across member agencies. Any proposed upgrades to trails will be subject to a review of environmental factors.

Table 9: Bush Fire Coordinating Committee (BFCC) classification for vehicular access trails

Classification	Summary of BFCC standard
Primary	• Fire trail of strategic importance or a feeder route to a network of secondary trails. Generally includes sealed roads or management trails that are suitable for access by Cat 1 tankers.
Secondary	• Fire trail that can be used for fire control, suppression and mitigation purposes. Generally includes management trails that are suitable for access by Cat 7 or 9 tankers, but may be suitable in some sections for Cat 1 tankers.
Dormant	• Fire trail that has been closed but has been identified as suitable for reopening with minimal works. Generally includes former management trails, fire control lines or utility access trails that are commonly used for prescribed burns.

It is important to note that these standards provide a target for management and do not reflect the current standard of trails within the reserves. The terrain in many areas of the reserves creates a situation where there may be no physical or practical means of attaining the proposed BFCC

standards. In these instances the classification may be changed to reflect the specific circumstances.

3.6.4 Access trail maintenance

Trails in the reserves are maintained in accordance with NPWS policy in the *Fire Management Manual* (2005), the relevant reserve plan of management and the Soil Conservation Service standards (DLWC, 1994). Table 10 summarises the indicative maintenance regimes applied to trails in order to avoid environmental damage and ensure cost-effective management. The trail maintenance program for the reserves is managed using the NPWS Asset Maintenance System, which establishes a cyclic maintenance program for trails within the reserves.

Table 10: Maintenance regimes for existing vehicular access trails by problems caused

Problem	Cause	Strategy
Erosion of track surface	• Crossbanks too far apart • Earth or vegetation windrow on the side of the trail prevents outfall drainage • Track being overused during wet periods • Culvert blocked, or rills on the surface	• Check crossbank spacings • Remove windrows • Restrict vehicle usage during wet weather • Unblock culverts • Install and compact suitable surface capping material
Sediment in outlets of crossbanks and mitre drains	• Vegetation in outlets • Excess soil erosion on trail surface	• Remove sediment • Check condition and spacing of erosion control structures
Tree and shrub trim-ming on edge of trail	• Overgrown vegetation encroaching over the trail surface, reducing the width of the trail	• Remove encroaching vegetation by mechanical or other means
Scouring of crossbank channel	• Excessive crossbank channel grade	• Regrade channel
Overtopping of crossbank	• Insufficient height of crossbank • Channel silted due to ponding	• Raise height of crossbank • Remove sediment and check cause of ponding
Erosion of outlets, crossbanks and mitre drain	• Excessive outlet grades	• Regrade outlet to a reduced grade • Stabilise outlet with vegetation • Relocate crossbank or mitre drain
Ponding in crossbank	• Insufficient crossfall grade • Blocked outlet • Track being overused during wet periods	• Regrade channel • Remove obstruction • Restrict vehicle usage
Blocked culvert	• Sediment build-up in culvert • Blockage in culvert	• Remove sediment from culvert • Remove debris from culvert
Culvert eroding	• Culvert blocked • Undersized culvert • Inlet and outlet eroding	• Seek engineering advice and redesign culvert to accommodate expected catchment flow • Reconstruct inlet and outlet protection or headwall
Trees across trail	• Tree fall due to bushfire or storm • Tree fall due to natural circumstances, e.g. age, termites, disease	• Undertake a risk assessment of trees located on the edge of the trail

3.6.5 Walking tracks

Within the reserves, the network of formal and informal walking tracks contributes significantly to the fire control advantage system. Walking tracks within the reserves are managed in accordance with policies and procedures detailed in the relevant plans of management for the reserves.

3.6.6 Hand tool lines

A hand tool line is a temporary fire control line generally less than 2 me wide constructed with hand tools though terrain that is too rugged or environmentally sensitive for use of machines. The following strategies can be used for the management of hand tool lines within reserves:

- Hand tool lines are constructed in accordance with best practice guidelines to minimise the potential for environmental degradation.
- The location and route of hand tool lines used during fire suppression operations or prescribed burns are mapped and recorded for future reference and re-use.
- Where necessary, hand tool lines are rehabilitated to prevent erosion and the establishment of informal access routes.
- In some instances, routine maintenance of vegetation regrowth along a hand tool line may be considered where the hand tool line is considered to be of strategic value.

3.6.7 Interface control line (ICL)

The ICL comprises a variety of features, including perimeter fire trails, fire breaks, sports ovals, public roads, walking tracks, partly cleared lands, or natural features such as rock outcrops or cliffs, which may be linked to form an access route along the property–bushland interface. In many interface areas, however, the presence of cliffs, escarpments and steep slopes creates a situation where there may be no physical or practical means of identifying an ICL.

The ICL assists in the implementation of prescribed burning and other mitigation programs and enables fire fighters to conduct back-burning or a direct attack on wildfires.

Interface survey and assessment

The intent of this strategy is to survey the interface adjacent to reserves and map sections where a suitable ICL exists, for use during fire operations. Mapping of the ICL will be undertaken in consultation with land management agencies, private land holders and fire management agencies in order to incorporate relevant local knowledge and ground-truthed information.

The location of Survey areas within the reserves are illustrated in Maps 3A–3F. Each survey area is identified on the maps by a unique map code that can be used to obtain details of the feature in the Interface survey register in Appendix 10.

ICL improvement

Where no ICL exists, an assessment will be undertaken to determine the feasibility of works to create one. Where possible improvements are identified, works may be incorporated into programs for fire breaks or prescribed burns.

3.6.8 Cooperative management

In many instances, access trails serve a variety of functions in addition to fire management:

- Other agencies such as TransGrid, Energy Australia, AGL, and Sydney Water may use trails to reach infrastructure for maintenance and inspections.
- Private landholders may use trails to reach their properties where formal access agreements have been put in place.
- RFS volunteer brigades may use trails for training exercises and orientation with permission of the relevant NPWS manager.

Where joint responsibilities are identified, NPWS will encourage landowners and land management agencies to develop cooperative agreements for the management of the access trail.

3.7 Other Fire Control Advantages

Other fire control advantages include water points for vehicles and helicopters, or helipads, to assist in the control and management of bushfires. The locations of advantage points in the reserves are marked on Maps 3A–3F.

Strategies for the management of other fire control advantages include the following:

- Advantage points are mapped where possible using GPS (Geographic Positioning System), or from air photos or local knowledge.
- Advantage points are inspected as part of a cyclic program in order to determine works requirements.
- Advantages are incorporated into the BFMC Section 52 operations coordination plans.
- The fire advantage network within and adjacent to the reserves is evaluated to determine additional advantage requirements in conjunction with the relevant BFMCs. If required, other fire control advantages may be strategically located in the reserves to support fire management operations.

3.8 Community Education, Cooperation and Enforcement

Community education, cooperation and enforcement programs are directed to particular communities with a recognised need because of the risk levels they face. NPWS will assist BFMCs to determine the location and priorities for programs each year. In conjunction with other member agencies of the BFMC, NPWS may implement the following strategies during the life of this strategy:

- Support the RFS in FireWise activities in vulnerable communities to increase the number of community members who prepare for fire on their properties.
- Support the NSW FB in Community Fire Unit program training days and involvement in other hazard reduction and fire preparedness activities.
- Support the NPWS Discovery program to incorporate fire management issues in displays, shows, guided walks and field study trips.
- Support the consideration of bushfire risk management in the development of bush regeneration programs.
- Use the media to promote and engender support for NPWS fire management activities.
- Review reserve signage and interpretation to include current fire management information and procedures relating to total fire bans, reserve closures and other fire management operations.
- As required, develop memorandums of understanding for all jointly managed fire management zones, ICLs, and fire trails identified in the strategy.
- Develop access agreements for strategic trails that traverse private or non-reserve lands.
- Investigate requests for hazard reduction or hazard complaints, where necessary jointly with the RFS or NSW FB. In all instances, NPWS will promote a holistic approach to the management of hazard complaints and promote the principle of shared responsibility for risk management with neighbours.

3.9 Research, Monitoring and Database Management

Ongoing research and monitoring is required to improve the understanding of the consequences of fire management regimes and operations. NPWS will encourage staff and research institutes such as universities and the Bushfire Cooperative Research Centre to study aspects of fire management and fire ecology. NPWS will undertake the following programs.

3.9.1 Database management

- Record all hazard reduction activities in the Bushfire Risk Information Management System and NPWS Geographic Information System.
- Review fire history archives to evaluate the attribution and accuracy of mapped data and incorporate other agencies' data where available.

- Acquire high-resolution digital air photographs of the reserves.
- Improve measurement and mapping of fire intensity and patchiness of fire regimes.
- Map or model the distribution of threatened species habitat to provide data for use in strategic environmental assessment and fire regime evaluations.

3.9.2 Monitoring

- Develop a visual fuel assessment guide to assist with rapid fuel load assessments.
- Determine the fire responses and critical life history phases of threatened species for which little information is available, and evaluate the effects of fire exclusion on seed-bank dynamics to more accurately define maximum inter-fire intervals.
- Develop biological indicator systems for rapid fire regime assessment.
- Establish long-term monitoring sites to monitor changes in biodiversity.

3.9.3 Research

- Assess the effects of fire on different cultural site types to determine appropriate management regimes.
- Assess the cultural sensitivity of landscapes through predictive modelling to manage the risk to cultural heritage values.
- Evaluate the prescribed burning strategies and patterns to determine the most effective strategies for asset protection and bushfire control.
- Evaluate the effectiveness of hazard reduction burning and its effect on the behaviour of wildfires.
- Assess the impact of post-fire erosion of sediments and ash on water quality in catchments, including assessment of the effects of fire intensity on soil erosion.
- Determine the most effective programs for community education and awareness.

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APPENDIX 1: FIRE REGIME GUIDELINES FOR VEGETATION COMMUNITIES

Table 1A outlines the fire interval guidelines for vegetation communities in the reserves. The guidelines have been compiled from best available information and research on the fire ecology of the communities (Bradstock et al 1995; Keith, 2002). The fire interval thresholds are based on a consideration of the broad vegetation type and the species composition of communities. The minimum interval is based on the primary juvenile periods of species sensitive to extinction under frequent fire regimes and does not include the time to replenish seed bank reserves. The maximum interval indicates the time since a fire at which species may be lost from the community due to senescence. The figures for maximum intervals are largely based on assumptions and generalisations rather than on quantitative life history studies.

It is important to note that the fire intervals identified in Table 1A provide a guide to identifying inappropriate fire regimes within the reserves. They do not specify the preferred or desired fire intervals for vegetation communities on a long-term basis. Desired fire regimes are those that provide a diversity of fire intervals (within the intervals range identified) along with patterns of fire intensity, season of occurrence and spatial extent. Extinctions are most likely to occur when fire regimes of relatively fixed intensity, frequency and extent prevail without variation.

Table 1A: Fire interval guidelines for vegetation communities

Regime	Vegetation communities	Minimum interval	Maximum interval	ha	% of reserve	Notes
A	**Rainforest communities**					
•	1 Closed forest	no fire	no fire	55.430	0.386	Fire should be avoided
B	**Saline wetlands (mangroves)**					
•	19 Tall open-scrub-watercourses	no fire	no fire	18.6	0.1	Fire should be avoided
C	**Wet sclerophyll forests**					
•	2 Low Closed-forest/emergents	25	60	16.0	0.1	Crown fires should be avoided in the lower end of the interval range
•	3 Tall open forest/open forest	25	60	5.2	0.1	Crown fires should be avoided in the lower end of the interval range
•	3A *E. saligna–E. pilularis* tall open forest	15	60	0.8	0.1	Crown fires should be avoided in the lower end of the interval range
D	**Semi-mesic grassy forests**					
•	8 Blackbutt open forest–Wianamatta shales	12	50	56.4	0.4	Crown fires should be avoided in the lower end of the interval range
•	Sheltered gully forest	10	50	2.1	0.1	Crown fires should be avoided in the lower end of the interval range
•	Sydney Sandstone gully forest	10	50	8.3	0.1	Crown fires should be avoided in the lower end of the interval range
E	**Swamp sclerophyll forests**					
•	No communities represented in the reserves	7	35	-	-	
F	**Sclerophyll grassy woodlands**					
•	No communities represented in the reserves	5–10	40	-	-	
G	**Grassy dry sclerophyll forests**					
•	No communities represented in the reserve	5	50	-	-	
H	**Shrubby dry sclerophyll forests**					
•	10A *E. capitellata–E. gummifera* open forest	7	30	5.3	0.1	
•	10ar Sydney Sandstone ridgetop woodland	7	30	7.0	0.1	Spectacle Island NR, Lion Island NR
•	10B *E. sieberi–E. gummifera* open forest/ low open forest	7	30	101.3	0.7	

Regime	Vegetation communities	Minimum interval	Maximum interval	ha	% of reserve	Notes
•	11 Plateau low open forest	7	30	141.5	1.0	
•	12 Casuarina low open forest–grassland patches	5	30	31.3	0.2	
•	13 Exposed Hawkesbury woodland	7	30	2580.7	18.0	Long Island NR only
•	14 *E. camfieldii* low woodland	12	30	5.9	0.1	Habitat for *G. caleyi*
•	15 Low woodland / low open woodland Hawkesbury	7	30	3937.0	27.4	
•	15/17 Low woodland–shrubland	7	30	434.4	3.0	
•	16 *E. luehmanniana* low open woodland	7	30	39.8	0.3	Restricted in distribution
•	4 Grey ironbark–mahogany open forest	15	30	19.0	0.1	
•	5 Spotted gum open forest	12	30	37.2	0.3	*Endangered Ecological Community*
•	6 Rough-barked apple–bangalay open forest	12	30	209.2	1.5	
•	7 Rough-barked apple open forest	12	30	238.5	1.7	
•	9 Sheltered Hawkesbury forest	7	30	4458.4	31.0	Lion Island NR and KCNP only
•	9h Narrabeen slopes forest	7	30	43.5	0.3	Spectacle Island NR and Lion Island NR
•	Duffys Forest EEC–blackbutt–turpentine forest	8	30	3.5	0.1	*Endangered Ecological Community*
•	Dry sandstone ridgetop woodland / low woodland	7	30	0.5	0.1	
•	Red bloodwood–scribbly gum woodland	7	30	19.3	0.1	
•	Duffys Forest EEC–silvertop ash–brown stringybark forest (EEC)	8	30	95.7	0.7	*Endangered Ecological Community*
•	Sydney Sandstone ridgetop woodland	7	30	5.5	0.1	
•	Yellow bloodwood forest	7	30	0.9	0.1	
I	**Heathlands**					
•	17 *Banksia–Hakea* scrub heath	7	30	1556.7	10.8	
•	18 Heath–rocky outcrops	7	30	106.0	0.7	
•	21a Costal clay heath (Barrenjoey Head)	7	30	24.7	0.2	*Endangered Ecological Community*
J	**Grasslands**					
•	*Themeda* grassland on sea cliffs and coastal headlands	2	10	TBA	TBA	EEC found on Barrenjoey head—some intervals greater than 7 years should be included in coastal areas. Evidence indicates maximum intervals should be approximately 10 years.
K	**Freshwater wetlands**					
•	21 Sedgeland/shrubland—impeded drainage	6	35	78.280	0.5	
•	20 Reedland/rushland	6	35	17.3	0.1	

APPENDIX 2: FIRE REGIME GUIDELINES FOR FLORA SPECIES

Map ID[1]	Scientific Name	Conservation Status[2]	Regeneration	Min Interval[3]	Max Interval[4]	Flowering season	Management Guidelines
FL?	*Acacia bynoeana*	TSC E2	Likely to resprout from woody rootstock and/or seed stored in the soil.	8*	30*	Unknown	Fire tolerant due to community and topographic preference. Three successive fires, each less than 8 years apart or more than 30 years without fire. (Benson & McDougall, 1996)
FL?	*Amperea xiphoclada var. papillata*	U	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL?	*Ancistrachne maidenii*	V	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL15	*Angophora crassifolia*	Rotap 2RCa	Resprouts. Transient seedbank	>1	>100	Unknown	Monitoring required.
FL5	*Asterolasia elegans*	TSC E, ESP E, Rotap 2ECa	Killed by 100% scorch; seed storage in soil	8–10	?	Spring	Only limited recruitment occurs without fire. Minimum threshold of 8–10 years should apply with prescribed burns being of low intensity and consume high levels of fine fuels. (Scott, 1994)
FL?	*Boronia fraseri*	P13	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL5	*Boronia serrulata*	Rotap 2RC-	Killed by 100% scorch; seed storage in soil	>5	?	Spring	Plants killed by fire. Regenerates from soil stored seed.
FL?	*Callistemon linearifolius*	V	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL?	*Corybas undulatus*	U	Fire response and regeneration unknown	?	?	Unknown	Can be locally common after fire, unlikely to be effected by fire. General community fire regimes should be appropriate.

