Fire Mitigation Plan

~ Pacific Palms ~

Great Lakes Council

September 2006

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EXECUTIVE SUMMARY

Great Lakes Council's, Fire Mitigation Plan – Pacific Palms has been prepared for the Pacific Palms and rural environs.

Funding through the Natural Disaster Risk Management Studies Programme assisted in the preparation of this report. The administration of the funding is with the NSW State Emergency Management Committee, through the Department of Transport and Regional Services (DOTARS).

Greater understanding of fire management planning by the community and planners provides a primary mechanism to protect life and property during fire events.

The areas mapped Bush Fire Prone Land guide fire management strategies in development assessment and strategic planning tools for hazard reduction works.

The bushfire mitigation program within this report identifies fire management zones such as asset protection zones, strategic fire advantage zones, land management zones, fire exclusion zones and highlights fire prevention and mitigation.

The management of hazardous fuels, or mitigation against imminent bushfires through cooperative education programs, reduces the risk to life and property throughout the area.

TABLE OF CONTENTS

TABLES

FIGURES

PART 1

Section 1-6

Background Information

SECTION 1

Introduction

Great Lakes Council has prepared this Fire Mitigation Plan to provide a comprehensive guide for fire management planning within Pacific Palms and rural environs. Council has the responsibility to manage community land in a manner that assists fire fighting authorities during fire operations and the protection of assets and life.

The Fire Mitigation Plan - Pacific Palms (the Plan) covers the villages of Elizabeth Beach, Blueys Beach and Boomerang Beach and encompasses Council land including road reserves and Crown land (managed by Council) in and around the villages environs. The plan considers management by other authorities, agencies, private property owners and existing management strategies.

The Plan provides fire management guidelines and incorporates statutory obligations to manage bushfire risks and to protect life and property.

Within the study area, the villages of Elizabeth Beach, Blueys Beach and Boomerang Beach, are situated on the coastal hinterland within Pacific Palms (Figure 1). Pacific Palms is accessed along the Lakes Way; north from Forster-Tuncurry and south from Bulahdelah. The coastal climate and the rural living setting within the Wallis Lake Region is also a well-known tourist destination.

The Pacific Palms area has been developed with residential properties amongst bushland areas and reserves for conservation and recreational use. Booti Booti National Park (BBNP), Wallis Lake and the South Pacific Ocean border the study area.

Toward the west much of the Wallis Lake is surrounded by vegetation (on private land, Council and Crown Land and in the national park), although fragmented from various land management practices, provided corridors for local flora and fauna.

Fire behaviour is greatly influenced by slope, aspect and fuel types. Understanding the effects of fire with forest types, fuel arrangements and knowing the influence of these on fire behaviour is important when assessing fire hazards and risks when planning fire management strategies.

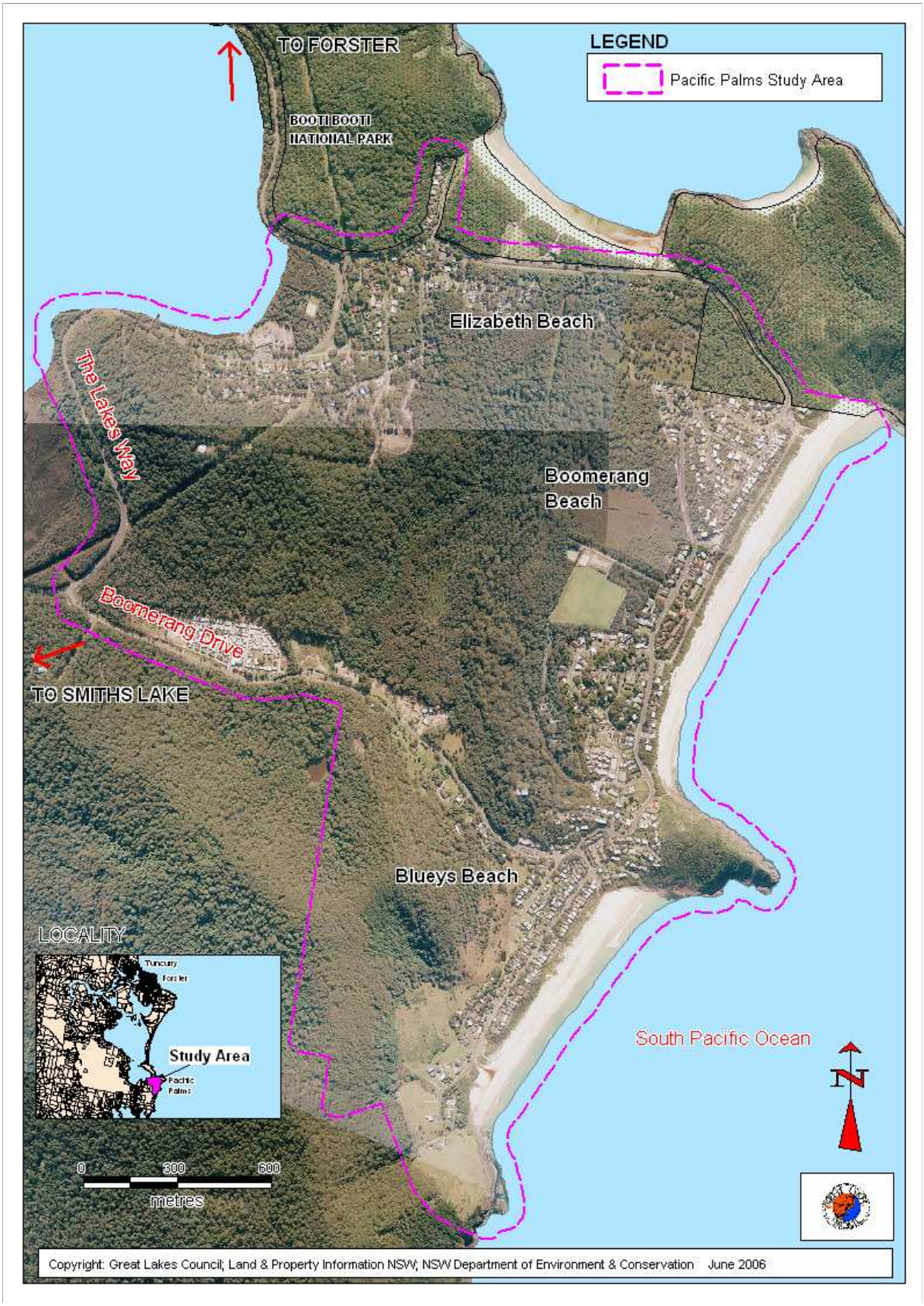


Figure 1: Location of Pacific Palms and the study area boundary.

Scope and Purpose

This report is a tool to guide fire management planning. Specifically, it assists Council land managers in applying processes, using appropriate assessment methods and to identify strategic management programs, for bushfire affected land and bushfire prone land.

The plan considers overall bushfire hazards and risks within Council owned and managed land (Council Land) within the Pacific Palms area. These fire management strategies are comprehensive within the plan identifying programs and activities necessary for Council to protect life and property, community assets and to meet fire and environmental management responsibilities and obligations.

These strategies have been guided by documents prepared by the NSW Rural Fire Service (RFS) including:

- Bush Fire Environmental Assessment Code for NSW, February 2006 (commonly known as 'The Code' and referred to as the BFEAC) and
- Planning for Bush Fire Protection, A guide for Councils, planners, fire fighting authorities, developers and home-owners, 2001 (PFBFP).

In addition an environmental assessment considers and reports on the environmental impacts of proposed hazard reduction works, under such legislation as the *Threatened Species Conservation Act 1995 (TSC Act)* and the EP&A Act.

The field assessments and analysis on Council Land incorporates threats to life and property from adjoining areas, overall bushfire risks, subsequent bushfire hazard ratings, existing land management practices, necessary approved fire management works, vegetation types and fire history. The proposed mechanical hazard reduction works and fire regimes, involved scientific analysis of fire threat and frequencies and the anticipated bushfire impact on the community.

Active management and involvement in ongoing hazard reduction by the community is important. The reduction of ground fuels and implementation of home protection plans to prepare properties against the effects of fires, improves the success of overall fire mitigation works.

Consultation with the stakeholders, neighbours, RFS and the Parks and Wildlife Division of DEC enabled a coordinated approach between Council, fire specialists and affected neighbours.

The Plan has been prepared with reference to various legislative and planning controls. These include specific fire legislation such as the *Rural Fires Act 1997* (RF Act) and the *Rural Fires Regulation 2002*. In addition specific policies, strategies, plans and guidelines are considered during the preparation of the fire management plan are tabulated below.

Plans, Policies, Strategies and guidelines		
Local Government	**Building Environment**	**Fire related**
Council Policy for Bush Fire Protection for Rural dwellings and subdivisions 1993	Building Code of Australia - AS3959 Construction of Building in bushfire prone areas Standards Australia, 1999	Planning for Bushfire Protection (RFS 2001)
Great Lakes Council Current Policy Register	Planning for Bushfire Protection (RFS 2001)	Bush Fire Environmental Assessment Code for NSW (RFS 2006).
Councils Policy for Fire Management for Council Controlled Natural Areas 1996	Building in bushfire prone areas. (RFS 2004g).	Lower Hunter Zone BFMC, Bush Fire Risk Management Plan (BFMC 2004)
Great Lakes Local Environmental Plan 1996 (LEP)	Building in bushfire prone areas. Guidelines for single dwellings development applications (RFS 2004e).	Great Lakes Plan of Operations. (RFS 2004d).
Mapped Bushfire Prone Land	Building in bushfire prone areas. Guidelines for subdivisions applications. (RFS 2004f).	
Council Development Control Plans (DCP)	**Natural resource**	
Council Tree Preservation Order (TPO)	Integrated Catchment Management Plan for the Lower North Coast 2002 (DIPNR 2002)	
Draft Vegetation Strategy, Eastern Portion. Great Lakes Council. Volume 1 & 2. (GLC 2004a&b)	Supplementary State of the Environmental Report (GLC 2004)	

Understanding the document

The fire management plan has been prepared to give strategic and operational outcome to fire responsibilities of Council and be used as an educational tool for property owners. The plan has been divided into 2 parts, with 9 sections to assist in the interpretation of the process and prepared outcomes.

Part 1 – Background Information

Section 1 — Introduces the processes.
Section 2–6 — Provides background information for fire management

Part 2 – Fire Mitigation Plan

Section 7 — Identifies and discusses the local environment, features and local fire issues.
Section 8 — Identifies management strategies for fire management zones relating to assets in the area.
Section 9 — Identifies the works program.

Part 3 – Other related fire information

Appendices/References — Gives background details on various fire management planning policies, background information and other data to assist in the interpretation of the plan.

The flow chart in Figure 2 demonstrates the steps in the preparation of the plan. The dictionary in appendix I identifies references to fire planning and operations.

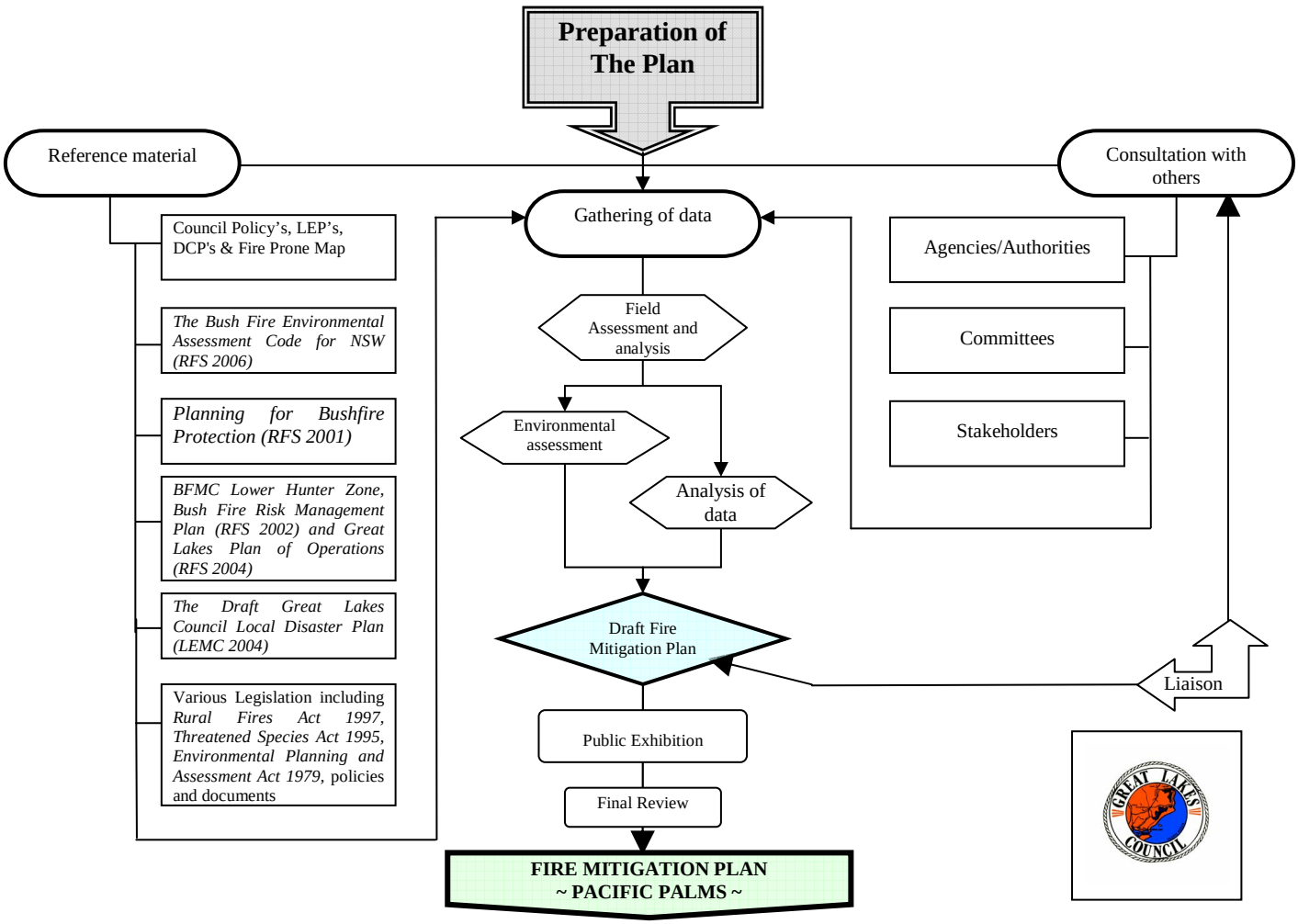


Figure 2: The planning process.

The planning process

The fire fighting functions apply to the various fire fighting authorities, during bushfires and emergency incidents. The plan provides additional information available for use during fire operations and concurrently meets the objectives of the RF Act.

Fire Management Objectives

Councils overall fire management objectives are defined within the *Great Lakes Council Management Plan* (Appendix II), and Councils policy for *Fire Management for Council Controlled Natural Areas.* Councils fire management objectives are consistent with statutory obligations and policies and are to:

- Protect life and property in or immediately adjacent to Council Land from bushfires.
- Minimise the spread of bushfire into or from Council Land.
- Minimise risk and reduce threat of bushfires on fire fighters and the community.
- Suppress or contain bushfire on Council Land.
- Reduce the risk of damage to assets and the environment.
- Maintain biodiversity and integrity of the natural environment.
- Promote participation of the community in implementing property fire management and Home Bush Fire Survival Planning.
- Inform the community of bushfire hazards and promote fire management planning in Bush Fire Prone Areas.
- Provide financial support and resourcing requirements to the NSW Rural Fire Service.
- Provide financial support and resourcing requirements to the State Emergency Service.
- Continue to annually evaluate and review the *Disaster Management Plan*.

Management Strategies

Council has identified their key fire strategies of the plan as:

- *To create fire management zones to assist in providing fuel reduced areas adjacent to assets.*
- *To implement fire mitigation programs to ensure ongoing fuel management continued for protection of community assets.*
- *To provide information for the community on bushfire works and to review in relation to Council's proposed activities.*
- *Acknowledge there are potential ignition risks of bushfires within parks and adjacent roadsides from natural and un-natural causes.*
- *Undertake environmental assessment for hazard reduction works to ensure steps towards sustainable actions area implemented.*

SECTION 2

Fire Management Responsibilities and Obligations

Under the RF Act public authorities and all land managers are responsible for preventing the occurrence of bushfires on and to mitigate against the spread of fires from entering or leaving their land.

Great Lakes Council

Council manages land within the local government area (LGA) including parks and reserves, formed and unformed road reserves and individual parcels of land.

Under the RF Act, the *State Emergency and Rescue Management Act 1989*, and the Rural Fires Regulation 2002 Council are:

- ✓ *A certifying authority to issue Bush Fire Hazard Reduction Certificates for Council managed land;*
- ✓ *Responsible for the identification of Bush Fire Prone Lands within the Council Area under section 146 of the EP&A Act which is certified by the Commissioner of the NSW RFS;*
- ✓ *Responsible for regulating property development & building construction through Local Environmental Plans (LEP) & Development Control Plans (DCP) to reduce hazards from bush, grass or rural fires. The Council refer developments under Section 100B to the Commissioner for certification of Bush Fire Safety Authorities;*
- ✓ *Responsible to ensure each DCP addresses bushfire hazard management and Council development controls in Bush Fire Prone Areas; and*
- ✓ *A consenting authority for development with consultation with the RFS in compliance with the RF Act under Section 79B and the EP&A Act and the Environmental Planning and Assessment Regulations 2000.*

Council contributes funds towards the operating costs of the RFS and the Emergency Services, to provide and maintain such items as fire fighting vehicles and facilities provide equipment and training of volunteers. Council also contributes towards employment of officers within the RFS to facilitate emergency services and mitigate hazards within LGA.

Bush Fire Management Committee

The Bush Fire Management Committee meets specific requirements under the RF Act. Great Lakes are within the Lower Hunter Zone Bush Fire Management Committee (BFMC), which

includes members from 2 other LGA's. A Council officer and an elected Councillor represent Great Lakes Council on the Committee.

The committee prepares the BFMC, Bush Fire Risk Management Plan (BFRMP), the BFMC, Plan of Operations, meets reporting requirements within the RF Act and is responsible for the promotion of public education programs relating to the bush and grass fire threat throughout the local area.

Great Lakes Council Local Disaster Plan

As constituted under the *State Emergency and Rescue Management Act, 1989* and within the State DISPLAN, Council has a committee member on the Great Lakes Local Emergency Management Committee (LEMC). The Local Disaster Plan guides determination of a local emergency and appointment of the Incident controller of the appropriate combat agency during fires in urban and rural areas.