Map ID[1]	Scientific Name	Conservation Status[2]	Regeneration	Min Interval[3]	Max Interval[4]	Flowering season	Management Guidelines
FL10a	*Cryptostylis hunteriana*	TSC V, ESP V, Rotap 3VC-	Survives 100% scorch; resprout location unknown	>2	?	Spring-Autumn	General community fire regimes should be appropriate.
FL7	*Darwinia biflora*	TSC V, ESP V, Rotap 2VCa	Killed by 100% scorch; short lived seed storage in soil	>11	31	Autumn	Fire tolerant due to community and topographic preference.
FL6	*Darwinia diminuta*	Rotap 2RCi	Killed by 100% scorch; seed storage in soil	5–11	31	Spring-Summer	Monitoring required.
FL4	*Darwinia grandiflora*	Rotap 2RCi	Species resprouts after fire and can regenerate from soil seed bank.	8*	70	Winter	Monitoring required.
FL?	*Darwinia peduncularis*	V	Fire response and regeneration unknown	8*	30*	Unknown	Likely to be fire tolerant due to community and topographic preference. Three successive fires, each less than 8 years apart or more than 30 years without fire.
FL7	*Darwinia procera*	Rotap 2RCa	Killed by 100% scorch; seed storage in soil	5–12	>42	Winter-Spring	Monitoring required.
FL7	*Epacris purpurascens var. purpurascens*	TSC V, Rotap 2KC-	Killed by 100% scorch; seed storage in soil	?	32	Winter	Seeding species sensitive to high fire frequency. Minimum interval 7 years. Requires fire intervals less than 30 years to germinate soil stored seed bank. Avoid winter burns.
FL3	*Eucalyptus camfieldii*	TSC V, ESP V, Rotap 2VCi	Regenerates via both epicormic buds and from a lignotuber after fire.	8*	>102	Unknown	Management guidelines suggests that fire may be important to this species in enabling it to out compete other vegetation growing on these sites. General community thresholds should be suitable for this species.
FL9	*Eucalyptus luehmanniana*	Rotap 2RCa	Survives 100% scorch; resprouts from epicormic shoots	>6	102		Monitoring required.

Map ID[1]	Scientific Name	Conservation Status[2]	Regeneration	Min Interval[3]	Max Interval[4]	Flowering season	Management Guidelines
FL?	*Genoplesium baueri*	U	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL?	*Grammitis stenophylla*	E2	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL5	*Grevillea caleyi*	TSC E, ESP E, Rotap 2ECi	Killed by 100% scorch; seed storage in soil	8–13	26	Winter-Spring	High frequency fire is listed as adversely effecting this species. Any proposal to burn the habitat of this species or within 1 km of a G.caleyi site should be referred to Threatened Species Unit. Guiding principles for fire frequency is fire free interval for 8–12 years, prevent any site from being burnt by 3 consecutive fires at <5year intervals. Allow fire to burn a site if it is >15–20 years old.Avoid the use of wetting agents if possible.
FL?	*Haloragodendron lucasii*	E2	Survives 100% scorch; resprouts from root suckers or rhizomes	10*	30*	Unknown	After fire, H.lucasii is capable of re-sprouting from its rootstock (Auld et al 1991, M. Sydes pers. obs. This species is therefore likely to unaffected by fire regimes that suit the general community thresholds.
FL2	*Kunzea rupestris*	TSC V, ESP V, Rotap 2VCa	Plants resprout after fire	8*	30*	Spring	Discontinuous fuels on rock platforms likely to protect whole stands from being destroyed at once. Three successive fires, each less than 8 years apart or more than 30 years without fire, is likely to cause decline. (Cohn, 1993)
	Lasiopetalum joyceae	V	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL10a	*Lomandra brevis*	Rotap 2RC-	Survives 100% scorch; resprout location unknown	3–8	27	Spring-Autumn	Monitoring required.
FL16	*Melaleuca deanei*	TSC V, ESP V, Rotap 3RC-	Resprouts. Canopy stored seed bank	10	>102	Spring-Summer	Likely to be adapted to heathland community threshold. Precautionary minimum interval of 10 years should be applied.

Map ID[1]	Scientific Name	Conservation Status[2]	Regeneration	Min Interval[3]	Max Interval[4]	Flowering season	Management Guidelines
FL5	*Micromyrtus blakelyi*	TSC V, ESP V, Rotap 2VCi	Killed by 100% scorch; seed storage in soil	>2	?	Spring	Likely to be fire tolerant to some extent given species location and vegetation community preference. Minimum threshold of 8 years should apply in known locations.
FL?	*Microtis angusii*	E2	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL5	*Persoonia hirsuta*	TSC E	Plants killed by fire. Regenerates from soil stored seed bank.	>7	?	Spring-Summer	As with other obligate seeders it may be important to allow for a longer fire free period to allow for seed bank replenishment after fire.
FL2	*Persoonia mollis subsp. maxima*	TSC E, ESP E, Rotap 2E	Killed by 100% scorch; seed storage in soil	12–16	41	Summer	This plant is an obligate seeder as such the threat from fire is as a result of a number of fire management activities including inappropriate fire frequency and trittering. Planned fires including populations of P.mollis ssp maxima should not be burnt at fire intervals less than 12–15 years and should be referred to NPWS Threatened Species Unit for consideration. Fire intervals of less than eight years are likely to result in extinction.
FL?	*Pimelea curviflora var. curviflora*	V	Fire response and regeneration unknown	?	?	Unknown	Monitoring required.
FL7	*Syzygium paniculatum*	TSC V, ESP V, Rotap 3VCi	Species likely to be killed by 100% scorch; however can resprout from location unknown; persistent soil seedbank	>3	201	Summer	Mature individuals tolerate fire, but at unknown frequencies and intensities. Since this species has been recorded in fire sensitive vegetation communities, fire should be avoided in known species locations.
FL3	*Tetratheca glandulosa*	TSC V, ESP V, Rotap 2VC-t	Resprouts from a woody rootstock	6–10	22	Winter-Spring	Fire tolerant due to community and topographic preference.

Map ID[1] Code to be used to identify features on NPWS operational maps. Based on functional fire response and life history species group based on the vital attributes groups of Noble & Slatyer (1980). See Also the NSW Flora Fire Response Database (NPWS 2006). FL? = Unknown functional group.

Conservation Status[2] NSW Threatened Species Conservation Act (TSC) & Commonwealth Endangered Species Protection Act (ESP) listings; Source: NSW Scientific Committee; E = endangered, V = vulnerable, U = Unprotected; ROTAP codes follow Briggs & Leigh; Source: Briggs, J.D. & Leigh, J.H. (1996) Rare or Threatened Australian Plants. 1995 Revised Edition. CSIRO, Canberra.; codes not prefixed by 'Rotap' are suggestions from other sources and not listed in Briggs & Leigh 1996.
Min Interval[3]—Minimum intervals based on NSW flora fire response database. Intervals marked with an * indicate a local variation of interval requirement.
Max Interval[4]—Maximum Intervals based on NSW flora fire response database. Intervals marked with an* indicate a local variation of interval requirement.

APPENDIX 3: FIRE MANAGEMENT GUIDELINES FOR FAUNA SPECIES

Map ID[1]	Scientific Name	Common Name	Conservation Status[2]	Management Guidelines
FA1	*Heleioporus australiacus*	Giant Burrowing Frog	V	• Avoid frequent fires. • Avoid high intensity burns in known locations. • Avoid burns during Summer and Autumn breeding season. • Maintain appropriate fire regimes in Dry/wet sclerophyll, riparian forest, sub-tropical rainforest or swamp habitat.
FA1	*Litoria aurea*	Green and Golden Bell Frog	E1	• Avoid high frequency fires—may lead to a build up of sediments in small ponds used for breeding and simplify the structure and species composition of habitat; • Maintain appropriate fire regimes to preserve sheltering sites such as vegetation and / or rocks inwet sclerophyll forests, riparian margins, marshes, dams, stream sides particularly those containing bullrushes (*Typha spp*) or spike rushes (*Eleocharis spp*).
FA1	*Pseudophryne australis*	Red-crowned Toadlet	V	• Avoid frequent burning that may reduce leaf litter in known habitat • Habitat preference indicates that the populations will survive less frequent fires. • Maintain appropriate fire regimes of 8–10 years in preferred Habitats including coastal heath, low open woodland, open forest particularly damp leaf litter in ephemeral drainage lines and soaks.
FA2	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subsp.)	V	• Frequently burnt areas often lead to a reduction in resource availability. • High intensity fires can reduce availability of nesting hollows. • Avoid frequent fire in vegetation communities containing foraging habitats for this species.
FA2	*Xanthomyza phrygia*	Regent Honeyeater	E1	• Itinerant species generally not affected by fire. • Keep fire out of canopy; • Avoid burning during July to November breeding season • Maintain appropriate fire regimes within known habitat including Red Ironbark, Red River Gum, also other eucalypts and mistletoe clumps and casuarinas in dry eucalypt woodland and dry sclerophyll forest with mature flowering trees, and riparian vegetation for breeding;
FA3	*Callocephalon fimbriatum*	Gang-gang Cockatoo	E2	• Nest in tree hollows, high up and usually near water. • Avoid burning of riparian corridors in known locations. • Avoid felling of potential roost trees (those with hollows) during mop-up operations; • Avoid burning during September to December breeding season. • Maintain appropriate fire regimes within known habitat including wet forests, especially densely wooded gullies and adjacent lowland woodlands.
FA3	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V	• Avoid high intensity fires in Allocasuarina dominated vegetation communities with a recurrent frequency of < 15 years. • Maintain diversity in of age structures in community's particularly open forests (with tree hollows for roosting). dominated by *Allocasuarina spp*. • Protect known nest sites by a 50–200 metre buffer strip.

Map ID[1]	Scientific Name	Common Name	Conservation Status[2]	Management Guidelines
				• Avoid burning during March to August breeding season.
FA3	*Haematopus fuliginosus*	Sooty Oystercatcher	V	• Unlikely to be effected by fire management activities unless burning coastal dune / rock outcrop vegetation. • Breeds any time of the year. • Nests in coastal tall open forest up to 1 km inland on suitable branches of trees such as Blackbutt, Greybark, Banyan or Pandanus. • Maintain appropriate fire regimes within known habitat including coastal forests , rocky outcrops.
FA3	*Haematopus longirostris*	Pied Oystercatcher	V	• Unlikely to be effected by fire management activities unless burning coastal dune / rock outcrop vegetation. • Avoid burning habitat during August to January breeding season • Avoid disturbances to nests in shallow scrapes in sand above high tide mark. • Maintain appropriate fire regimes within known habitat including ocean beaches (except where cliffs replace beaches) and estuarine flats.
FA3	*Lathamus discolor*	Swift Parrot	E1	• Itinerant species, generally not effected by fire. • Avoid burning during September to December breeding season • Maintain appropriate fire regimes within community thresholds for Eucalypt forest and woodland, especially where eucalypts are flowering profusely and an abundance of psyllids is available
FA3	*Limicola falcinellus*	Broad-billed Sandpiper	V	• Migratory species which breeds in the northern hemisphere which is unlikely to be effected by fire management. • Avoid disturbance to known nest sites in mature Eucalypts with tree hollows. • Maintain appropriate fire regimes within known habitat including Coastal, Wetlands/mudflats
FA3	*Macronectes giganteus*	Southern Giant-Petrel	E1	• Unlikely to be effected by fire management activities. • Preferred habitat is Oceanic/ Coastal
FA3	*Neophema pulchella*	Turquoise Parrot	V	• Protect roosting/ nesting sites in tree hollows/logs > 2 m from ground. • Avoid felling possible habitat trees/stumps during mop up operations. • Avoid medium-high intensity burns in known locations during August to January breeding season • Maintain appropriate fire regimes within known habitat including Eucalypt woodlands and open forests with a ground cover of grasses and low understorey of shrubs
FA3	*Ninox connivens*	Barking Owl	V	• Protect nesting sites in Tree hollows and sometimes in rabbit burrows in dry forests during winter/spring breeding season. • Should not be affected by low/medium intensity fires. • Avoid high intensity large area burns that reduce forage habitat. • Maintain appropriate fire regimes within known habitat including Forest and woodland, eucalypt savanna woodland, well-forested hills and flats, trees along watercourses and in gorges.

Map ID[1]	Scientific Name	Common Name	Conservation Status[2]	Management Guidelines
FA3	*Ninox strenua*	Powerful Owl	V	• Protect known nesting sites required during winter spring breeding season. • Avoid medium-high intensity fire in known locations during nesting season. • Avoid high intensity prescribed burns or wildfires over large areas that reduce forage habitat • Maintain appropriate fire regimes within known habitat including Forests and woodlands (requires tree hollows for roosting)
FA3	*Pandion haliaetus*	Osprey	V	• Unlikely to be effected by fire management activities. • This species nests in trees on rocky outcrops, nest sites need to be identified and protected; • Avoid burning during April to July breeding season • Maintain appropriate fire regimes within known habitat including Coastal waters, inlets, estuaries, offshore islands, occasionally far up rivers.
FA3	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subsp.)	V	• Avoid fire management activities within known/ potential habitat during breeding season. • Implement low intensity mosaic burns within known habitat. • Minimise frequency of fires within known/ potential habitat.
FA3	*Ptilinopus superbus*	Superb Fruit-Dove	V	• Unlikely to be effected by fire management activities as it is a locally vagrant species which follows local food sources • Avoid burning during September to January breeding season. • Maintain appropriate fire regimes within known habitat including rainforests, adjacent woodlands, mangroves, & shrubland with native fruits.
FA3	*Haematopus fuliginosus*	Sooty Oystercatcher	V	• Unlikely to be effected by fire management activities unless burning coastal dune / rock outcrop vegetation. • Breeds any time of the year. • Nests in coastal tall open forest up to 1 km inland on suitable branches of trees such as Blackbutt, Greybark, Banyan or Pandanus. • Maintain appropriate fire regimes within known habitat including coastal forests , rocky outcrops.
FA3	*Tyto novaehollandiae*	Masked Owl	V	• Protect nesting sites required in winter/spring breeding season. • Avoid medium-high intensity fire in known locations. • Avoid high intensity burns over large areas. • Maintain appropriate fire regimes within known habitat including Open woodland/forest with tree hollows for roosting.
FA3	*Tyto tenebricosa*	Sooty Owl	V	• Protection of nesting sites in drier forest required in winter/spring breeding season. • Should not be affected by low/medium intensity fires. • Avoid high intensity burns over large areas that reduce forage habitat. • Maintain appropriate fire regimes within known habitat including Tall, wet forests in sheltered east and south-east facing mountain gullies.
FA4	*Dasyurus maculatus*	Spotted-tailed Quoll	V	• Avoid high intensity fires over large areas. • Avoid burning immediately prior and during the April to August breeding period. • Protect potential den site in hollow logs during mop up operations;

Map ID[1]	Scientific Name	Common Name	Conservation Status[2]	Management Guidelines
				• Avoid fires greater than the home range of the species which is approximately 800 ha;
FA4	*Isoodon obesulus*	Southern Brown Bandicoot	E1	• Prescribed burns should not exceed 8–12 yeas in suitable and known habitats. • Mosaic burning pattern will promote this species. • Maintain appropriate fire regimes within community thresholds for heaths to woodlands habitat with a sandy substrate
FA5	*Phascolarctos cinereus*	Koala	V	• Avoid medium to high intensity fires in areas of known colonies or in low open forest with known forage tree species. • Avoid burning Breeds in Summer, • Avoid Frequent fires in preferred habitat of Wet or dry Eucalypt forest on high nutrient soils containing preferred feeding trees
FA5	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	• Maintain appropriate fire regimes within community thresholds for forests and woodlands with well developed understorey.
FA6	*Cercartetus nanus*	Eastern Pygmy-possum	V	• Avoid high intensity fires over large areas. • Avoid frequent fires that may reduce cover and feed availability. • Maintain a variety of age classes in understorey vegetation by implementing a mosaic of fire intensities and frequencies. • Avoid burning during the breeding season.
FA7	*Varanus rosenbergi*	Rosenberg's Goanna	V	• Little known species. • Likely to be sensitive to large area burns due to habitat loss and also to high intensity fires due to use of hollow logs as refuge. • Protect known nests burrows in soil, hollow logs and rock crevices. • Maintain appropriate fire regimes within known habitat including Open woodland with generally rocky terrain.
FA9	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	V	• Unlikely to be adversely affected by prescribed fire regimes due to winter hibernation and can utilise a wide range of forest types. • Avoid high intensity fire around known roosting sites during breeding season and to preserve den sites. • Avoid high frequency fire in habitats, as this will decrease prey (invertebrate density). • Maintain a mosaic of age classes within habitat.
	Eudyptula minor	Little Penguin	U	• Maintain 100% of Little Penguin (*Eudyptula minor*) habitat in an unburnt state.

Map ID[1] Code to be used to identify features on NPWS operational maps. Based on functional fire response and life history species group FA1 = Amphibians, FA2 = Passerine Birds, FA3 = Non Passerine Birds, FA4 = Ground Mammals, FA5 = Arboreal Mammals, FA6 = Macropods, FA7 = Reptiles, FA8 = Invertebrates, FA9 = Bats
Conservation Status[2] NSW Threatened Species Conservation Act (TSC) & Commonwealth Endangered Species Protection Act (ESP) listings; Source: NSW Scientific Committee; E = endangered, V = vulnerable, U = Unprotected.

APPENDIX 4: GUIDELINES FOR ABORIGINAL HERITAGE MANAGEMENT

The Department of Environment and Conservation's (DEC) Aboriginal Heritage Information Management System (AHIMS) details the location and types of Aboriginal sites within the landscape and the risk of damage that may be caused by fire management activities. The database lists twenty different types of site features currently recognised. The Aboriginal site features in AHIMS have been grouped in Table 4A into five groups on the basis that certain features will respond similarly to fire management activities. For each site group, management strategies have been identified to prevent possible damage to features.

In addition to the strategies in Table 4A, consultation should be undertaken with local Aboriginal representatives, DEC site officers or the DEC Cultural Heritage Unit to determine appropriate management strategies.

Table 4A: Guidelines for Aboriginal Cultural Heritage management

Map ID[1]	Site group[2]	Management strategies
AH1	Artefact (AFT) Earth mound (ETM) Hearth (HTH) Non-human bone (BOM) Ochre quarry (OCQ) Potential archaeological deposit (PAD) Shell (SHL)	• Do not break earth around known sites, especially where there is surface evidence of artefacts, shell, charcoal or ochre. • Any surface alteration adjacent to site must be immediately reversed to previous state. A note must be made of site location, and details of site disturbance must be provided to DEC Cultural Heritage Unit. • Vehicles or heavy equipment must not be used on or within these sites unless a path exists that will not damage the site. • Vegetation which is screening the site must not be damaged. • There must be no slashing/trittering of vegetation, no tree removal, and no use of earthmoving equipment such as bulldozers. • If using fire, place the control lines well away from the site.
AH2	Art (ART) Grinding groove (GRG)	• If burning, loose leaf litter must be carefully removed from rock platforms and from under overhangs. Leaf litter is to be returned to the site after the fire, as site may be covered for protection from vandalism. • If using fire, place control lines well away from the site. • Heavy equipment (including vehicles) must not be used on rock platforms or within 10 m of sites unless an existing road is available for use. • If burning, rake loose leaf litter away from vegetation near the site if smoke is likely to mark rock paintings. • Do not use chemicals or other retardants within 20 m of art sites. If windy, the distance is to be extended to 50 m. • Vegetation which is screening the site must not be damaged. • There must be no slashing/trittering of vegetation, no tree removal, and no use of earthmoving equipment such as bulldozers.
AH3	Aboriginal resource & gathering (ARG) Habitation structure (HAB) Modified tree (TRE) Water hole (WTR)	• Loose leaf litter and low ground cover are to be manually cleared by raking for 10 m around carved or scarred trees and wooden structures. Wooden structures and trees of concern are to be protected at the time of burn. For example, dampen earth around structures and trees to be protected, and minimise risk of ember attack. • If using fire, place control lines well away from the site. • Trees of concern must be examined as soon as possible after the passage of the fire, and embers that might cause the tree to burn must be extinguished. • Chemicals or other retardants that can harm plants and animals used by Aboriginal people or cause damage to water holes must not be used. • There must be no slashing/trittering of vegetation, no tree removal, and no use of earthmoving equipment such as bulldozers. *If site is used by Aboriginal people, then liaise with the Aboriginal community to ensure that hazard reduction is timed to cause minimal damage to the resource and is not disruptive to gathering practices. Do not proceed if damage cannot be avoided.*

Map ID[1]	Site group[2]	Management strategies
AH4	Fish trap (FSH) Stone arrangement (STA) Stone quarry (STQ) *Note: there is a high likelihood that other sites from Grouping 1 will be in the general vicinity.*	• Do not move loose stones (i.e. to create a 'natural fire break'), especially where they have been already grouped or arranged. • Heavy machinery is not to be used in or adjacent to these sites. • Do not drive vehicles or use heavy equipment within these sites unless a path exists that will not damage the site. • Vegetation which is screening the site must not be damaged. • There must be no slashing/trittering of vegetation, • Do not remove trees or use earthmoving equipment such as bulldozers. • If using fire, place control lines well away from the site.
AH5	Aboriginal ceremony & dreaming (ACD) Burial (BUR) Ceremonial ring (CMR) Conflict (CFT) *Note: there is a high likelihood that sites from the other groupings will be in the general vicinity*	• There must be no slashing/trittering of vegetation, no tree removal, and no use of earthmoving equipment such as bulldozers. • There must be no breaking of earth near known sites of this group, especially near burials and ceremonial rings. • If human skeletal remains are located (and it cannot be confirmed that they are a known Aboriginal burial), then the police must be called, and the immediate location must be treated as a 'crime scene'. • Vehicles or heavy equipment must not be used on or within these sites unless on established vehicular access. • Vegetation which is screening the site must not be damaged. • If using fire, place control lines well away from the site. *These types of sites are highly sensitive. Discussions must be held between DEC Aboriginal Heritage Conservation Officer and the local Aboriginal people before any hazard reduction works are undertaken. Do not proceed if a resolution cannot be reached.*

1. Map ID: Code used to identify features on NPWS operational maps.
2. Site group: Used to group sites recorded in AHIMS by like environmental variables, i.e. relative to likely fire and hazard reduction impacts. Does not indicate any grouping of sites features on the ground.

APPENDIX 5: GUIDELINES FOR HISTORIC HERITAGE MANAGEMENT

The DEC's Historic Heritage Information Management System (HHIMS) details the location and types of historic sites within the landscape. Site features in HHIMS have been grouped in Table 5A into five groups on the basis that certain features will respond similarly to fire management activities. For each site group, management strategies have been identified to prevent possible damage to features.

In addition to the strategies in Table 5A, consultation will be undertaken by NPWS with archaeologists, DEC Historic Sites officers or the DEC Cultural Heritage Unit to determine appropriate management strategies.

Table 5A: Fire management guidelines to protect historic heritage

Map ID[1]	Site group[2]	Management strategies
HH1	Flammable, structurally unsound sites, including buildings with low structural integrity	• As far as possible, protect site from fire. • Avoid all ground disturbances, including the use of earthmoving machinery, handline construction and driving over sites. • Avoid water bombing. • Use of foams, wetting agents and retardant is acceptable.
HH2	Flammable but structurally sound sites, including buildings, wooden fences, signs, stock rails	• As far as possible, protect site from fire. • Avoid all ground disturbances, including the use of earthmoving machinery, handline construction and driving over sites. • Waterbombing and use of foams, wetting agents and retardant is acceptable.
HH3	Low flammability but structurally unsound sound sites, including dry stone walls	• Avoid all ground disturbances, including the use of earthmoving machinery, handline construction and driving over sites. • Avoid water bombing. • Use of foams, wetting agents and retardant is acceptable. • Site may be burnt by bushfire, back-burn or prescribed burn without damage.
HH4	Low flammability and structurally sound sites and earthworks, including stone foundations, aqueducts	• Avoid all ground disturbances, including the use of earthmoving machinery, handline construction and driving over sites. • Waterbombing and use of foams, wetting agents and retardant are acceptable. • Site may be burnt by bushfire, back burn or prescribed burn without damage.
HH5	Quarries	• . Site unlikely to be affected by fire or any fire management activities.

1. Map ID: Code used to identify features on NPWS operational maps.
2. Site group: Used to group sites identified in HHIMS by like environmental variables, i.e. relative to likely fire and hazard reduction impacts. Does not indicate any grouping of sites features on ground.

APPENDIX 6: STANDARD OPERATIONAL GUIDELINES

Issue	Guidelines
Aerial water bombing	• The use of bombing aircraft should support containment operations by aggressively attacking hotspots and spot-overs. • The use of bombing aircraft without the support of ground-based suppression crews should be limited to very specific circumstances. • Where practicable. foam should be used to increase the effectiveness of the water. • Ground crews must be alerted to water bombing operations. • Where practicable, fresh water should be used for water bombing in preference to salt water.
Aerial ignition	• Aerial ignition may be used during backburning or fuel reduction operations where practicable, but only with the prior consent of a senior NPWS officer. • Use incendiaries to rapidly progress backburns downslope where required.
Backburning	• Temperature and humidity trends must be monitored carefully to determine the safest times to implement backburns. Generally, when the Fire Danger Index (FDI) is very high or greater, backburning should begin when the humidity begins to rise in the late afternoon or early evening. With a lower FDI, backburning may be safely undertaken during the day. • Where practicable, clear a 1 m radius around dead and fibrous-barked trees adjacent to containment lines before backburning, or wet down these trees as part of the backburn ignition. • Avoid ignition of backburns at the bottom of slopes where a long and intense upslope burn is likely.
Command & control	• The first combatant agency on site may assume control of the fire, but then must ensure that the relevant land management agency is notified promptly. • On the arrival of other combatant agencies, the initial incident controller will consult with regard to the ongoing command, control and incident management team requirements as per the relevant BFMC plan of operations.
Containment lines	• Construction of new containment lines should be avoided, where practicable, except where they can be constructed with minimal environmental impact. New containment lines require the prior consent of a senior NPWS officer. • Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation. • All containment lines not required for other purposes should be closed at the cessation of the incident. • All personnel involved in containment line construction should be briefed on both natural and cultural heritage sites in the location.
Earthmoving equipment	• Earthmoving equipment may be used only with the prior consent of a senior NPWS officer, and then only if the probability of its success is high. • Earthmoving equipment must be always guided and supervised by an experienced officer, and accompanied by a support vehicle. When engaged in direct or parallel attack, this vehicle must be a fire fighting vehicle. • Containment lines constructed by earthmoving equipment should consider the protection of drainage features, observe the *Threatened Species and Cultural Heritage Operational Guidelines*, and be surveyed, where possible, to identify unknown cultural heritage sites. • Earthmoving equipment should be washed down, where practicable, before entering NPWS estate.
Fire advantage recording	• All fire advantages used during wildfire suppression operations must be mapped and, where relevant, added to the database.
Fire suppression chemicals	• Wetting and foaming agents (surfactants) are permitted for use in wildfire suppression. • The use of fire retardant is permitted only with the prior consent of the senior NPWS officer, and should be avoided where reasonable alternatives are available. • Exclude the use of surfactants and retardants within 50 m of rainforest, watercourses, dams and swamps. • Areas where fire suppression chemicals are used must be mapped, and the names of the products must be recorded. • The *Threatened Species Operational Guidelines* are to be observed.
Rehabilitation	• Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation. • Where necessary, undertake pest control programs to prevent the invasion and spread of pest species.
Smoke management	• The potential impacts of smoke and possible mitigation tactics must be considered when planning for wildfire suppression and prescribed burning operations. • If smoke becomes a hazard on local roads or highways, the police and relevant media must be

Issue	Guidelines
	notified. • Smoke must be managed in accordance with RTA traffic management guidelines.
Visitor management	• The reserve may be closed to the public during periods of extreme fire danger or during wildfire suppression operations.