The *Great Lakes Council Local Disaster Plan* (DISPLAN) assists in the arrangements at a local level to prevent, prepare for, respond to and recover from emergencies.

NSW Rural Fire Service

The NSW Rural Fire Service (RFS) work cooperatively with Council to ensure the effective allocation of funding, management, maintenance and support, of fire and emergency operations. The RFS also assists other emergency service organisations at incidents and at emergencies under the control of those organisations.

The RFS function is to provide bush fire fighting services and provide the resources including appliances and personnel resources to combat rural fires within the LGA, rural fire district. The network of Rural Fire Brigade Stations and equipment across the Great Lakes Area are managed by the RFS and maintained through Council depots.

Council has conferred to the Commissioner of the RFS a range of functions under the RF Act as they relate to issuing of s66-s70 notices, bush fire hazard complaints and the issuing of bush fire hazard reduction certificate in accordance with the Code. The issuing of bushfire hazard advice notices on private land is accompanied by the RFS authorised BFHRC for private landholders to undertake works. Other authorities certify their own bushfire hazard activities.

The RFS also provides community education, fire fighters and specialist to mitigate and suppress fires by assisting in emergencies and daily incidents such as wild fires, motor vehicle accidents, floods and storm damage events.

NSW Fire Brigade

The NSW Fire Brigade (NSWFB) responds to and manages emergency incidents, as well as educating the community through prevention programs and to build community resilience by preparing for emergencies.

> ✓ *'The NSWFB provides fire protection, urban search and rescue, hazardous material response, natural hazards response, emergency life support, terrorist consequence management and other emergency management capabilities. The NSWFB works cooperatively to develop and implement plans for emergency services throughout NSW, through the maintenance of strategic working alliances with other emergency and support services' (NSW Fire Brigade 2004).*

Department of Environment and Conservation NSW (Parks and Wildlife Division)

The Parks and Wildlife Division of the Department of Environment and Conservation NSW (DEC) (commonly known as the National Parks and Wildlife Service (NPWS)) are a recognised fire authority and public land manager who implement fire and environmental management obligations under the *Threatened Species Act 1995* (TSC Act) and other related legislation. The organisation prepares fire management plans and identifies fire management strategies in accordance with DEC plans, policies and procedures such as those detailed in the "NPWS Fire Management Manual" (NPWS 2001).

DEC undertakes operational fire fighting cooperatively with other agencies and landholders. DEC fire management planning and approach to fire suppression, mitigation and prevention is to meet fire legislation, planning objectives that sustain ecological processes and principles, and which maintains the protection of life, property and environmental assets.

Department of Planning and Infrastructure (Forests)

Department of Planning and Infrastructure (DPI), (Forests) formerly State Forests (SF) provide resources and support for emergency fire management, to protect life, property, community assets and forest values.

Their Fuel Management Plans identify fire management zones, appropriate fire regimes, and hazard reduction works including the use of prescribed burns as a management tool for reducing forests fuels and to identify practices that are economically and ecological sustainable.

NSW Department of Lands

NSW Department of Lands (DL) has a responsibility for bushfire management on Crown Land, Crown Roads and Crown Reserves. This land is often fragmented, by settlements or are linear (foreshores, roadways, waterway areas), with varying conservation values. The Crown Reserve System promotes "...the cooperative care, control, and management of Crown reserves by the community with assistance from the Department of Lands, other government agencies and reserve users." (DL 2005). By Crown Land managers delegating to the local

government authority (managers of crown land), enable Council to cooperatively plan and implement fire management objectives.

Hazard reduction, environmental assessment and the preparation of a fire plans (by Reserve Trusts) during the management of reserves assist in protecting assets, neighbouring assets and communities as required by the DL (DL 2005b).

Country Energy/TransGrid

Country Energy recognises that vegetation management is important to prevent the spread of bushfires and prevent the ignition from electricity lines. Country Energy environmental policy and commitment to meeting legislative requirements ensures the environment is protected and enhanced for future generations, during service operations and fire prevention management.

The authority, TransGrid is responsible for the high voltage transmission lines and associated assets, which traverse the state and are generally, located in rural and semi-rural areas. TransGrid risk approach to asset management assumes that every transmission line has the potential to be impacted by fire, or to initiate fire, including bushfire.

TransGrid has also prepared a Bush Fire Risk Management Plan that identifies strategies, policies and procedures that are based on the principles of risk management and specifically on bushfire risk management (TransGrid 2003).

MidCoast Water

MidCoast Water is responsible for the supply of reticulated water and sewage system within some areas in Great Lakes LGA and the management of wastewater through the facilities in Forster, Tuncurry, Hawks Nest, Bulahdelah and Stroud.

During fire fighting operations, authorised personnel access fire hydrants throughout some localities to supply fire appliances with fire fighting water. The readily available supply in some urban and rural areas assists in the suppression of wild fires or use during hazard reduction activities.

MidCoast Water ensures the protection of facilities by undertaking fire mitigation works around their own assets to required levels in the various fire management zones.

Private Landholders

The broader community actively undertakes hazard reduction works in and around their properties. As landholders become aware of changes to fire regulations further hazard reduction works are implemented. . These works complement works by other landholders or land managers in and around villages, townships and rural areas.

The emphasis on the responsibility for owner/occupiers to minimise the occurrence and the spread of fire, and to meet legislative requirements when bushfire hazard reduction is required, is highlighted through community education programs. Hazard reduction works can provide reduced fuels, safer environs and protection of community assets including biodiversity within forested areas.

Appendix III can assist landholders with being prepared for bushfires by providing steps and options to take and assist in fire prevention and hazard reduction. Additional information can be sourced on the RFS website or the local fire control centres and Rural Fire Brigades.

SECTION 3

Bush Fire Risk Description

Bush Fire Risk

Bush fire risk analysis is a mechanism to undertake risk assessments (in the field) on assets including life and property, natural and cultural heritage. By preparing for the imminent advancement of a bushfire incident, hazard reduction activities can serve to quell the intensity and subsequent detrimental affects on the community or the asset.

The BFRMP is an indicator for Council in prioritising bush fire mitigation works. Within this document the resultant bushfire risk ranking (extreme, major, moderate, minor or insignificant) identifies ranking of an area (or special area) depending on the ability for assets (built/natural) withstand or recover from a fire event).

Bush fire risk is defined as: The chance of the bushfire igniting, spreading and causing damage to assets within the community or reducing biodiversity of areas within natural areas.

The Plan incorporates field assessment of assets, the potential localised bushfire risks, hazard reduction requirements with outcomes that also consider environmental legislation and guidelines. The fire management strategies included within section 8 identify fire mitigation works proposed in fire management zones (FMZ's) including asset protection zone (APZ's), strategic fire management zones (SFAZ's), land management zones (LMZ's) and fire exclusion zones (FEZ's) within the study area.

Overview of the BFRMP Bush Fire Risks within the Study Area

As described within the BFRMP, the bushfire risk categories within Pacific Palms is a consequence of the proximity of bushland areas to the villages. The management of fire hazards, through reducing fuels within bushland areas, assists in the protection of the community. Vegetation management lessens the impact on residents, visitors and fire fighters during a fire incident that may occur.

The Australian landscape has adapted and evolved due to fires. Lightning strikes are a natural phenomenon and have been known historically to occur throughout the area. Seasonal thunderstorms along the coastline and further inland are a source of ignition as well as other ignition sources, which range from arson, escaped hazard reduction, accidental ignition and motor vehicle accidents.

Existing Features

The Pacific Palms study area has an extensive coverage of continuous vegetation communities. Urban settlement development and interface is amongst bushland areas and west of coastal public areas retained for conservation and public recreation within Elizabeth Beach, Boomerang Beach and Blueys Beach. Within these areas and inland bushland areas, there are key habitats (including SEPP 26) via corridors and adjoining existing reserve systems.

These areas if ignited are likely to sustain bushfires, and may affect adjoining properties. To the south of the study area forested private land adjoin Crown Land where historically, coastal bushfires have a fire path leading north—northwest or alternatively depending on weather patterns, south parallel to the coast (Figure 3).

Various fire advantage lines exist both naturally and man made including roads, transmission lines, waterways, lakes and wet gullies. These may be used as required during wild fires as control lines however spotting which can occur during extreme fire weather conditions, may be as far as 5 kilometres across such advantage lines.

Pacific Palms has reticulated water within the urban area and also abuts Wallis Lake, which provides water sources for fire fighters and aerial water bombing craft. This moister environment can assist in providing environmental conditions to slow the movement and longevity of fires.

The pattern of urban development within the villages, often divided by bushland areas, is conducive to ignition of fires from ember attack such as those in Pacific Palms (Figure 4). Bushfire affected land within Pacific Palms has been detailed only within the Plan. As seen in the example, the surrounding areas of Pacific Palms are predominantly bushland areas. The bushland areas within the village may provide bushfire hazards adjacent to properties; however by maintaining FMZ's adjacent to assets bushfire risks are reduced.

The terrain within the local area has a variety of slopes that range from 0–5^{o} in the low—lying areas to 15^{o} on the undulating elevated slopes and at times greater than 18^{o} on steeper areas sand dune ridges typically found within this coastal area. The steeper slopes enable fires to run in places at a greater rate of spread than those with lesser slope. The type and arrangement of fuels affect fire spread and fire behaviour in an area.