APPENDIX 7: FIRE MANAGEMENT ZONES

Strategic Fire Advantage Zones (SFAZ)

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
SZ 1	3A & 3B	Anembo Reserve	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	0.1	4.4
SZ 2	3A	Apple Tree Bay Creek	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	32.0	3.8
SZ 3	3F	Basin Carpark	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	0.2	0.3
SZ 4	3A & 3B	Birramal	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	4.1	8.0
SZ 5	3A	Bobbin Head Track West	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	113.2	3.4
SZ 6	3A	Bobbin Head Track West A	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	1.7	0.1
SZ 7	3C & 3F	Bonna Cr A	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	2.5	0.2
SZ 8	3C & 3F	Bonna Cr B	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.6	1.2
SZ 9	3C & 3F	Bonna Cr D	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.2	0.4
SZ 10	3E	Brooklyn Dam A	• To assist with the strategic control of	• Assess requirement for prescribed burn between	NPWS,	3.0	5.2

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
			bushfires and the protection of assets in Brooklyn	10–18 years post fire (consider alternating broad area and edge burns).	Hornsby SC., Dept. Lands,		
SZ 11	3E	Brooklyn Dam B	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC.,	1.7	5.1
SZ 12	3E	Brooklyn Dam C	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC.,	2.6	0.8
SZ 13	3E	Brooklyn Dam D	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC.,	5.2	1.0
SZ 14	3E	Brooklyn Dam F	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC.,	17.5	4.3
SZ 15	3E	Brooklyn Dam G	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS,	13.7	5.8
SZ 16	3A & 3B	Bulara B	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS, Dept. Lands,	0.0	2.6
SZ 17	3A	Caleys/ Fraser Brook	• To assist with the strategic control of bushfires and the protection of assets in North Wahroonga	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC and *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Ku-ring-gai C., Dept. Lands,	62.8	93.7
SZ 18	3C	Chiltern Rd B	• To assist with the strategic control of bushfires and the protection of assets in Ingleside	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS, Dept. Lands,	2.6	1.0
SZ 19	3C	Chiltern Trail	• To assist with the strategic control of bushfires and the protection of assets in Ingleside	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS, Dept. Lands,	58.9	2.2
SZ 20	3C & 3F	Cicada Glen Creek A	• To assist with the strategic control of bushfires and the protection of assets in Church Point	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	11.3	0.8
SZ 21	3C	Cicada Glen Creek B	• To assist with the strategic control of bushfires and the protection of assets in Church Point	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Closed forest/	NPWS, Dept. Lands,	29.3	5.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				Gully Forest Communities.			
SZ 22	3C	Cicada Glen Creek C	• To assist with the strategic control of bushfires and the protection of assets in Church Point	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities.	NPWS, Dept. Lands,	24.4	10.4
SZ 23	3C & 3F	Cicada Glen Creek D	• To assist with the strategic control of bushfires and the protection of assets in Church Point	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Dept. Lands,	7.7	6.2
SZ 24	3F	Coasters Retreat	• To assist with the strategic control of bushfires and the protection of assets in Coasters Retreat	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	48.5	0.4
SZ 25	3F	Coasters Retreat Foreshore	• To assist with the strategic control of bushfires and the protection of assets in Coasters Retreat	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	3.1	0.4
SZ 26	3A	Cockle Creek	• To assist with the strategic control of bushfires and the protection of assets in North Wahroonga	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Duffys Forest EEC *and Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Ku-ring-gai C., Dept. Lands,	75.1	1.5
SZ 27	3B	Coonawarra	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	6.1	7.5
SZ 28	3B	Cooyong Rd South	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	2.4	10.5
SZ 29	3D & 3F	Cottage Point	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	4.7	0.8
SZ 30	3D & 3F	Cottage Point Community A	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	0.5	0.3
SZ 31	3D & 3F	Cottage Point Community C	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	0.1	0.1
SZ 32	3D & 3F	Cottage Point	• To assist with the strategic control of	• Assess requirement for prescribed burn at 7–12 year	NPWS,	0.1	0.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
		Community D	bushfires and the protection of assets in Cottage Point	intervals.			
SZ 33	3D & 3F	Cottage Point Community E	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	0.1	0.0
SZ 34	3D & 3F	Cottage Point Community F	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	0.2	0.0
SZ 35	3D & 3F	Cottage Point Community K	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	0.3	0.3
SZ 36	3A & 3B & 3F	Cowan Track	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC and Closed forest/ Gully Forest Communities.	NPWS, Dept. Lands,	389.3	0.7
SZ 38	3A	Deadmans	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	58.5	1.1
SZ 37	3A	DEC North Turramurra House	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	0.7	1.1
SZ 40	3B	Duffys Trigg	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	4.2	0.3
SZ 39	3B & 3C	Duffys Trigg	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	4.3	0.3
SZ 41	3A	Eden Dr Asquith	• To assist with the strategic control of bushfires and the protection of assets in Asquith	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS, Hornsby SC., Dept. Lands,	0.3	4.0
SZ 42	3C & 3F	Elvina Bay Community A	• To assist with the strategic control of bushfires and the protection of assets in Elvina Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.1	0.3
SZ 43	3C & 3F	Elvina Bay Community A	• To assist with the strategic control of bushfires and the protection of assets in Lovett Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater	NPWS,	0.1	0.6

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				Spotted gum EEC.			
SZ 44	3C & 3F	Elvina Bay Community D (Normanhurst St)	• To assist with the strategic control of bushfires and the protection of assets in Elvina Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.1	0.4
SZ 45	3C & 3F	Elvina Bay Community E	• To assist with the strategic control of bushfires and the protection of assets in Elvina Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.8	0.7
SZ 46	3C & 3F	Elvina Bay Community F	• To assist with the strategic control of bushfires and the protection of assets in Elvina Bay	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.6	1.0
SZ 47	3C & 3F	Elvina Trail	• To assist with the strategic control of bushfires and the protection of assets in Elvina Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	30.3	1.3
SZ 48	3E	George St Brooklyn	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC., Dept. Lands,	0.2	30.2
SZ 49	3C	Gilwinga Rd	• To assist with the strategic control of bushfires and the protection of assets in Church Point	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	1.9	2.0
SZ 50	3C	Gilwinga Rd	• To assist with the strategic control of bushfires and the protection of assets in Church Point	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	0.5	0.5
SZ 51	3F	Great Mackerel Beach Swamp	• To assist with the strategic control of bushfires and the protection of assets in Great Mackerel Bea	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	2.8	1.0
SZ 52	3A	Gywdir Av	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn between 5–10 years post fire.	NPWS, Ku-ring-gai C.,	0.3	2.7
SZ 53	3B & 3C	Harvey Trig A	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	50.9	0.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
SZ 54	3B & 3C	Harvey Trig B	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	25.0	0.0
SZ 55	3B & 3C	Harvey Trig C	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for *Grevillea caleyi*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	195.2	4.0
SZ 56	3C	Ingleside Scout Camp B	• To assist with the strategic control of bushfires and the protection of assets in Ingleside	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS, Dept. Lands,	10.0	11.9
SZ 57	3B & 3C	Kanangra Rd	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	0.5	2.5
SZ 58	3B	Killawarra	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	5.4	2.2
SZ 59	3A	Ku-ring-gai Chase Rd North A	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	4.0	0.5
SZ 60	3A	Ku-ring-gai Chase Rd North B	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	11.6	1.2
SZ 61	3A	Ku-ring-gai Chase Rd North C	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	26.4	0.0
SZ 62	3B	Kulgoa A	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS, Dept. Lands,	0.3	0.6
SZ 63	3B	Kulgoa B	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	1.7	0.7
SZ 64	3C & 3F	Little Lovett Bay	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.5	2.9

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
SZ 65	3C & 3F	Little Lovett Bay Community A	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.6	0.3
SZ 66	3F	Mackerel Beach	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities.	NPWS,	3.1	0.5
SZ 67	3C	McCowen Trig	• To assist with the strategic control of bushfires and the protection of assets in Ingleside	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS, Dept. Lands,	78.7	1.2
SZ 68	3B	Mona Vale Rd Pistol Club East	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Dept. Lands,	16.2	6.8
SZ 69	3A & 3B	Mona Vale Rd Pistol Club West A	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Ku-ring-gai C., Dept. Lands,	12.1	8.7
SZ 70	3C & 3F	Morning Bay Community C	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS, Dept. Lands,	0.1	1.1
SZ 71	3C & 3F	Morning Bay Community F	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.1	0.6
SZ 72	3C & 3F	Morning Bay Community H	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS, Dept. Lands,	0.5	0.3
SZ 73	-	-	• -	• -	-	-	-
SZ 74	3A	Mt Colah Depot Road	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on	NPWS, Dept. Lands,	3.1	1.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				Southern Brown Bandicoot population.			
SZ 75	3A	Mt Ku-ring-gai East	• To assist with the strategic control of bushfires and the protection of assets in Mt Ku-ring-gai	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Dept. Lands,	165.6	1.9
SZ 76	3A	Mt Ku-ring-gai South	• To assist with the strategic control of bushfires and the protection of assets in Mt Ku-ring-gai	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC., Dept. Lands,	69.0	13.0
SZ 77	3A	Murrua A	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	3.8	0.0
SZ 78	3A	Murrua B	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	3.7	0.0
SZ 79	3A	Murrua C	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	0.7	0.0
SZ 80	3A	Murrua D	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	4.3	0.0
SZ 81	3A	Myall Track	• To assist with the strategic control of bushfires and the protection of assets in Mount Colah	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	91.7	1.5
SZ 82	3B	NB School	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	7.5	2.5
SZ 83	3B & 3C	Neverfail	• To assist with the strategic control of bushfires and the protection of assets in TerreyHills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC and *Grevillea caleyi*.	NPWS, Dept. Lands,	173.2	45.7
SZ 84	3A & 3B	North	• To assist with the strategic control of	• Assess requirement for prescribed burn between	NPWS, Ku-	95.1	39.4

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
		Turramurra East	bushfires and the protection of assets in North Turramurra	10–18 years post fire (consider alternating broad area and edge burns).	ring-gai C., Dept. Lands,		
SZ 85	3D & 3F	Notting Lane	• To assist with the strategic control of bushfires and the protection of assets in Cottage Point	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	3.0	0.4
SZ 86	3A	Paciffic Highway Beaumont Rd	• To assist with the strategic control of bushfires and the protection of assets in Mt Ku-ring-gai	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS, Hornsby SC., Dept. Lands,	4.6	6.1
SZ 87	3A	Powerline Trail	• To assist with the strategic control of bushfires and the protection of assets in Mt Colah	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	51.5	1.8
SZ 88	3F	Resolute Dam East	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Dyke Vegetation.	NPWS,	20.3	0.0
SZ 89	3F	Resolute Dam West	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS,	9.0	0.0
SZ 90	3C & 3F	Rocky Point A	• To assist with the strategic control of bushfires and the protection of assets in Lovett Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.1	1.0
SZ 91	3C & 3F	Salvation Creek North	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	166.1	6.8
SZ 92	3C & 3F	Salvation Creek South	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Pittwater Spotted gum EEC, *Eucalyptus camfieldii* and Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	181.2	2.3
SZ 93	3C & 3F	Salvation Creek	• To assist with the strategic control of	• Assess requirement for prescribed burn between	NPWS,	8.1	3.2

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
		South A	bushfires and the protection of assets in Lovett Bay	10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC and Closed forest/ Gully Forest Communities.			
SZ 94	3B	Sandy Trail	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	7.0	21.1
SZ 95	3A & 3B	Slade Lookout	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	137.7	33.6
SZ 96	3B & 3C	Smiths Creek East	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	129.1	4.8
SZ 97	3B & 3C	Smiths Creek West	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	157.3	0.1
SZ 98	3G	Smugglers Track	• To assist with the strategic control of bushfires and the protection of assets in Palm Beach	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS,	4.2	0.0
SZ 99	3A	Sphinx Memorial	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	3.9	0.0
SZ 100	3C & 3F	Studee Lane E	• To assist with the strategic control of bushfires and the protection of assets in Lovett Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.5	1.2
SZ 101	3B & 3C	Terrey Hills Trail B	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	2.9	2.9
SZ	3F	The Basin Track	• To assist with the strategic control of	• Assess requirement for prescribed burn between 8–	NPWS,	25.2	0.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
102			bushfires and the protection of assets in Coasters Retreat	14 years post fire. • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities.			
SZ 103	3C	The Duckholes	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Dept. Lands,	46.3	4.5
SZ 104	3A	The Landings A	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn at 7–12 year intervals. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	6.8	1.1
SZ 105	3A	The Landings C	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn between 5–10 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Ku-ring-gai C.,	0.3	0.4
SZ 106	3A	The Landings Creek	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn between 8–14 years post fire. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	69.5	2.0
SZ 107	3A & 3B	Timbarra Rd East	• To assist with the strategic control of bushfires and the protection of assets in St Ives Chase	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Ku-ring-gai C.,	66.7	1.4
SZ 108	3A	Timbarra Rd West	• To assist with the strategic control of bushfires and the protection of assets in St Ives Chase	• Assess requirement for prescribed burn between 5–10 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Dept. Lands,	0.0	2.0
SZ 109	3C & 3F	Towlers Bay Trail A	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	7.0	2.3
SZ 110	3C & 3F	Towlers Bay Trail B	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS, Dept. Lands,	3.4	2.6
SZ 111	3C & 3F	Towlers Bay Trail C	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS,	11.4	0.2

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				• Maintain appropriate fire regimes for Pittwater Spotted gum EEC. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.			
SZ 112	3C & 3F	Towlers Bay YHA	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	0.9	0.6
SZ 113	3B & 3C	Tumbledown Dick Hill	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Duffys Forest EEC and *Grevillea caleyi*.	NPWS, Dept. Lands,	16.2	0.2
SZ 114	3B	Weemala B	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS, Dept. Lands,	0.1	4.6
SZ 115	3B & 3F	Wilkins	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC and Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	205.2	0.1
SZ 116	3B & 3C	Wirreanda Creek	• To assist with the strategic control of bushfires and the protection of assets in Terrey Hills	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Dept. Lands,	84.6	19.9
SZ 117	3C & 3F	Wirrungalla Av	• To assist with the strategic control of bushfires and the protection of assets in Elvina Bay	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Pittwater Spotted gum EEC and Closed forest/ Gully Forest Communities.	NPWS,	7.5	1.9
SZ 118	3C & 3F	Woody Point A	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	1.5	0.1
SZ 119	3C & 3F	Woody Point B	• To assist with the strategic control of bushfires and the protection of assets in	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	0.2	1.4

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
			Morning Bay	• Maintain appropriate fire regimes for Pittwater Spotted gum EEC.			
SZ 120	3C & 3F	Woody Point C	• To assist with the strategic control of bushfires and the protection of assets in Morning Bay	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Pittwater Spotted gum EEC.	NPWS,	1.4	1.0
SZ 121	3A	Mt Ku-ring-gai North	• To assist with the strategic control of bushfires and the protection of assets in Mt Ku-ring-gai	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Hornsby SC.,	46.3	2.6
SZ 122	3A	North Turramurra West	• To assist with the strategic control of bushfires and the protection of assets in North Turramurra	• Assess requirement for prescribed burn between 8–14 years post fire. • Maintain appropriate fire regimes for Duffys Forest EEC and *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Ku-ring-gai C., Dept. Lands,	67.2	11.6
SZ 123	3F	Mackerel Beach	• To assist with the strategic control of bushfires and the protection of assets in Great Mackerel Beach	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS,	176.3	9.5
SZ 124	3F	Gayimai Track	• To assist with the strategic control of bushfires and the protection of assets in West Head	• Assess requirement for prescribed burn at 7–12 year intervals.	NPWS,	5.7	1.0
SZ 125	3A & 3B	Timbarra Rd West	• To assist with the strategic control of bushfires and the protection of assets in St Ives Chase	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS, Ku-ring-gai C., Dept. Lands,	54.1	10.4
SZ 126	3B & 3C & 3F	Akuna Bay Carpark	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	1.7	0.0
SZ 127	3A	Apple Tree Bay	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	2.6	0.0
SZ 128	3G	Barrenjoey Lighthouse	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.3	0.0
SZ 129	3A	Bobbin Head Picknic Area	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	5.0	0.4
SZ 130	3A	DEC Mt Colah House	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.2	0.0
SZ 131	3C & 3F	Elvina Bay Comunity C	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.0	2.1
SZ 132	3C & 3F	Elvina Bay Comunity G	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.0	0.8
SZ	3B & 3C	Illawong Bay	• To provide a safe area for the public and	• Assess requirement for slashing, trittering or under-	NPWS,	1.1	0.1

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
133	& 3F		firefighters in the event of a bushfire.	scrubbing at 1- 2 year intervals.			
SZ 134	3A	Kalkari Visitor Centre	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	4.1	0.0
SZ 135	3C & 3F	Little Lovett Bay Community B	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.0	1.0
SZ 136	3C & 3F	Morning Bay Community D	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.1	1.1
SZ 137	3C & 3F	Morning Bay Community I	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.0	0.8
SZ 138	3A	Mt Colah Depot	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	2.7	0.0
SZ 139	3F	Resolute House	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	1.0	0.0
SZ 140	3A	Sydney North Regional Office	• To assist with the protection of assets from bushfire damage.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.7	0.2
SZ 141	3F	The Basin Camping Ground	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	4.7	0.0
SZ 142	3G	Barrenjoey Headland	• To provide a safe area for the public and firefighters in the event of a bushfire.	• Assess requirement for slashing, trittering or under-scrubbing at 1- 2 year intervals.	NPWS,	0.5	0.0
SZ 143	3E	Brooklyn Dam E	• To assist with the strategic control of bushfires and the protection of assets in Brooklyn	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC.,	0.0	2.8

Heritage Area Management Zones (HAMZ)

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
HZ 1	3A	Alison Trig	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	66.9	2.2
HZ 2	3F	America Bay	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	2.3	0.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				• Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.			
HZ 3	3F	America Bay A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	99.7	0.4
HZ 4	3F	America Bay B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	90.0	1.8
HZ 5	3A	Appletree Bay Road	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20–60 years within zone	NPWS,	3.0	0.0
HZ 6	3G	Barrenjoey Headland	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for *Themeda* grassland EEC.	NPWS, Dept. Lands,	26.7	0.8
HZ 7	3A & 3D	Beaumont Rs East B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	154.8	10.7
HZ 8	3A	Birrawanna Loop	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Closed forest/ Gully Forest Communities and *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	105.4	1.5
HZ 9	3A	Bobbin Head Road	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	3.6	1.1
HZ 10	3A & 3B	Bobbin Hesd Track East	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	170.9	0.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
HZ 11	3C & 3F	Castle Bay Creek	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	60.5	0.0
HZ 12	3B & 3C & 3F	Centre Track East	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	138.1	4.1
HZ 13	3F	Challenger Head	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	89.8	5.2
HZ 14	3A	Chase Trail	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC and *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	68.0	0.0
HZ 15	3B, 3C, 3D & 3F	Christmas Tree Hill	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC and Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	245.9	6.3
HZ 16	3B & 3C & 3F	Coal and Candle Creek	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20–60 years within zone	NPWS,	5.7	1.1
HZ 17	3D	Cowan Railway Easement	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC and Closed forest/ Gully Forest Communities.	NPWS, Dept. Lands,	11.2	8.7
HZ 18	3F	Currawong Beach	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS,	66.3	22.0
HZ 19	3B, 3C, 3D & 3F	Ellis Trig	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS,	374.8	13.1

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				• Maintain appropriate fire regimes Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.			
HZ 20	3C & 3F	Elvina Bay Car Park	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 8–14 years post fire. Maintain appropriate fire regimes for *Eucalyptus camfieldii.*	NPWS,	0.3	0.2
HZ 21	3F	Flint and Steel Bay	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	11.1	0.0
HZ 22	3F	Flint and Steel Bay	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	171.1	0.6
HZ 23	3A	Gibberagong	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Maintain appropriate fire regimes for Duffys Forest EEC and *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	140.4	0.8
HZ 24	3B	Golf Links East	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Dept. Lands,	16.7	2.0
HZ 25	3B & 3F	Golf links North	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS,	37.5	0.3
HZ 26	3B, 3C, 3D & 3F	Hungry Trig	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	269.8	2.1
HZ 27	3A & 3B	Jacomb Track	• To maintain appropriate land management regimes to conserve natural and cultural	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	44.0	0.0

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
			heritage features	• Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.			
HZ 28	3A & 3B	Kierans Creek	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	260.9	29.2
HZ 29	3F	Koolewong	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities, Dyke Vegetation and for *Themeda* grassland EEC..	NPWS,	106.4	0.2
HZ 30	3G	Lion Island	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20-60 years within zone • Where possible suppress all fires as quickly as possible to prevent the entire island being burnt and to reduce effects of fire on ecological values. • Assess and monitor impacts of fire regimes on Little Penguin (*Eudyptula minor*) population.	NPWS,	11.8	0.0
HZ 31	3A, 3B, 3D & 3F	Long Trail	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC and Closed forest/ Gully Forest Communities.	NPWS,	327.7	0.0
HZ 32	3F	Longnose Point	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities.	NPWS,	69.2	2.5
HZ 33	3F	Mackerel Beach North	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS,	37.9	1.5
HZ 34	3C & 3F	McCarrs Creek North	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Pittwater	NPWS,	225.5	13.9

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				Spotted gum EEC and for *Eucalyptus camfieldii.* • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.			
HZ 35	3C & 3F	McCarrs Creek South	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20–60 years within zone	NPWS, Dept. Lands,	1.0	8.8
HZ 36	3A	Mills Park Asquith	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Hornsby SC., Dept. Lands,	3.3	16.0
HZ 37	3C & 3F	Morning Bay Creek	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	345.5	3.0
HZ 38	3A	Mt Colah F3 Off Ramp A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns). • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	1.1	1.1
HZ 39	3A	Mt Ku-ring-gai North D	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	27.8	0.0
HZ 40	3A	Myall Rd Mt Colah A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	0.1	4.4
HZ 41	3B	Napyula B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Dept. Lands,	5.2	0.9
HZ 42	3A & 3B	Napyula St A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS, Dept. Lands,	9.9	1.6

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				• Maintain appropriate fire regimes for Duffys Forest EEC.			
HZ 43	3G	Palm Beach	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	0.5	0.7
HZ 44	3F	Portuguese Beach	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	41.4	1.5
HZ 45	3C & 3D & 3F	Refuge Bay	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	634.3	1.9
HZ 46	3A & 3B	Ryland A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS,	40.7	0.0
HZ 47	3A & 3B	Ryland B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Ku-ring-gai C.,	106.4	0.0
HZ 48	3A & 3B	Ryland C	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns)	NPWS, Ku-ring-gai C.,	52.1	8.9
HZ 49	3C & 3F	Salvation Loop	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	70.7	0.8
HZ 50	3D & 3E & 3F	Seymours Creek A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS,	2.9	0.6
HZ 51	3D & 3E & 3F	Seymours Creek B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS, Hornsby SC.,	47.4	4.3

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
HZ 52	3D & 3E & 3F	Seymours Creek C	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Dept. Lands,	0.0	15.9
HZ 53	3E & 3G	Spectacle Island	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20-60 years within zone • Where possible suppress all fires as quickly as possible to prevent the entire island being burnt and to reduce effects of fire on ecological values. • Assess and monitor impacts of fire regimes on significant species.	NPWS,	46.9	0.0
HZ 54	3A & 3B	Sphinx Track	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	15.7	0.0
HZ 55	3B & 3C & 3D	Tabar Trig	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	184.0	4.3
HZ 56	3F	The Basin Creek	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	263.9	2.8
HZ 57	3A	Ticket Box	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC and *Persoonia mollis ssp. maxima*. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS, Dept. Lands,	81.6	4.6
HZ 58	3A & 3B	Timbarra Rd West B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	7.3	0.0
HZ 59	3B & 3C & 3F	Waratah Track	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes Closed forest/	NPWS, Dept. Lands,	437.1	3.7

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				Gully Forest Communities and for *Eucalyptus camfieldii.* • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.			
HZ 60	3A & 3B	Warrimoo Track	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20–60 years within zone • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	15.9	0.0
HZ 61	3F	West Head Beach	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	8.9	0.6
HZ 62	3F	West Head Loop	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	2.5	0.0
HZ 63	3B & 3D & 3F	Wilkins North	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	83.5	0.0
HZ 64	3A & 3B & 3D	Windybanks Ridge	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities.	NPWS,	213.6	6.2
HZ 65	3C & 3F	Yeomans Creek A	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities. • Assess and monitor impacts of fire regimes on Southern Brown Bandicoot population.	NPWS,	446.3	1.4
HZ 66	3C & 3D & 3F	Yeomans Creek B	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	207.3	0.0
HZ 67	3E & 3G	Long Island East	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20-60 years within zone • Where possible suppress all fires as quickly as possible to prevent the entire island being burnt and to reduce effects of fire on ecological values. • Encourage Telstra and Rail Infrastructure Corporation (RIC) to continue to undertake fuel	NPWS, Hornsby SC.,	40.6	2.4

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
				reduction measures around their assets on their lands that are adjacent to the reserve boundary; • Assess and monitor impacts of fire regimes on significant species.			
HZ 68	3E & 3G	Long Island West	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Where practicable, maintain fire intervals between 20-60 years within zone • Where possible suppress all fires as quickly as possible to prevent the entire island being burnt and to reduce effects of fire on ecological values. • Assess and monitor impacts of fire regimes on significant species.	NPWS, Hornsby SC.,	26.2	7.3
HZ 69	3D & 3E & 3F	Tunnel 1	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS, Hornsby SC.,	10.9	23.1
HZ 70	3D & 3E & 3F	Millicent Trig D1	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 10–18 years post fire (consider alternating broad area and edge burns).	NPWS,	3.9	3.6
HZ 71	3D & 3E & 3F	Cowan Substation	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	8.2	12.9
HZ 72	3D & 3E & 3F	Wedgewood Trail	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between at 12–20 years post fire (consider alternating broad area and edge burns) • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities.	NPWS,	9.4	35.6
HZ 73	3D & 3E & 3F	Shark Rock Ridge	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes Closed forest/ Gully Forest Communities.	NPWS, Dept. Lands,	1303.1	25.6
HZ 74	3D & 3E & 3F	Govett Ridge/ Porto Ridge/ Campbells Crater	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC and Diatreme Vegetation.	NPWS,	1572.0	25.8
HZ 75	3F	Resolute	• To maintain appropriate land management regimes to conserve natural and cultural heritage features	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event.	NPWS,	64.3	0.0
			•	•			

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Ha. on Park	Ha. Off park
HZ 76	3A, 3B, 3D & 3F	Mount Murray Anderson	• To assist with the strategic control of bushfires and the protection of assets in Duffys Forest	• Assess requirement for prescribed burn between 15–30 years post fire or opportunistic burn by unplanned bushfire event. • Maintain appropriate fire regimes for Duffys Forest EEC.	NPWS,	626.8	0.0
HZ 77	3A	Mt Ku-ring-gai Aboriginal Area	• To maintain appropriate land management regimes to conserve natural and cultural heritage	• Assess requirement for prescribed burn between 15-30 years post fire or opportunistic burn by unplanned	NPWS,	0.6	1.0

Tenure[1] - All attempts have been made to ensure the accuracy of tenures identified. The tenures identified in the Table are not guaranteed to be free from error or omission. Where discrepancies are identified the Department of Environment and Conservation (NSW) will negotiate on a case by case basis the appropriate management responsibilities for the management zone with the relevant parties. Changes to the details may be incorporated during subsequent revisions of the strategy.

APPENDIX 8: FIRE BREAK REGISTER

Note: for the purpose of this Fire Management Strategy fire breaks are considered Strategic Fire Advantage Zones (SFAZ)

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Length (m)
FB 1	3A	Murrua Rd to Gwydir Av	• To provide safe access for fire agency crews and to assist in the protection of assets in North Turramurra	• Maintain existing fire break by slashing , tritter or underscrubing as required	NPWS, Ku-ring-gai C., Private Lands	683.4
FB 2	3A	The Landings to Murrua Rd B	• To provide safe access for fire agency crews and to assist in the protection of assets in North Turramurra	• Maintain existing fire break by slashing , tritter or underscrubing as required	NPWS, Private Lands	200.6
FB 3	3A	Curagal Rd to Huon Park	• To provide safe access for fire agency crews and to assist in the protection of assets in North Turramurra	• Maintain existing fire break by slashing , tritter or underscrubing as required	Private Lands	267.5

Tenure[1] - All attempts have been made to ensure the accuracy of tenures identified. The tenures identified in the Table are not guaranteed to be free from error or omission. Where discrepancies are identified the Department of Environment and Conservation (NSW) will negotiate on a case by case basis the appropriate management responsibilities for the fire break with the relevant parties. Changes to the details may be incorporated during subsequent revisions of the strategy.