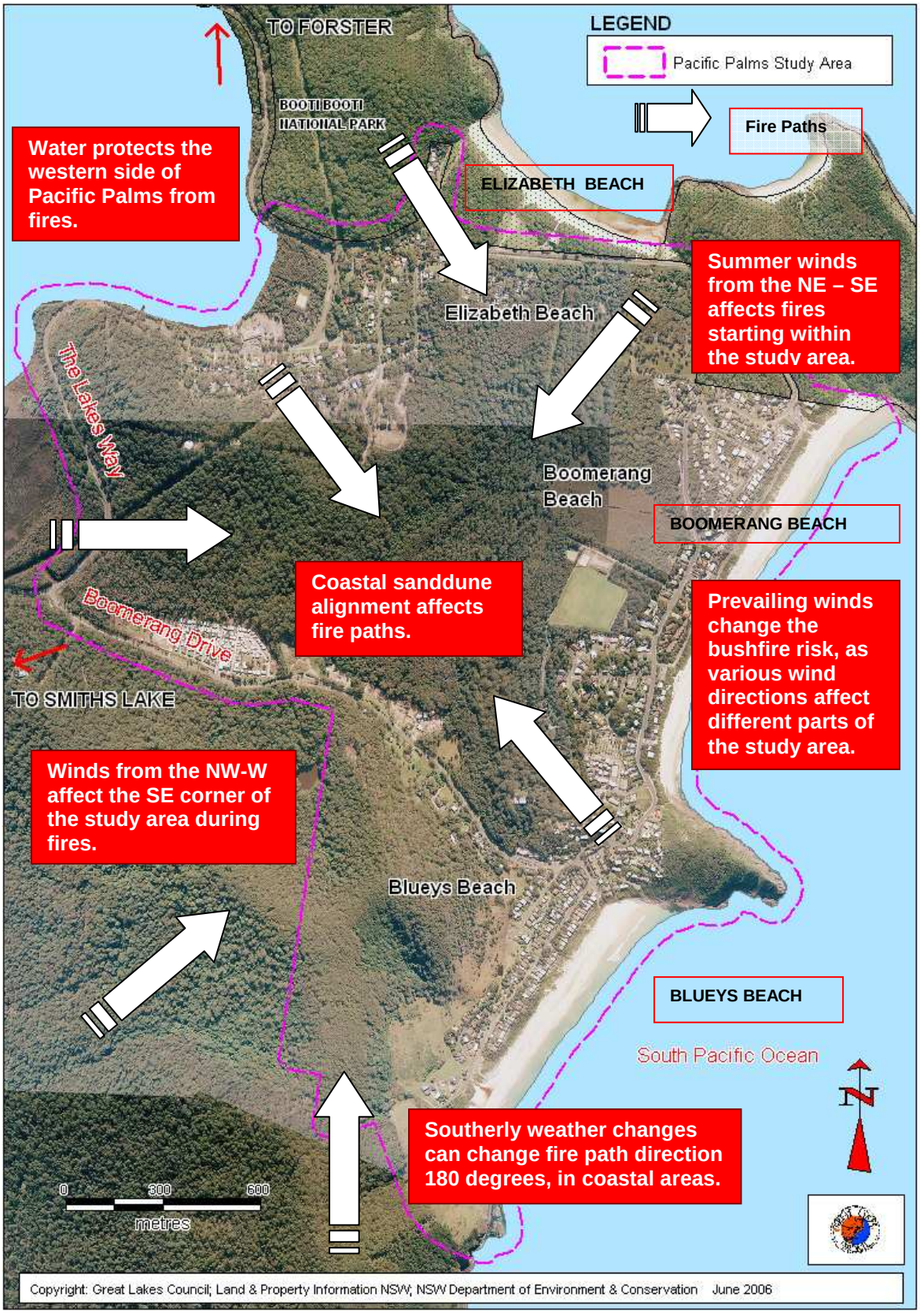


Figure 3: Bushfire risk to Pacific Palms.

Figure 4: Development within Pacific Palms.

Risk to Life and Property

The BFRMP identifies Pacific Palms as being within *moderate, major and extreme bushfire risks.* The higher the risk, the more chance fire has a greater impact on the asset or the community. The closer the bushfire threat the higher the risk. The BFRMP assessment identified and used set criteria in determining the bushfire risk. Council has summarised the assessment of both urban and rural developments (Appendix VI). This assists planners when implementing fire management under the various legislative documents and procedures.

Six (6) localities have been identified where life and property[1] (LP) are directly threatened from the spread of fire or impacted by bushfire (bushfire affected lands), from adjacent bushland to the urban interface (Table 1) (Figure 5).

Table 1: Risk to life and property.

Code	Location	Description of risk	BFRMP Risk Rating
LP1	Elizabeth Beach (North)	Northern bushland interface of Elizabeth Beach linking bushland areas with the village to the south.	Major / Extreme
LP2	Elizabeth Beach (South)	Southern residential edge and bushland interface of Elizabeth Beach.	Major / Extreme
LP3	Blueys Beach (South & West)	South & western bushland areas linking with the southern edge of Blueys Beach.	Moderate
LP4	Boomerang/Blueys Beach (West & North)	Western & northern bushland interface adjacent to residential and rural properties of Boomerang & Blueys Beach.	Moderate / Major / Extreme
LP5	Blueys Beach (North)	Northern bushland interface of Blueys Beach linking bushland areas with the village to the south.	Moderate / Major / Extreme
LP6	Boomerang/Blueys Beach (East) – Coastal Foreshore	Western bushland interface along the coastal foreshore.	Moderate / Major

Potential ember attack during a bushfire incident from adjacent burning bushland re-enforces the importance and requirement for householders to mitigate against the fire threat and for residents to undertake their own fire preparedness activities.

[1] Life and Property is identified on figures as LP with corresponding number identified in Table 6

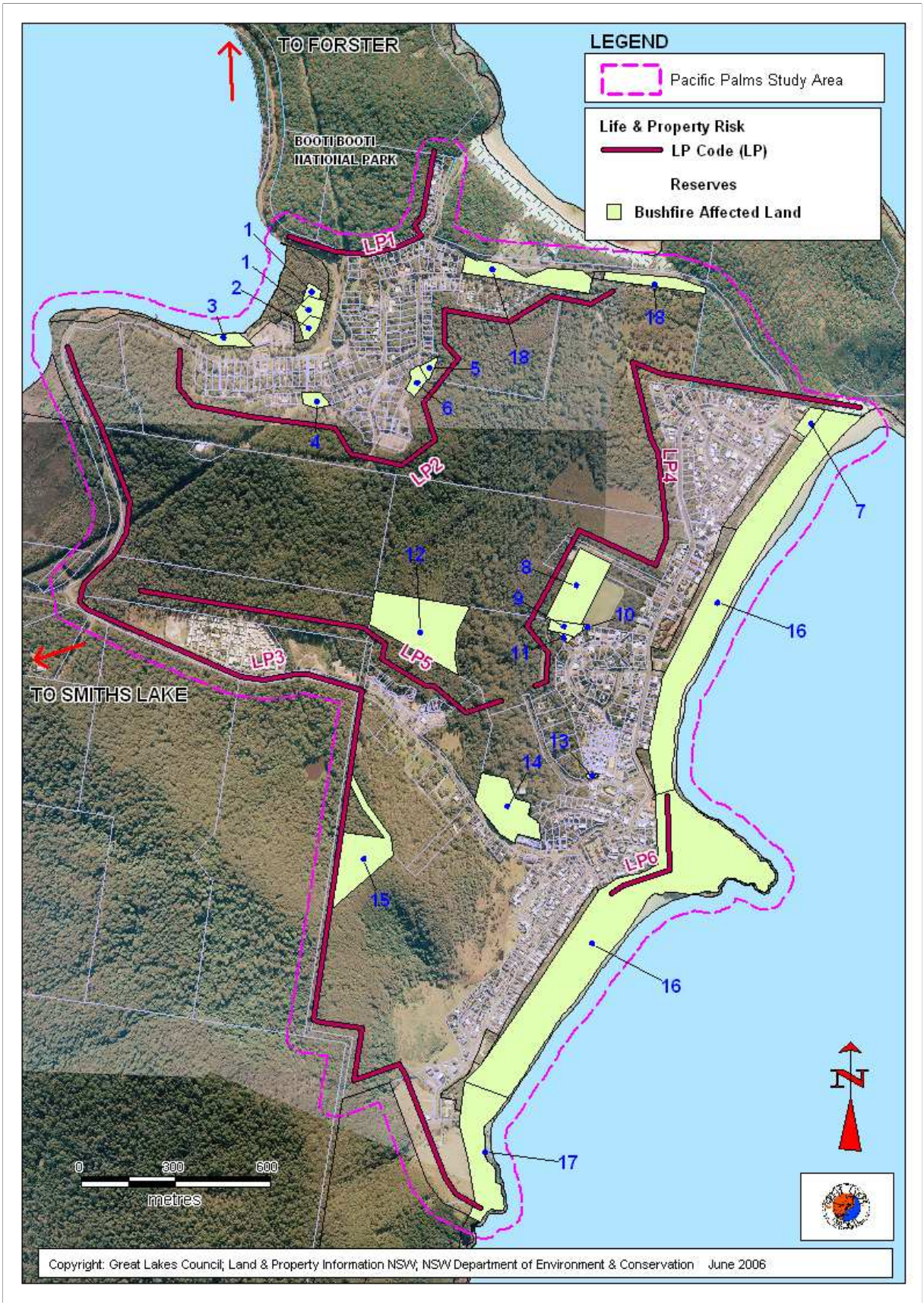


Figure 5: Location of life and property risk.