APPENDIX 9: ACCESS TRAIL REGISTER

Note: the Fire Management Strategy Maps 3A – 3F illustrate the proposed BFCC Class for access trails within the reserves. These maps do not reflect the current accessibility of access trails and should not be used as operational maps. During operations local knowledge representatives should be contacted in order to determine the current accessibility of access trails.

Map ID	Map No	Name	Current accessibility	Proposed BFCC Class	Strategy	Tenure[1]	Length (m)
T 1	3F	Bairn Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	2552.2
T 2	3F	Basin Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	2862.8
T 3	3A	Beaumont Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1557.7
T 4	3A & 3B	Bibbenluke Sth Branch Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	418.1
T 5	3A & 3B	Bibbenluke Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Dept. Lands,	1386.6
T 6	3A & 3B	Birramal To Bibbenluke Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	864.2
T 7	3A	Birrawanna Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Energy Australia,	1157.4
T 8	3A	Bobbin Head Trail	Closed	Closed Trail	• Assess requirements to upgrade or maintain to Closed Trail standard	NPWS,	5164.0
T 9	3C & 3F	Bona Cr	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	1159.8
T 10	3A & 3B	Booralie Namba Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	847.8
T 11	3E	Brooklyn Dam North Branch 2 Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS, Hornsby SC., State Rail,	1015.9
T 12	3E	Brooklyn Dam North 2 Trail	Cat 7	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Hornsby SC., State Rail,	281.2
T 13	3E	Brooklyn Dam North Branch 1 Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS, Hornsby SC., State Rail,	242.4
T 14	3D & 3E & 3F	Brooklyn Dam South Branch 2 Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS, State Rail,	3261.5
T 15	3E	Brooklyn Dam Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	4887.4
T 16	3A & 3B	Bulara St	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	148.9
T 17	3B & 3C & 3F	Centre Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	3317.7

Map ID	Map No	Name	Current accessibility	Proposed BFCC Class	Strategy	Tenure[1]	Length (m)
T 18	3F	Challenger Branch Trail	Closed	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	489.7
T 19	3F	Challenger Trail	Cat 1	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1535.0
T 20	3A	Chase Trail	Cat 1	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1203.6
T 21	3A	Chelmsford Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Dept. Lands,	579.5
T 22	3C	Chiltern North Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1206.3
T 23	3C	Chiltern Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	1602.6
T 24	3B	Coonawarra Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	424.5
T 25	3B	Cooyong (Neverfail) Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1123.8
T 26	3B	Cooyong - Amuna Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	1809.2
T 27	3D &3E	Cowan substation railway complex Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1195.2
T 28	3D & 3E & 3F	Cowan Railway Tunnel 1 Trail	Closed	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1277.9
T 29	3D & 3E & 3F	Cowan Railway Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	233.8
T 30	3A & 3B & 3F	Cowan Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	3031.4
T 31	3A & 3B	Cullamine Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	869.4
T 32	3A	Deadmans Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Energy Australia,	646.3
T 33	3C	Duckholes Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	2746.8
T 34	3B & 3C & 3F	Ellis Trig Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	82.9
T 35	3C & 3F	Elvina Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	1964.4
T 36	3F	Euro Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	879.5
T 37	3A	Gibberagong Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Dept. Lands,	1380.6
T 38	3C	Gilwinga Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Dept. Lands,	259.2

Map ID	Map No	Name	Current accessibility	Proposed BFCC Class	Strategy	Tenure[1]	Length (m)
T 39	3A	Gywdir to Samuel King Oval Trail	Cat 7	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Ku-ring-gai C.,	2429.6
T 40	3B & 3C & 3F	Hungary Trail	Cat 9	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1641.7
T 41	3A	Huon Park Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	246.6
T 42	3A	Jacombs Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	829.3
T 43	3D & 3E & 3F	Jeresalem Bay Trail	Cat 7	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1325.3
T 44	3A	Ku-ring-gai Chase Road Branch 2 Trail	Closed	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS, Energy Australia,	464.7
T 45	3A	Ku-ring-gai Chase Road Branch 1 Trail	Closed	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	559.7
T 46	3B & 3C & 3F	Liberator General san Martin Powerline Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS, Energy Australia,	245.1
T 47	3B, 3C, 3D & 3F	Long Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	3305.0
T 48	3F	Lookout Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	961.8
T 49	3F	Mackerel North Trail	Cat 1	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	656.8
T 50	3F	Mackerel Trail	Cat 7	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1147.5
T 51	3C & 3F	Morning Bay Wharf Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	141.2
T 52	3A	Mt Kuring-gai Oval Powerline Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS, Dept. Lands, Hornsby SC.,	1316.4
T 53	3A	Mt Kuring-gai Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS, Dept. Lands,	969.2
T 54	3A	Murrua Powerline Branch Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	651.7
T 55	3A	Murrua Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	4858.2
T 56	3A	Myall Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1391.8
T 57	3A & 3B	Napulya St	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	52.8

Map ID	Map No	Name	Current accessibility	Proposed BFCC Class	Strategy	Tenure[1]	Length (m)
T 58	3B & 3C	Nerang Trail	Cat 1	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1005.3
T 59	3A & 3B	Perimeter Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	7016.4
T 60	3A	Powerline Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1392.0
T 61	3F	Resolute Dam Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1349.9
T 62	3F	Resolute Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	2053.3
T 63	3B	Ryland East Trail	Closed	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	975.2
T 64	3A & 3B	Ryland Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	2807.6
T 65	3B	Ryland Trail West Branch 1 Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	499.1
T 66	3B	Ryland Trail West Branch 2 Trail	Cat 7	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	830.9
T 67	3C & 3F	Salvation Loop Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	3187.6
T 68	3B	Sandy Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	2992.9
T 69	3B	Short Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	317.0
T 70	3A & 3B	Show Ground Pistol Club Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1527.7
T 71	3A & 3B	Slade Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	742.4
T 72	3B & 3C	Smiths Creek East Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	908.6
T 73	3B	Smiths Creek West Trail	Cat 7	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	2732.3
T 74	3F	Soldiers Point Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1315.0
T 75	3A	Sphinx Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1480.8
T 76	3C & 3F	Studee Lane	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	762.8
T 77	3B & 3C	TerreyHills Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	1937.4
T 78	3F	Topham Trail	Cat 7	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1873.6
T 79	3C & 3F	Towlers Bay RFS	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS, Dept. Lands,	207.0

Map ID	Map No	Name	Current accessibility	Proposed BFCC Class	Strategy	Tenure[1]	Length (m)
		Branch Trail					
T 80	3C & 3F	Towlers Bay Trail	Cat 1	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	3787.5
T 81	3B & 3C	Valet Carpark Trail	Cat 1	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	297.3
T 82	3C & 3F	Wallaroo Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	2902.7
T 83	3C & 3F	Waratah North Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	403.3
T 84	3C & 3F	Waratah Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	4704.8
T 85	3A & 3B	Warrimoo Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	1350.1
T 86	3A & 3B	Warrimoo Trail Branch	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	381.3
T 87	3B & 3F	Wilkins Trail	Cat 1	Secondary	• Assess requirements to upgrade or maintain to Secondary standard	NPWS,	644.9
T 88	3C & 3F	Willunga Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	735.2
T 89	3A & 3D	Windybanks Trail	Cat 7	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	479.2
T 90	3C & 3F	Wirrungalla Trail	Cat 7	Primary	• Assess requirements to upgrade or maintain to Primary standard	NPWS,	1228.1
T 91	3C & 3F	Yeomans Branch Trail	Cat 1	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	1544.4
T92	3A & 3B	Duffys Warf Track	Walking Track	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	666.6
T93	3B	Cooyong (Neverfail North	Walking Track	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	204.1
T94	3B	Cooyong (Neverfail) South	Walking Track	Dormant	• Assess requirements to upgrade or maintain to Dormant standard	NPWS,	11123.2

Tenure[1] - All attempts have been made to ensure the accuracy of tenures identified. The tenures identified in the Table are not guaranteed to be free from error or omission. Where discrepancies are identified the Department of Environment and Conservation (NSW) will negotiate on a case by case basis the appropriate management responsibilities for vehicular access trails with the relevant parties. Changes to the details may be incorporated during subsequent revisions of the strategy.

APPENDIX 10: INTERFACE SURVEY AND ASSESSMENT

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Length (m)
IS 1	3A	Church St to King St	• To provide safe access for fire agency crews and to assist in the protection of assets in Mt Ku-ring-gai East	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands,	353.9
IS 2	3D & 3E	Cowan Sub Station	• To provide safe access for fire agency crews and to assist in the protection of assets in Cowan	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	Private Lands,	440.3
IS 3	3A	Curtin Av	• To provide safe access for fire agency crews and to assist in the protection of assets in North Wahroonga	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Ku-ring-gai C., Private Lands,	1083.6
IS 4	3C	Gilwinga Dr	• To provide safe access for fire agency crews and to assist in the protection of assets in Church Point	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands,	537.4
IS 5	3A	Halversens Marina	• To provide safe access for fire agency crews and to assist in the protection of assets in Bobbin Head	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands	384.2
IS 6	3A	King St to Blackwood Av	• To provide safe access for fire agency crews and to assist in the protection of assets in Mt Ku-ring-gai East	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands,	560.6
IS 7	3B & 3C	McCarrs Creek Road A	• To provide safe access for fire agency crews and to assist in the protection of assets in TerreyHills	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands,	509.9
IS 8	3B & 3C	Nerang Av to Booralie Rd	• To provide safe access for fire agency crews and to assist in the protection of assets in TerreyHills	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands	488.3
IS 9	3B & 3C	Nerang Av to McCarrs Creek Rd	• To provide safe access for fire agency crews and to assist in the protection of assets in TerreyHills	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands,	1014.1
IS 10	3A	Seaview St to Harwood Av A	• To provide safe access for fire agency crews and to assist in the protection of assets in Mt Ku-ring-gai East	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	Hornsby SC., NPWS, Private Lands,	509.1
IS 11	3A	Seaview St to Harwood Av B	• To provide safe access for fire agency crews and to assist in the protection of assets in Mt Ku-ring-gai East	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands	85.8
IS 12	3C & 3F	Elvina Bay Community	• To provide safe access for fire agency crews and to assist in the protection of assets in Elvina Bay	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	Private Lands	86.4
IS 13	3D & 3F	Cowan Drive	• To provide safe access for fire agency crews	• Consult with land managers/ Survey to	NPWS, Private Lands	656.2

Map ID	Map No.	Name	Objective	Strategy	Tenure[1]	Length (m)
			and to assist in the protection of assets in Cottage Point	determine current accessibility/ Assess feasibility of works		
IS 14	3D & 3F	Notting Lane	• To provide safe access for fire agency crews and to assist in the protection of assets in Cottage Point	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands	418.5
IS 15	3A	North Turramurra High School	• To provide safe access for fire agency crews and to assist in the protection of assets in Cottage Point	• Consult with land managers/ Survey to determine current accessibility/ Assess feasibility of works	NPWS, Private Lands	343.9

Tenure[1] - All attempts have been made to ensure the accuracy of tenures identified. The tenures identified in the Table are not guaranteed to be free from error or omission. Where discrepancies are identified the Department of Environment and Conservation (NSW) will negotiate on a case by case basis the appropriate management responsibilities for vehicular access trails with the relevant parties. Changes to the details may be incorporated during subsequent revisions of the strategy.

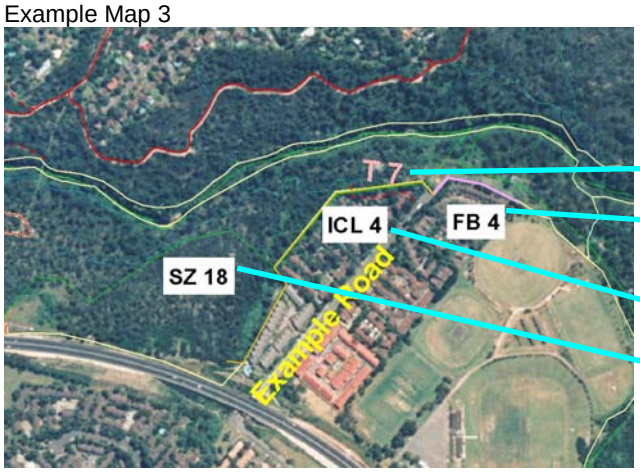
NATIONAL PARKS AND WILDLIFE SERVICE

43 Bridge Street
Hurstville
NSW
Australia 2220

Guide to interpreting the fire management strategy maps

Step 1 – Locate the area of interest on the Fire management strategy Map 3

Example Map 3



Step 2 - Identify the Map features and Map references

For example in the example map the following map features are identified

T7 – Vehicle Trail 7

FB 4 – Fire Break 4

IS4 – Interface survey 4

SZ 18 – Strategic fire management zone 18

Step 3 – refer to the appropriate appendix in the Fire Management Strategy to find the proposed management for the feature.

For SZ 18 – Strategic fire management zone 18 in the map refer to Appendix 7.

Appendix 7: Fire Management Zones

Map ID	Map No.	Name	Objective	Strategy	Tenure	Ha. on Park	Ha. Off park
SZ 18	3A	Example Road	To assist with the strategic control of bushfires and the protection of assets in Example Town	Assess requirement for prescribed burn between 8–14 years post fire.	NPWS,	13.2	7.9

For FB 4 – Fire Break 4 in the map refer to Appendix 8.