Risk to Natural Heritage

The BFRMP identifies and classifies Council reserves within Pacific Palms as having *insignificant, minor and major bushfire environmental and ecological risks*[2]. Those Council managed areas affected by bushfire have been included within Table 2. The risk rating indicates the effects of fire on the land identified or the actual level of impact of fire on the environment

Table 2: Risk to natural heritage on bush fire affected lands.

ID	Council Managed Land	Lot / DP	Vegetation Community	Vegetation Formation	Environmental & Ecological Risk Rating
1	Pacific Palms Tennis Courts RES 113	Lot 447 DP 45864	▪ Swamp Oak	▪ Forested wetland	Insignificant / Minor / Major
	(Pt R93454)	Pt Lot 2 DP 875579	"	"	Minor / Major
2	Pacific Palms Community Hall RES 113 (Pt R93454)	Lot 432 DP 753168 (Pt R93454)	▪ Swamp Oak	▪ Forested wetland	Insignificant / Minor / Major
3	Lot 380 DP 753168	Lot 380 DP 753168	▪ Cleared ▪ Dry Blackbutt	▪ Grassland ▪ Dry sclerophyll forest	Insignificant
4	Public Reserve RES 5276	Lot 24 DP 833985	▪ Grey Gum/Grey Ironbark/White Mahogany ▪ Cleared	▪ Dry sclerophyll forest ▪ Grassland	Minor
5	RES 5275	Lot 23 DP 833985	▪ Grey Gum/Grey Ironbark/White Mahogany ▪ Swamp Mahogany	▪ Dry sclerophyll forest ▪ Swamp Mahogany	Minor
6	Lot 16 DP 1047733	Lot 16 DP 1047733	▪ Grey Gum/Grey Ironbark/White Mahogany	▪ Dry sclerophyll forest	Minor
7	Public Reserve RES 1009 (R210072)	Lot 1 DP 248650	▪ Banksia	▪ Heathlands	Major
8	Pacific Palms Sports Complex RES 5032	Lot 54 DP 610055	▪ Cleared ▪ Paperbark	▪ Grassland ▪ Forested wetland	Minor / Major
9	Public Reserve RES 5061	Lot 14 DP 253875	▪ Paperbark	▪ Forested wetland	Minor / Major
10	Public Reserve	Lot 35 DP 1044735	▪ Paperbark	▪ Forested wetland	Minor / Major
11	Public Reserve RES 5361	Lot 18 DP 804903	▪ Paperbark	▪ Forested wetland	Minor / Major
12	RES 5256	Lot 7 DP 811686	▪ Swamp ▪ Paperbark	▪ Freshwater wetlands ▪ Forested wetland	Major
13	Public Reserve RES 5245	Lot 17 DP 804903	▪ Paperbark	▪ Forested wetland	Insignificant / Minor
14	Pacific Palms Tourist Centre RES 5115	Lot 45 DP 200167	▪ Swamp Mahogany ▪ Blackbutt-Bloodwood/Apple	▪ Forested wetland ▪ Dry sclerophyll forest	Minor / Major
15	Public Reserve RES 5256	Lot 111 DP 1060098	▪ White Mahogany/Red Mahogany/Grey Ironbark/Grey Gum ▪ Grey Gum/Grey Ironbark/White Mahogany	▪ Dry sclerophyll forest	Major

[2] Environmental & ecological risk rating is the affect on the biodiversity and natural values of the area

ID	Council Managed Land	Lot / DP	Vegetation Community	Vegetation Formation	Environmental & Ecological Risk Rating
16	Boomerang Beach	Lot 7133 DP 1077044	▪ Sand Ridge ▪ Banksia ▪ Heath	▪ Heathlands	Major
	Blueys Beach (R210072)	Lot 7040 DP 1077045	▪ Sand Ridge ▪ Heath	▪ Heathlands	Major
17	Blueys Beach Foreshore	Pt Vacant Crown Land	▪ Sand Ridge ▪ Cleared ▪ Myrtle	▪ Grassland ▪ Rainforest	Minor / Major
18	RES 58 (R84278)	Lot 7054 DP 1071153	▪ Palm	▪ Rainforest	Minor / Major
	"	Lot 7055 DP 1071165	"	"	Minor / Major
	"	Lot 7128 DP 1070576	▪ Cleared	▪ Grassland	Insignificant

The adjoining BBNP to the north of the study area is classified as having a major bushfire environmental and ecological risk.

Assessment of the fire risk within Council managed reserves adjacent to assets and identifying fire threats is part of the analysis within the plan. Fire regimes for hazard reduction burning are also described within code for SFAZ and LMZ's, which consider biodiversity with burning practices.

There are higher risks to the conservation values to many of these areas as they are within Key Habitat and Regional Corridors and have high conservation values linking with BBNP and Wallis Lakes Estuary. When assessing the regional status of ecosystems within the LGA, (mapped of by the North East Comprehensive Regional Assessment (CRA)), the priority identified Swamp oak as a vulnerable, severely depleted community and requires further protection. In decreasing priority for local vulnerable status (paperbark) and rare status (swamp and rainforest) the conservation of these communities during fire management is important.

SEPP 14 (Coastal Wetland) and SEPP 26 (Littoral Rainforest) both occur within the study area, which requires special management practices to ensure their enhancement within the environment.

The compilation of the table within appendix VII assists planners to determine, by desktop, an overview of the vegetation types that are reviewed on site through each assessment determination. The vegetation category (type 1, 2 or 3 from the PBFP), guides the identification of fire management zones for new developments and subdivisions can assist during development assessment.

Risk to Cultural heritage

The conservation and protection of significant cultural heritage (Aboriginal and non-Aboriginal heritage) is important when undertaking any activity. The BFRMP does not

specifically identify any archaeological or aboriginal heritage sites in or around the study area.

In addition the DEC (Parks and Wildlife Division) maintained Aboriginal Heritage Information Management System (AHIMS) search for Aboriginal Objects and Aboriginal Sites were consulted as part of the process.

Clause 21 of Great Lakes Local Environmental Plan, 1996 makes provision for significant 'Heritage items' and guides their enhancement and protection. Within Great Lakes, Schedule 2 does list 3 heritage items as local and regional (but not of state significance) within the study area.

Field Assessment Methodology

Field assessments are undertaken to provide data for analysis for managers. The assessment process follows guidelines provided by the RFS, and is an acceptable process for fire managers to determine the hazard and risk analysis of bushfire within and adjacent to bushfire affected Council managed land.

The contributing factors to the assessment include; the distance of the bushfire hazard to the asset (Threat) and, where the potential severity is influenced by the bushfire or by bushfire hazards (Risk). The overall fuel hazards are given as low, moderate, high, very high and extreme ratings.

The assessment includes using factors such as;

- ✓ Vegetation type and separation distance of canopies;
- ✓ Overall fuel loads, (bark, surface, elevated);
- ✓ Slope;
- ✓ Fuel quantity; and
- ✓ Size of combined risk areas.

The hazard assessment also considers fire resistance construction standard of a building (or asset) (no standard, level 1, 2 or 3), Bush Fire Prone Land, BFRMP ratings including the hazard and risk rating and the risk management zone.

The assessment outcomes are based on potential extreme weather conditions, and the ability of an asset to recover from or withstand a bushfire.

Hazard reduction activities and seasonal influences affect vegetation growth rates and the resultant rating of the existing hazard. Variations in growth rates affect overall fuel loads; the ability to ignite and the rate the fire could spread. The preferred fire intensity within fire

management zones adjacent to assets is ideally low—moderate. Fires may spread from adjoining areas or ignite as spot fires within the FMZ's.

The Commissioner of the NSW Rural Fire Service has certified Bush Fire Prone Land within Great Lakes Council under *section 146* of the RF Act. Bush Fire Prone Land was identified using bushfire vegetation mapping categories[3]. This provides a basis for planners and land manager's to identify areas where specific conditions apply to new developments and where hazard reduction activities are required to reduce the impact of bushfire on life and property.

Detailed site inspections capture hazard assessments and local environmental effects. Outcomes incorporate legislative requirements for fuel reduction and apply techniques with limited impact to local ecological values, yet simultaneously consider protection of life and property.

Recommendations for bushfire risk mitigation works are described within section 8.

[3] Refer to Appendix V for Criteria for mapping bushfire prone land

SECTION 4

Hazard Reduction

Guidelines for hazard reduction

Hazard reduction works are carried out to protect dwellings, buildings or other assets susceptible to fire. This provides a safer environment for fire fighters to work around whilst protecting people and assets during a fire.

Hazard reduction reduces fuel levels to minimise potential damage to life, property and the environment if a bushfire does occur.

Management of fuels

Graduated fuel management of hazards adjacent to development is important to ensure provisions are in place to assist in reducing the risk and the threat of fire whilst still maintaining at least a degree of the visual and environmental amenity of the area. These zones are commonly referred to as FMZ's including APZ, SFAZ, LMZ and FEZ's.

Asset Protection Zone (APZ) *is an area surrounding an asset where ground fuel (often including the shrub layer) has been reduced to minimise the ignition and spread of fire and provide a refuge area for fire fighters and landowners to fight a bushfire.*

Strategic Fire Management Zone (SFAZ) *is the area adjacent to the APZ or are strategically located within fire paths (where APZ's are not in place) to reduce the severity of fires and the impact on the community. These areas complement works within APZ or other SFAZ and provide protection for fire fighters, watering points, significant sites or essential services.*

Land Management Zone (LMZ*) is the area of conservation and heritage value.*

Fire Exclusion Zone (FEZ) *is the area where fire is excluded from the area as fire regime thresholds have been met.*

Each zone has specific management strategies that can be implemented to meet management objectives (Table 3). Council has adopted the FMZ's and strategies as defined within the BFRMP.