Appendix 8: Fire Break Register

Map ID	Map No.	Name	Objective	Strategy	Tenure	Length (m)
FB 4	3A	Example Rd East	To provide safe access for fire agency crews and to assist in the protection of assets in Example Town	Maintain existing fire break by slashing , tritter or underscrubing as required	NPWS, Private Lands	168.4

For T7 – Vehicle Trail 7 in the map refer to Appendix 9

Appendix 9: Access Trail register

Map ID	Map No	Name	Current accessibility	Proposed BFCC Class	Strategy	Tenure	Length (m)
T 7	3A	Example Rd Powerline Trail	Cat 7	Secondary	Assess requirements to upgrade or maintain to Dormant standard	NPWS,	143.7

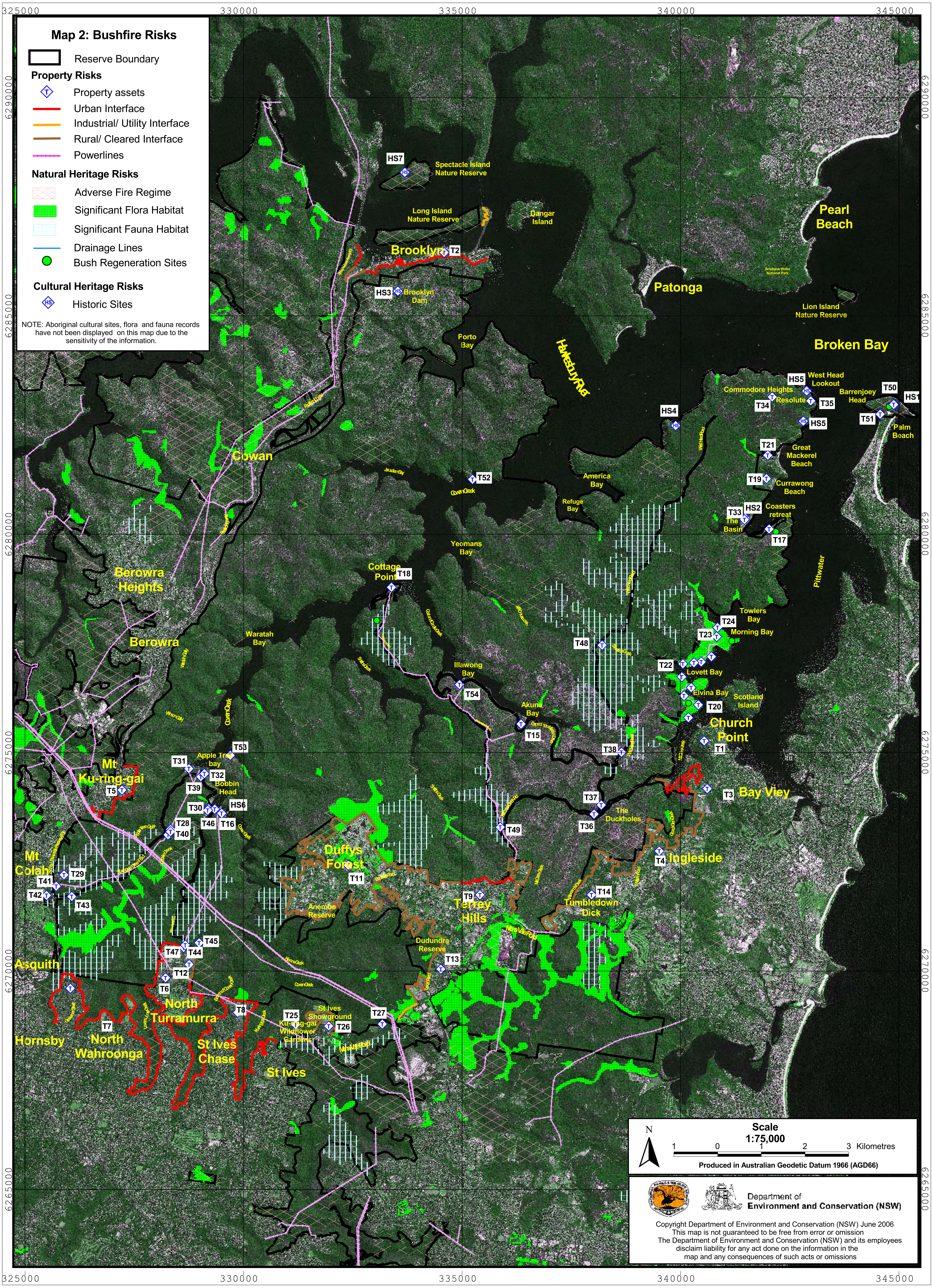
For IS4 – Interface survey refer to Appendix 10

Appendix 10: Interface Survey and Assessment

Map ID	Map No.	Name	Objective	Strategy	Tenure	Length (m)
IS 4	3A	Example Road West	To provide safe access for fire agency crews and to assist in the protection of assets in Example Town	Consultation with other agencies private landholders/ Survey to determine accessibility and feasibility of works	NPWS, Private Lands	572.2

Map 2: Bushfire Risks

Map 3A – 3F: Fire Management Strategies


Map 2: Bushfire Risks
Reserve Boundary
Property Risks
Property assets
Urban Interface
Industrial/ Utility Interface
Rural/ Cleared Interface
Powerlines
Natural Heritage Risks
Adverse Fire Regime
Significant Flora Habitat
Significant Fauna Habitat
Drainage Lines
Bush Regeneration Sites
Cultural Heritage Risks
Historic Sites
NOTE: Aboriginal cultural sites, flora and fauna records have not been displayed on this map due to the sensitivity of the information.
325000
330000
335000
340000
345000
6290000
6285000
6280000
6275000
6270000
6265000
Spectacle Island Nature Reserve
Long Island Nature Reserve
Dangar Island
Brooklyn
Brooklyn Dam
Pearl Beach
Patonga
Lion Island Nature Reserve
Broken Bay
Porto Bay
Hawkesbury River
Cowan
West Head Lookout
Commodore Heights
Resolute
Barrenjoey Head
Palm Beach
America Bay
Refuge Bay
Great Mackerel Beach
Currawong Beach
Coasters retreat
The Basin
Pittwater
Yeomans Bay
Cottage Point
Berowra Heights
Berowra
Waratah Bay
Illawong Bay
Akuna Bay
Towlers Bay
Morning Bay
Lovett Bay
Elvina Bay
Scotland Island
Church Point
Bay View
Mt Ku-ring-gai
Apple Tree bay
Bobbin Head
The Duckholes
Ingleside
Mt Colah
Duffys Forest
Anembo Reserve
Terrey Hills
Tumbledown Dick
Dudundra Reserve
Asquith
Hornsby
North Wahroonga
North Turramurra
St Ives Chase
St Ives
St Ives Showground
Ku-ring-gai Wildflower Garden
HS1
HS2
HS3
HS4
HS5
HS6
HS7
T1
T2
T3
T4
T5
T6
T7
T8
T9
T11
T12
T13
T14
T15
T16
T17
T18
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325000 330000

Map 3A: Fire Management Strategies

NPWS Office/ Depots
Reserve Boundary
Fire Management Zones (SZ or HZ)
Zone boundary
Fire Breaks (FB)
Proposed maintanace
Access Trails (T)
Proposed Primary
Proposed Secondary
Proposed Dormant
Other access
Public or Private Access
Walking Track
Interface Survey (IS)
Proposed survey
Fire Control Advantages
Helipad
WH Helicopter Water Point
WV Vehicle Water Point

NOTE: The development of fire management strategies for the reserve(s) has resulted in the identification of zones, fire trails, fire breaks and other strategies that extend beyond the boundaries of the reserve onto adjoining land tenures. The implementation of strategies for adjoining lands, is suggested only and requires the approval of relevant land managers and the relevant Bush Fire Management Committee (BFMC).

N

Scale 1:25,000

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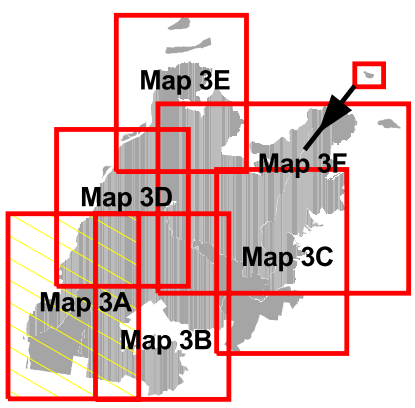
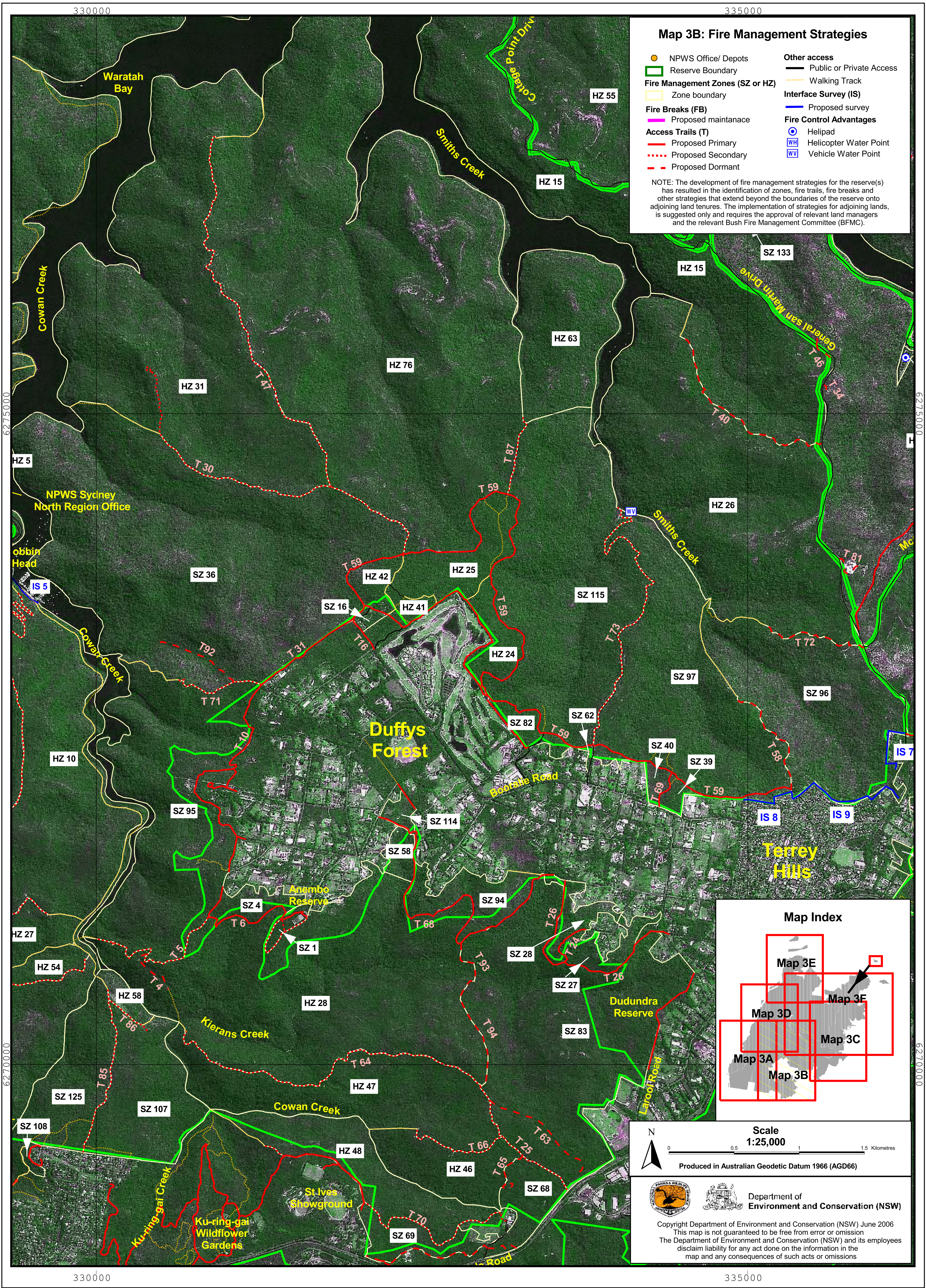
Department of **Environment and Conservation (NSW)**

Map Index



Berowra
Waratah Gully
Waratah Bay
HZ 64
T 89
Winson Gully
HZ 7
Cowan Creek
T 3
SZ 86
HZ 39
HZ 31
T 47
HZ 77
SZ 121
T 53
SZ 127
Apple Tree bay
HZ 5
T 30
IS 11
IS 10
Mt Ku-ring-gai
SZ 75
NPWS Sydney North Region Office
IS 1
SZ 2
SZ 140
SZ 61
Bobbin Head
IS 6
T 1
IS 5
SZ 36
Apple Tree Creek
SZ 134
HZ 8
Cowan Creek
T92
T 71
T 10
Mt Colah
SZ 81
SZ 87
NPWS Lower Hawkesbury Office
Sydney - Newcastle Freeway (F3)
T 52
NPWS Mt Colah Depot
T 56
T 60
T 44
Cockle Creek
SZ 138
Ku-ring-gai Chase Road
SZ 38
HZ 10
SZ 74
SZ 60
HZ 1
SZ 5
T 8
SZ 95
HZ 40
SZ 60
T 32
T 45
HZ 23
HZ 38
T 54
HZ 14
SZ 106
Bobbin Head Road
T 42
SZ 4
T 6
T 20
HZ 57
SZ 6
HZ 27
T 21
SZ 99
T 5
SZ 77
T 55
SZ 104
HZ 54
SZ 41
SZ 78
T 75
HZ 58
SZ 79
IS 15
SZ 37
T 4
SZ 26
T 86
SZ 80
FB 2
Kierans Creek
HZ 36
T 37
Asquith
SZ 17
SZ 122
SZ 84
T 85
IS 3
FB 1
T 41
SZ 125
SZ 107
T 39
FB 3
SZ 52
SZ 108
Grosvenor Street
Lovers Jump Creek
North Turramurra
Branch of Cowan Creek
Ku-ring-gai Creek
Ku-ring-gai Wildflower Gardens

6275000 6270000


Map 3B: Fire Management Strategies
NPWS Office/ Depots
Reserve Boundary
Fire Management Zones (SZ or HZ)
Zone boundary
Fire Breaks (FB)
Proposed maintanace
Access Trails (T)
Proposed Primary
Proposed Secondary
Proposed Dormant
Other access
Public or Private Access
Walking Track
Interface Survey (IS)
Proposed survey
Fire Control Advantages
Helipad
Helicopter Water Point
Vehicle Water Point
NOTE: The development of fire management strategies for the reserve(s) has resulted in the identification of zones, fire trails, fire breaks and other strategies that extend beyond the boundaries of the reserve onto adjoining land tenures. The implementation of strategies for adjoining lands, is suggested only and requires the approval of relevant land managers and the relevant Bush Fire Management Committee (BFMC).
330000
335000
6275000
6270000
Waratah Bay
Cowan Creek
Smiths Creek
Cottage Point Drive
General san Martin Drive
NPWS Sydney North Region Office
Duffys Forest
Terrey Hills
Booralie Road
Anembo Reserve
Kierans Creek
Dundundra Reserve
Laroona Road
Ku-ring-gai Creek
Ku-ring-gai Wildflower Gardens
St Ives Showground
HZ 55
HZ 15
SZ 133
HZ 63
HZ 76
HZ 31
HZ 5
HZ 26
HZ 25
HZ 42
HZ 41
HZ 24
SZ 16
SZ 36
SZ 115
SZ 97
SZ 96
SZ 82
SZ 62
SZ 40
SZ 39
HZ 10
SZ 95
SZ 114
SZ 58
SZ 94
SZ 4
SZ 1
SZ 28
SZ 27
HZ 27
HZ 54
HZ 58
HZ 28
SZ 83
HZ 47
SZ 125
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SZ 108
HZ 48
HZ 46
SZ 68
SZ 69
IS 5
IS 7
IS 8
IS 9
T 47
T 30
T 87
T 59
T 73
T 72
T 46
T 34
T 40
T 81
T 92
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T 71
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T 69
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T 24
T 6
T 5
T 4
T 86
T 85
T 68
T 93
T 94
T 64
T 63
T 66
T 25
T 65
T 70
Map Index
Map 3E
Map 3F
Map 3D
Map 3C
Map 3A
Map 3B
N
Scale
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1
1.5
Kilometres
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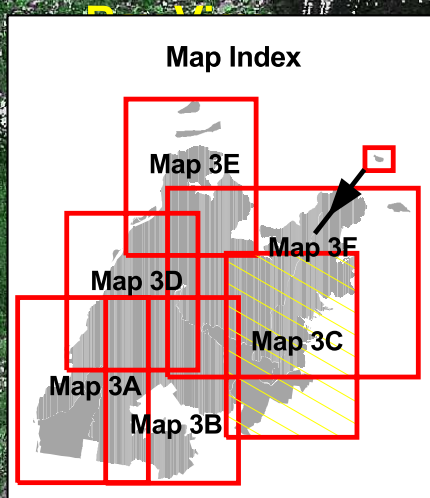
340000