Table 3: Fire management zones.

Fire Management Zones[4]	Objectives	Type of works	Notes
Asset Protection Zone (APZ)	❑ Protect life and property ❑ Mitigate against ignition of fires ❑ Prevent the spread of fires ❑ Reduce intensity of fires ❑ Minimise impact to conservation values within the area	✓ Reduce fuel levels by mechanical means ✓ Reduce fuels by hazard reduction burning ✓ Reduce fuels by grazing ✓ Works authorised within approved development applications (DA's) ✓ Works certified by environmental impact assessment/the Code	▪ Maintain average overall fuel levels (OFL) at moderate whereby levels are 8t/ha or below in an outer protection area (OPA) ▪ Maintain fuels 5t and below per hectare in the inner protection area (IPA) ▪ Burn to reduce fine fuels by approximately 70-100%
Strategic Fire Advantage Zone (SFAZ)	❑ Protect life and property ❑ Mitigate against ignition of fires ❑ Prevent the spread of fires ❑ Reduce intensity of fires ❑ Minimise impact to conservation values within the area ❑ Enhance adjacent APZ works	✓ Reduce fuel levels by mechanical means ✓ Reduce fuels by hazard reduction burning ✓ Reduce fuels by grazing ✓ Maintain or construct fire advantages/fire trails ✓ Works authorised within approved DA's ✓ Works certified by environmental impact assessment/the Code	▪ Maintain average overall fuel levels at high and below. Burn to reduce fine fuels by approximately 50-80%
Land Management Zone (LMZ)	❑ Minimise impact to conservation values within the area	✓ Reduce fuels by hazard reduction burning ✓ Environmental assessment to be undertaken ✓ Maintain existing fire advantages/fire trails ✓ Construct fire advantages/fire trails ✓ Works certified by environmental impact assessment/the Code for ecological burning	▪ Minimise works except for rehabilitation when required ▪ Burn to provide a mosaic pattern of burnt areas
Fire Exclusion Zone (FEZ)	❑ Minimise impact to conservation values within the area	✓ Maintain existing fire advantages/fire trails ✓ Construct fire advantages/fire trails ✓ Works certified by environmental impact assessment/the Code	▪ Minimise works except for rehabilitation when required ▪ Hazard reduction & biodiversity burning excluded

[4] These zones are equivalent to the those defined within the Lower Hunter Zone, BFMC Bush Fire Risk Management Plan, 2002

Identification and implementation of hazard reduction activities for existing buildings are guided by conditions within the RFS publication of the *Bush Fire Environmental Assessment Code for NSW in 2006 (BFEAC)*. The widths of APZ fuel reduced areas are calculated using predetermined widths appropriate for various slopes (Appendix IV). Vegetation types and the floristic structure affect the implementation of mechanical on ground works. Retaining hospices (clumps/groups of trees/shrubs) of existing plants is to minimise impact on conservation values and improve community protection from the fires.

*The Planning for Bush fire Protection, 2001 (PBFP) identifies s*pecifications for asset protection zones, perimeter roads and fire trails, access and their construction standards for new developments. Reference to this manual is important for planners, developers and the community to understand bushfire protection and preparedness in bushfire prone land (Appendix IV).

The BFEAC and the PBFP guides hazard reduction work requirements for existing buildings as well as future developments and subdivisions. The BFEAC or other environmental assessment may be required to undertake mechanical fuel reduction activities or to initiate low—moderate intensity hazard reduction burns.

Hazard reduction options include:

- ✓ Hand removal of shrubs;
- ✓ Tree removal;
- ✓ Clearing away fuels such as leaves, pruning and clippings;
- ✓ Clearing out gutters;
- ✓ Mechanical mowing, slashing, ploughing, trittering5; bulldozing;
- ✓ Reducing fuels by grading or; and
- ✓ Hazard reduction burning including pile burning (1.5m high piles) or prescribed burning of vegetation.

Encouraging a discontinuous vegetation layer ensures the environment remains intact. Retaining a stand of vegetation is important as this can often act as a shield against strong winds, flying embers, and radiant heat on assets and provides protection on leeward side of these hospices. Retaining some groundcover of leaf fall, grasses and herbs ensures soil erosion is minimised.

[5] Trittering – mechanical mulching of the vegetation into smaller pieces

SECTION 5

Fire Preparedness and Community Education

Preparedness

The community is responsible for providing protection for themselves and their respective assets on their land from fire threat. By actively preparing property and homes against fires, possible fire ignitions and threats is a proactive approach to fire management.

Having a background to bushfire regulations, how to prepare for grass and bushfires, what to do when fire approaches, what actions to take and consider, and the equipment required to assist during a fire event, is part of being prepared.

There are several actions that can be undertaken including:

- ✓ Reduce possible ignition sources within properties.
- ✓ Reduce risk of ignition of the building and objects.
- ✓ Ensure designated access is clear for fire fighters.
- ✓ Reduced ground/fine fuels within the area.

Statistic shows, that by properly preparing a home and implementing appropriate strategies before the fire event, extensive damage can be reduced or even prevented.

SECTION 6

Ecological Considerations

Introduction

The plan promotes the integration of the protection and enhancement of the environment to ensure continued provision of environmental services and biodiversity whilst concurrently protecting life, property and community assets. Legislative guidelines initiate and explicitly require specific responses to meet these principles.

Further to these basic conservation requirements, is the completion of an environmental assessment to identify potential impacts, which may effect the environment of any proposed works.

The *National Strategy for the conservation of Australia's biodiversity, 1996* promotes an integrated approach to conserve biological diversity and to meet community objectives. Ecologically sustainable development (ESD) meets the needs of Australians today, while conserving our ecosystems for the benefit of future generations (Department of Environment and Heritage 1992).

Fire and biodiversity in the Australian landscape is known to play an important role in determining the health and integrity of vegetation communities and fauna. This relates to both inter fire intervals (over and under frequent fire) and fire severity. Consideration to fire regimes and the management of fire on the environment is important when implementing fire management practices within natural areas.

Biodiversity Thresholds

Fire is a natural phenomenon however some landscapes are more adapted to fire whilst others are generally intolerant of fires, such as rainforests. Those that burn less frequently are moist forests but fires are more common in coastal heath, drier forests and woodland areas (Native Vegetation Advisory Council 1999).

Fire frequency affects the survival of plants and animals and longevity of populations. Minimal fire frequency enables enhancement of the environment whereas, inappropriate fire frequency disrupts the existing processes and thus biodiversity. *"Clearing of vegetation; and high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition"* are recognised as key threatening processes (TSC Act 1995).

Species loss is expected when frequency of fires goes beyond known biodiversity thresholds. Recurrent disturbance interrupts plant life cycle processes such as maturation, seed

production and development of fire resistant organs (Bradstock *et al* 1995). Also, too infrequent fire intervals promote species loss and reduced diversity to both plant and animal communities.

The fire history (intensity and regularity) of an area directly influences the future requirement for a particular fire regime. A mosaic of burns (age classes) within a localised area varies existing fuel loads and resultant fire intensity within each vegetation community. Interruptions to natural systems from unplanned fires in bushland areas adjacent to urban fringes, recreational areas and road easements affect planning decisions. Consideration of these effects when planning hazard reduction burning reduces the impact on biodiversity.

The management of ground fuels is directly related to the years since individual fire events. Field analysis to assess fuel loadings enables managers to identify predicted fire behaviour from field assessments (NPWS 2003b) and therefore appropriately manages against risks.

Appendix VII, is an example of the quantitatively analysis of fine fuel accumulation that has been projected for the Sydney Region (NPWS unpub.). The managers accept the use of these tables to guide fuel accumulation using the age since last fire parameter. These fine fuel load graphs (including litter, herbs & shrub layer) can be applied to forested areas within the Great Lakes LGA. The graph demonstrates that immediately after fire open forests have a marked increase in fuels to year 5, whereby after this period accumulation slows and exponentially increases to a point where decomposition and successive changes eventually has minimal variation from its standard range (15 years +). Within rainforest formations fuel accumulates rapidly in the first 2 years then remains static as decomposition maintains a balanced environment (Refer to Appendix VII). Fire behaviour and intensity is affected by such factors as fuel accumulation and fuel loads.

Fire management objectives must ensure that there is, within an area, a mosaic pattern of burns with a range of age classes (time since fire) within each different vegetation community type (Bradstock *et al 1995*). This ensures seedlings mature and deposit viable seeds in the seed bank before the next fire.

Bradstock *et al 1995* defined fire regimes desirable to met conservation objectives and enhance species diversity. The related plant responses to fire frequency are seen below. A decline in population of plant species can be generally be expected in fire-tolerant communities (except rainforests, etc) when:

- ✓ *There are more than 2 consecutive fires less than 6-8 years apart (fire sensitive shrubs decline).*
- ✓ *Intervals between fires exceed 30 years (herbs and shrubs with short lived individuals and seed bank decline).*
- ✓ *3 or more consecutive fires occur at intervals of 15 – 30 years (sub-dominant herbs and shrubs decline).*

- ✓ *Occurrence of more than 2 consecutive fires, which consume less than 8-10 tonnes/hectare of surface fuel (species with heat-simulated seed banks in the soil decline) (Bradstock et al 1995).*

Appendix VIII identifies the currently accepted biodiversity thresholds for all 65 vegetation communities within Great Lakes LGA, (as identified within the *Draft Great Lakes Vegetation Survey 2003) as* adopted from the DEC (Parks and Wildlife Division) (DEC 2005a; Bradstock *et al 1995*). This has been correlated with vegetation formation from Appendix IX and from of the Planning for Bushfire Protection, 2001 (Appendix 2 – Category 1, 2, or 3). Within this table specific minimum fire regime for SFAZ from within the Code has been collated.

The threatened species hazard reduction list within the Code (NSW RFS 2004g) are also referred to during the decision making process to identify the type of hazard reduction work that can be applied including hand removal, tree removal, slashing, trittering and burning.

Conservation Values

The Great Lakes area has demonstrated locally important and recognised significant ecological values, as described in documented reports and studies. On a local level the management of habitats and enhancement of conservation corridors, promotes diversity within the environment through appropriate fire management. The Great Lakes Council area has existing fauna corridors and predicted key habitat areas, which have been defined by the DEC (DEC 2005b).

The mechanism for national and state environment protection and biodiversity conservation is the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the TSC Act.

The TSC Act lists endangered populations (within Schedule 1, Part 2 of the TSC Act) and endangered ecological communities (within Schedule 1, Part 3 of the Act) in NSW. Two (2) endangered populations and eight (8) listed ecological communities potentially occur locally. This includes:

- ✓ Endangered Koala, Hawks Nest and Tea Gardens population.
- ✓ Endangered Emu population in the NSW North Coast Bioregion.
- ✓ Lowland Rainforest on floodplain in the NSW North Coast Bioregion.
- ✓ Littoral Rainforest in the NSW North Coast Bioregion.
- ✓ Coastal Saltmarsh in the NSW North Coast Bioregion.
- ✓ Swamp Oak Flood Plains in the NSW North Coast Bioregion.
- ✓ Freshwater Wetland on Coastal Floodplains in the NSW North Coast Bioregion.
- ✓ River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast Bioregion.
- ✓ Sub-tropical Coastal Floodplain Forest of the NSW North Coast Bioregion.
- ✓ Swamp Oak Floodplains of the NSW North Coast Bioregion and

- ✓ Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast Bioregion (TSC Act 1995).

The NSW Scientific Committee determines those species considered to be endangered (Schedule 1, Part 1), presumed extinct (Part 4), vulnerable (Schedule 2) and also activities deemed to be key threatening processes (Schedule 3). Such determinations are listed within the TSC Act. Table 4 shows the conservation significance within Great Lakes.

Fire managers need to have regard to conservation guidelines and consider management of various species and the impact through hazard reduction work, wildfire and disturbances, as well as key management guidelines from threat abatement plans.

Table 4: Conservation significance within Great Lakes.

Conservation significance within Great Lakes LGA	Status – EPBC. Listed as Endangered (E) & Vulnerable (V)	Status – TSC. Listed as Endangered (E) &Vulnerable (V)	Total Number
State & Nationally Threatened flora species	3 (E) & 8 (V)	5 (E) & 10 (V)	15
State & Nationally Threatened fauna species (26 mammals, 2 reptiles, 7 frogs & 47 birds)	4 (E) & 7 (V)	12 (E) & 70 (V)	82
International migratory wader species (JAMBA[6], CAMBA[7], Bonn Convention[8])	35	-	35
International migratory waterbird species (JAMBA, CAMBA, Bonn Convention)	21	-	21
International migratory near-shore seabird species (JAMBA, CAMBA, Bonn Convention)	7	-	7
Rare or threatened Australian plants (ROTAP)	-	-	7
Flora species recorded in Great Lakes LGA	-	-	1,428
Fauna species recorded in Great Lakes LGA	-	-	499

The Draft Great Lakes Council Vegetation Strategy, Volume 1 and 2, 2004, details vegetation community descriptions and regional and local status as well as the significance and conservation values of vegetation communities. It also details the association with vegetation communities of threatened fauna and flora, International migratory species, and rare or threatened plants (ROTAP). Also from within this report the regional status of vegetation within Great Lakes has been determined (Refer to Appendix X).

[6] Japan-Australia Migratory Bird Agreement (JAMBA)
[7] China-Australia Migratory Bird Agreement (CAMBA)
[8] Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

Environmental Considerations

During the preparation of the fire mitigation plan and the subsequent operational works, planners have gathered field data and reviewed available background information. By referring to the following checklist (which includes reports and various documents) planners can ensure the process considers the range of potential issues and that hazard reduction activities on Council land meet both legislative and policy objectives:

Checklist	Reference Material Source
❑ Planning for Bush Fire Protection, 2003	RFS
❑ Environmental Assessment Code for NSW, February 2006 (the Code)	RFS
❑ Threatened Species/Threatened species hazard reduction list for the Code within each LGA	DEC/ RFS
❑ Geographic information system layers	GLC/ RFS
❑ Documentation on threatened and vulnerable species that have specific management consideration to fire or mechanical impacts	RFS/DEC
❑ Updated Atlas of the NSW Wildlife records/Local records	DEC/GLC
❑ Updated fire history records	RFS/DEC
❑ Species impact statements	GLC/DEC
❑ Environmental impact assessments or reviews of environmental factors	GLC
❑ Eight part tests that apply to the area	GLC
❑ Management plans for the area	GLC/DEC
❑ Strategic plans	GLC
❑ Detailed Local Environmental Studies	GLC/DEC
❑ Local Environmental Plans (LEP's)	GLC
❑ Updated changes to planning zones	GLC
❑ Development controls and conditions on private development	GLC
❑ Consideration to State Environmental Planning	Commonwealth & State Gov
❑ Changes relating to the Native Vegetation Act, 2003	DOP

PART 2

Fire Mitigation Plan

~ Pacific Palms ~

SECTION 7

Pacific Palms and our Living Environment

Location

Within the study area, Pacific Palms is situated between Wallis Lake and east to the South Pacific Ocean. Access is along the Lakes Way from the Pacific Highway south at Bulahdelah and north from Forster-Tuncurry. Pacific Palms study area has 418 hectares for urban and rural living with an estimated population in 2006 of approximately 870 (GLC 2003; derived from historic annual population increases).

Council managed land within the study area includes residential and commercial properties, road reserves and parks for recreation and environmental protection and crown land which cover approximately 55 hectares. Of this Council managed lands, 49 hectares are bushfire affected either by being Bushfire Prone Land or are affected by bushfire (Table 5, Figure 6).

Within Pacific Palms the open space areas consist parks, forested bushland areas, or regenerating forests (Figure 6), which provide habitat and conserve highly significant vegetated areas. These areas are considered Endangered Ecological Communities (EEC) and are recorded by the State of Environmental Protection (SEPP) as Coastal swamps (SEPP 14) (adjacent to the lake) and Coastal littoral rainforest (SEPP 26).

Pacific Palms urban interface is nestled amongst forested land within both private and public lands. Bushland corridors link with Council Reserves with some bordering BBNP. The Parks and Wildlife Division of DEC manage BBNP, which borders the northern side of the study area.

Road Access

The tourist drive from the Lakes Way loops through the study area of Pacific Palms where bituminised roadways (primary and secondary) enable fire appliances to have good access from Tuncurry, Smiths Lake, Green Point and Bungwahl. The Lakes Way Road allows good egress for fire fighting units, residents, and visitors for use during fires fighting or use as an escape route.

Table 5: Bushfire affected Council managed land within the study area.

ID	Property Name	Reserve Number	Lo t/ DP	Ha	Vegetation Community	Land Type	Managed by
1	Pacific Palms Tennis Courts	RES 113 (Pt R93454) "	Lot 447 DP 45864 (Pt R93454) Pt Lot 2 DP 875579	0.5395 0.1766	▪ Swamp Oak "	Community Land Community Land	Council & Crown Council & Crown
2	Pacific Palms Community Hall	RES 113 (Pt R93454)	Lot 432 DP 753168 (Pt R93454)	0.3353	▪ Swamp Oak	Community Land	Council & Crown
3	Lot 380 DP 753168	Lot 380 DP 753168	Lot 380 DP 753168	0.528	▪ Cleared ▪ Dry Blackbutt	Standard	Council & Crown
4	Public Reserve	RES 5276	Lot 24 DP 833985	0.325	▪ Grey Gum/Grey Ironbark/White Mahogany ▪ Cleared	Community Land	Council
5	RES 5275	RES 5275	Lot 23 DP 833985	0.202	▪ Grey Gum/Grey Ironbark/White Mahogany ▪ Swamp Mahogany	Community Land	Council
6	Lot 16 DP 1047733	Lot 16 DP 1047733	Lot 16 DP 1047733	0.3611	▪ Grey Gum/Grey Ironbark/White Mahogany	Standard	Council
7	Public Reserve	RES 1009 (R210072)	Lot 1 DP 248650	0.4148	▪ Banksia	Crown Land	Council & Crown
8	Pacific Palms Sports Complex	RES 5032	Lot 54 DP 610055	2.604	▪ Cleared ▪ Paperbark	GLC	Council
9	Public Reserve	RES 5061	Lot 14 DP 253875	0.0469	▪ Paperbark	GLC	Council
10	Public Reserve	Lot 35 DP 1044735	Lot 35 DP 1044735	0.0151	▪ Paperbark	Standard	Council
11	Public Reserve	RES 5361	Lot 18 DP 804903	0.4002	▪ Paperbark	Community Land	Council
12	RES 5256	RES 5256	Lot 7 DP 811686	0.0005	▪ Swamp ▪ Paperbark	Community Land	Council
13	Public Reserve	RES 5245	Lot 17 DP 804903	0.041	▪ Paperbark	Community Land	Council
14	Pacific Palms Tourist Centre	RES 5115	Lot 45 DP 200167	2.615	▪ Swamp Mahogany ▪ Blackbutt-Bloodwood/Apple	Community Land	Council
15	Public Reserve	RES 5256	Lot 111 DP 1060098	3.016	▪ White Mahogany/Red Mahogany/Grey Ironbark/Grey Gum ▪ Grey Gum/Grey Ironbark/White Mahogany	GLC	Council
16	Boomerang Beach Blueys Beach	R210072 R210072	Lot 7133 DP 1077044 Lot 7040 DP 1077045	11.75 18.815	▪ Sand Ridge ▪ Banksia ▪ Heath	Foreshore Reserve Crown Land	Council & Crown Council & Crown