6280000

6275000

HZ 56 · SZ 102 · SZ 141 · retreat · SZ 25 · The Basin · SZ 24 · T 74 · HZ 44 · T 78 · HZ 45 · T 82 · T 1 · HZ 11 · T 91 · West Head Road · HZ 37 · HZ 32 · T 48 · T 67 · HZ 49 · Yeomans Creek · SZ 7 · Towlers Bay · SZ 8 · SZ 111 · SZ 112 · Morning Bay · T 9 · SZ 9 · HZ 65 · T 80 · SZ 91 · SZ 109 · SZ 110 · Woody Point · T 83 · Salvation Creek · SZ 71 · SZ 118 · SZ 137 · SZ 72 · SZ 119 · SZ 64 · SZ 120 · SZ 135 · SZ 70 · SZ 93 · SZ 136 · SZ 90 · Lovett Bay · T 84 · SZ 92 · SZ 100 · T 76 · Elvina Bay · IS 12 · SZ 43 · SZ 47 · SZ 45 · SZ 131 · Scotland Island · T 35 · T 90 · SZ 46 · Akuna Bay · SZ 132 · General San Martin Drive · HZ 59 · West Head Road · Church Point · McCarrs Creek · HZ 34 · HZ 19 · HZ 35 · IS 4 · T 17 · McCarrs Creek Rd · HZ 12 · SZ 20 · SZ 23 · T 81 · T 22 · SZ 49 · SZ 50 · Cicada Glen Creek · SZ 21 · SZ 19 · The Duckholes · SZ 22 · T 23 · SZ 55 · SZ 103 · SZ 67 · SZ 18 · Ingleside · SZ 56 · T 77 · IS 7 · SZ 53 · McCarrs Creek · Chiltern Road · T 33 · Wirreanda Creek · SZ 101 · SZ 116 · SZ 54 · SZ 57 · SZ 113 · Tumbledown Dick · Mona Vale Road



Map 3C: Fire Management Strategies

- NPWS Office/ Depots
- Reserve Boundary

Fire Management Zones (SZ or HZ)
- Zone boundary

Fire Breaks (FB)
- Proposed maintanace

Access Trails (T)
- Proposed Primary
- Proposed Secondary
- Proposed Dormant

Other access
- Public or Private Access
- Walking Track

Interface Survey (IS)
- Proposed survey

Fire Control Advantages
- Helipad
- WH Helicopter Water Point
- WV Vehicle Water Point

NOTE: The development of fire management strategies for the reserve(s) has resulted in the identification of zones, fire trails, fire breaks and other strategies that extend beyond the boundaries of the reserve onto adjoining land tenures. The implementation of strategies for adjoining lands, is suggested only and requires the approval of relevant land managers and the relevant Bush Fire Management Committee (BFMC).

N

Scale 1:25,000

0 0.5 1 1.5 Kilometres

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Department of Environment and Conservation (NSW)

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Map 3D: Fire Management Strategies

- NPWS Office/ Depots
- Reserve Boundary

Fire Management Zones (SZ or HZ)
- Zone boundary

Fire Breaks (FB)
- Proposed maintanace

Access Trails (T)
- Proposed Primary
- Proposed Secondary
- Proposed Dormant

Other access
- Public or Private Access
- Walking Track

Interface Survey (IS)
- Proposed survey

Fire Control Advantages
- Helipad
- WH Helicopter Water Point
- WV Vehicle Water Point

NOTE: The development of fire management strategies for the reserve(s) has resulted in the identification of zones, fire trails, fire breaks and other strategies that extend beyond the boundaries of the reserve onto adjoining land tenures. The implementation of strategies for adjoining lands, is suggested only and requires the approval of relevant land managers and the relevant Bush Fire Management Committee (BFMC).

N

Scale 1:25,000

0 0.5 1 1.5 Kilometres

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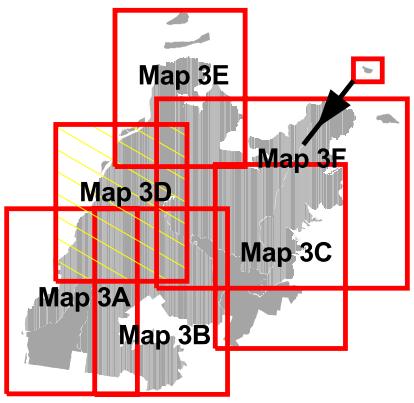
Department of **Environment and Conservation (NSW)**

Map Index



6280000

6275000

Pacific Highway
HZ 69
T 28
HZ 72
HZ 70
T 29
HZ 71
IS 2
T 27
T 43
Cowan
Sydney - Newcastle Freeway (Fa)
Jerusalem Bay
HZ 17
Pacific Highway
HZ 73
Cottage Point
SZ 31
SZ 32
SZ 34
SZ 33
SZ 35
SZ 30
IS 14
IS 13
SZ 85
SZ 29
Cottage Point Drive
Waratah Bay
HZ 55
Berowra
Waratah Gully
HZ 64
Smiths Creek
HZ 15
T 89
Cowan Creek
Winson Gully
HZ 7
T 3
HZ 39
HZ 63
HZ 76
HZ 31
T 47
SZ 121
T 53
SZ 127
Apple Tree bay
HZ 5
T 30
T 87
IS 10
SZ 75
NPWS Sydney North Region Office
SZ 140
SZ 2
T 59
SZ 61
Bobbin Head
T 59
SZ 36
HZ 42
HZ 25

330000

335000

Map 3E: Fire Management Strategies

- NPWS Office/ Depots
- Reserve Boundary

Fire Management Zones (SZ or HZ)
- Zone boundary

Fire Breaks (FB)
- Proposed maintanace

Access Trails (T)
- Proposed Primary
- Proposed Secondary
- Proposed Dormant

Other access
- Public or Private Access
- Walking Track

Interface Survey (IS)
- Proposed survey

Fire Control Advantages
- Helipad
- WH Helicopter Water Point
- WV Vehicle Water Point

NOTE: The development of fire management strategies for the reserve(s) has resulted in the identification of zones, fire trails, fire breaks and other strategies that extend beyond the boundaries of the reserve onto adjoining land tenures. The implementation of strategies for adjoining lands, is suggested only and requires the approval of relevant land managers and the relevant Bush Fire Management Committee (BFMC).

N

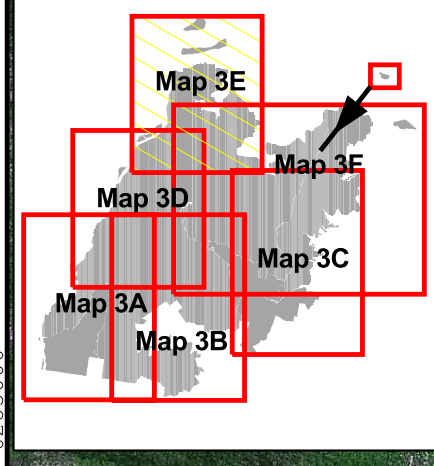
Scale 1:25,000

0 0.5 1 1.5 Kilometres

Produced in Australian Geodetic Datum 1966 (AGD66)

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

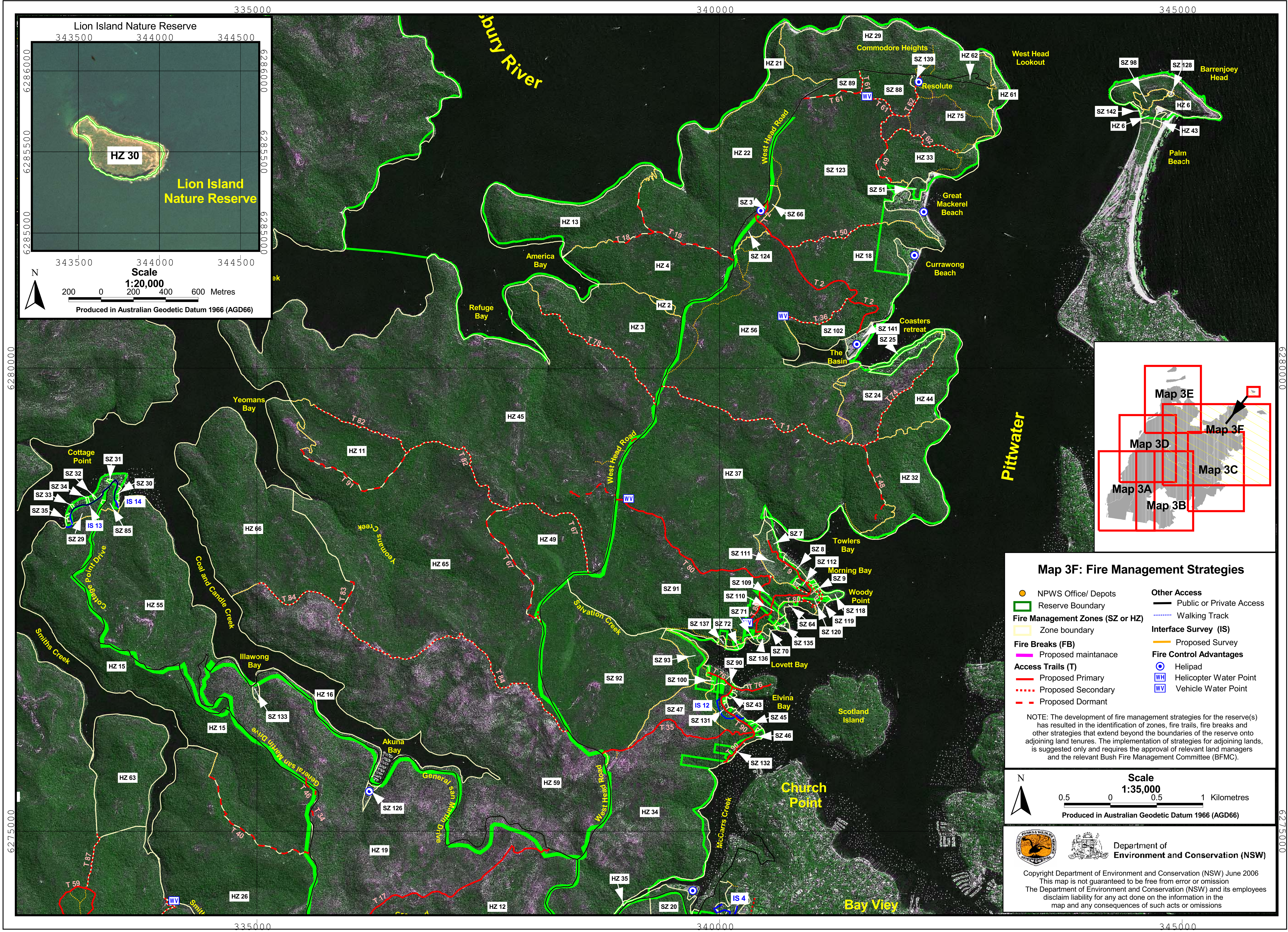
Map Index



Spectacle Island Nature Reserve
HZ 53
Long Island Nature Reserve
HZ 68
HZ 67
Dangar Island
Brooklyn
SZ 143
SZ 11
SZ 15
SZ 48
SZ 10
SZ 14
T 15
T 13
T 14
SZ 13
WH
WV
Brooklyn Dam
HZ 30
SZ 12
HZ 51
HZ 52
HZ 50
Porto Bay
Pacific Highway
HZ 69
T 28
HZ 72
HZ 70
T 29
HZ 71
T 27
T 43
HZ 74
Jerusalem Bay
Cowan Creek

6285000

335000


Map 3F: Fire Management Strategies
Lion Island Nature Reserve
HZ 30
Lion Island Nature Reserve
Scale 1:20,000
200 0 200 400 600 Metres
Produced in Australian Geodetic Datum 1966 (AGD66)
NPWS Office/ Depots
Reserve Boundary
Fire Management Zones (SZ or HZ)
Zone boundary
Fire Breaks (FB)
Proposed maintanace
Access Trails (T)
Proposed Primary
Proposed Secondary
Proposed Dormant
Other Access
Public or Private Access
Walking Track
Interface Survey (IS)
Proposed Survey
Fire Control Advantages
Helipad
Helicopter Water Point
Vehicle Water Point
NOTE: The development of fire management strategies for the reserve(s) has resulted in the identification of zones, fire trails, fire breaks and other strategies that extend beyond the boundaries of the reserve onto adjoining land tenures. The implementation of strategies for adjoining lands, is suggested only and requires the approval of relevant land managers and the relevant Bush Fire Management Committee (BFMC).
Scale 1:35,000
0.5 0 0.5 1 Kilometres
Produced in Australian Geodetic Datum 1966 (AGD66)
Map 3A
Map 3B
Map 3C
Map 3D
Map 3E
Map 3F
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Pittwater
Church Point
Scotland Island
Palm Beach
Barrenjoey Head
West Head Lookout
Commodore Heights
Great Mackerel Beach
Currawong Beach
Coasters retreat
The Basin
America Bay
Refuge Bay
Yeomans Bay
Cottage Point
Illawong Bay
Akuna Bay
Towlers Bay
Morning Bay
Woody Point
Lovett Bay
Elvina Bay
West Head Road
Salvation Creek
Coal and Candle Creek
Smiths Creek
McCarrs Creek
Cottage Point Drive
General San Martin Drive
Resolute