ID	Property Name	Reserve Number	Lo t/ DP	Ha	Vegetation Community	Land Type	Managed by
17	Blueys Beach Foreshore	Blueys Beach	Pt Vacant Crown Land	3.65	▪ Sand Ridge ▪ Cleared ▪ Myrtle	Pt Vacant Crown Land	Council & Crown
18	RES 58 (R84278) “ “	RES 58 (R84278) “ “	Lot 7054 DP 1071153 Lot 7055 DP 1071165 Lot 7128 DP 1070576	0.998 1.987 0.0001	▪ Palm “ ▪ Cleared	Crown Land Crown Land Crown Land	Council & Crown Council & Crown Council & Crown
			TOTAL	**48.80**			

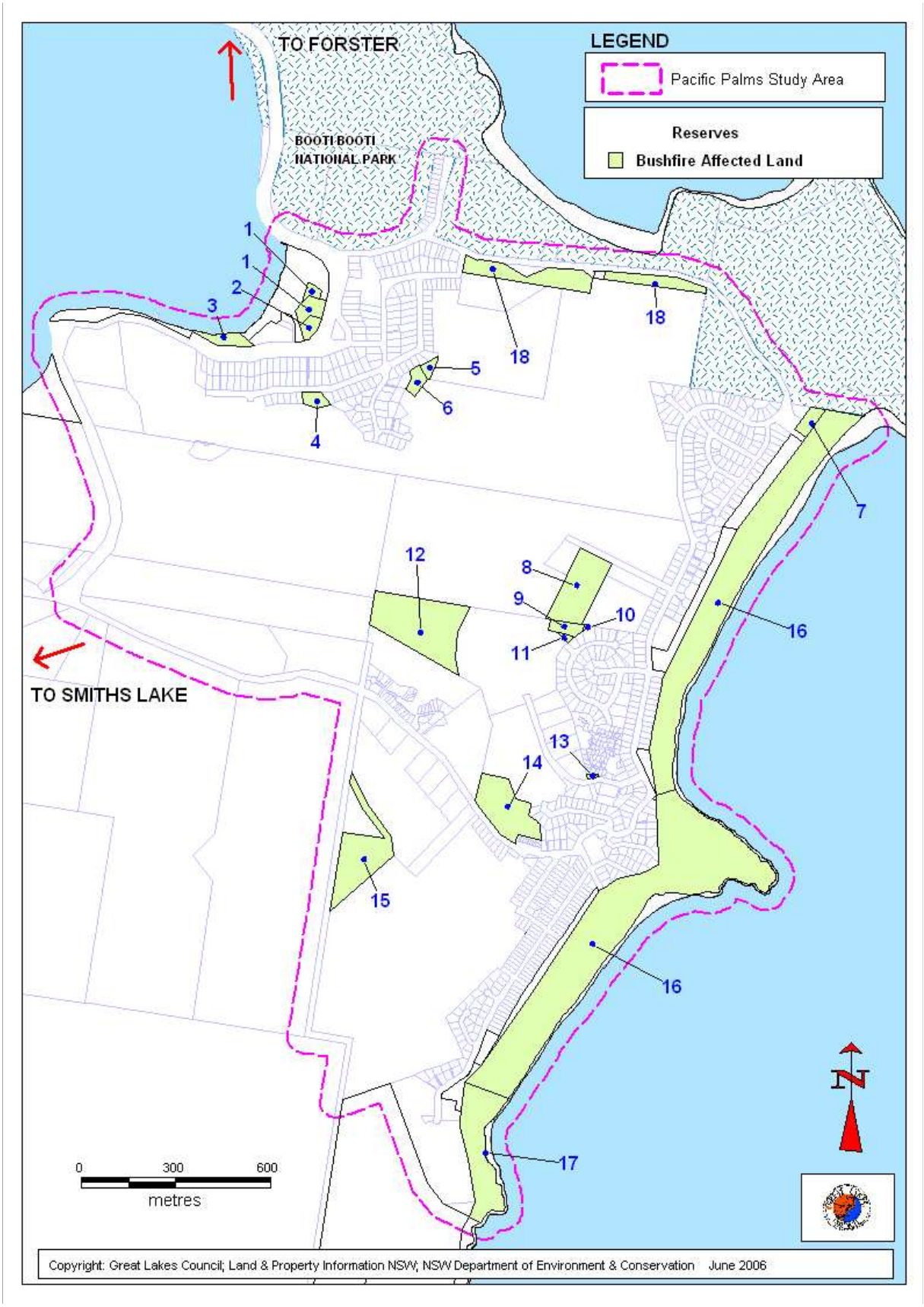


Figure 6: Location of Council managed land affected by bushfire in the study area.

Community Assets

Pacific Palms comprises of residential, commercial and special purpose properties that at times are adjacent to bushland areas. The study area (approximately 418 hectares) comprises of urban land, with some of the remaining area has been identified for future development within bushland areas.

Pacific Palms has a mixture of dwellings built to the Australian Building Standard AS 3959 since the approval of subdivisions. These have various fire regulations and development approvals in relation to fire management zones, building structure and protection in event of a fire.

Additionally Council approved buildings complied with the following Council bushfire protection policies and guides by the Department of Bush Fire Services before legislative changes took affect in 2003 to improve construction techniques and hazard reduction in bushfire prone lands:

- Policy for Bush Fire Protection for Rural dwellings/subdivisions (1993),
- Policy for fire management for council controlled natural areas (1996), and
- The Department of Bush Fire Services, "Planning for Bush Fire Protection, A guide for land use planners, fire authorities, developers and home owners"(1991).

Since the enforcement of the document "Planning for Bushfire Protection 2003", development within the area is required to meet legislative building standards and hazard reduction requirements. This also affects adjoining property owner's fuel reduction works Additionally the Code provides guidelines for fire protection of existing buildings.

Development of the various villages has impacted on the environment and fragmented bushland areas originally found along the coastline as seen in the example within Figure 7.

Public Utilities

Country Energy maintains electricity infrastructure in the study area. Reticulated water and sewage is available within Pacific Palms and maintained by MidCoast water.

Telstra provides and maintains the communication network services through underground and overhead lines.

Service localities, maintenance points or junction boxes and underground electricity and telephone access points are identified by posts or marked on the ground within the vicinity of site, on roadways or easements.

Figure 7: Example of developments within Pacific Palms.

Natural and Cultural Heritage

The 68 hectares of development within the villages of Pacific Palms, are generally surrounded by natural bushland areas including 49 hectares of Council managed land. Fragmented vegetation communities are now set amongst urban developments and represent the forest types that originally existed in the area or altered forms of such. Although fragmented, these areas are significant for vegetation and fauna habitat and thus serve to enhance conservation values of the local area. Fire management in these areas must consider the existing environmental values.

Council parks, road reserves and undeveloped residential properties link can often be interlinked and form wildlife corridors through Pacific Palms. Within the study area the vegetation formation is predominantly Dry sclerophyll forest with a grass or shrubby understorey, Forested wetland (Coastal floodplain wetland), and Rainforests (Littoral rainforest). Some areas lack sub dominant and ground cover layers or possess as altered structure as a consequence of human interaction (i.e. logging, slashing). Limited smaller areas support Freshwater wetlands integrating with the adjacent Forested wetlands. The open undeveloped areas cleared areas are referred to as being cleared and most such areas are formed of maintained pastures or grassland areas.

Former vegetation survey and mapping projects involved a review of aerial photograph interpretation and targeted traverse (ground-truthing). Vegetation communities were delineated on the basis of the structure and floristics of the canopy as well as other structural descriptors and land use influences.

From these surveys and the vegetation community types described within the Draft Great Lakes Vegetation Strategy 2004, within the study area 22 natural vegetation communities were identified, which covers approximately 538 hectares. The forest types are those described in the Research Note No 17 (Forest Commission of NSW 1989) and a map of the location of the vegetation communities is provided in Figure 8.

The provided vegetation data is expected to have local variation as detailed ground—truthing would provide further floristic details, in addition to the existing mapped vegetation. This information is evolving and amended as ground truthing and survey work leads to maps being updated and enhanced.

Cleared land covers approximately 13% of the study area. The vegetation formations within and adjacent to residential properties of Pacific Palms include in decreasing order; Dry sclerophyll forest (shrub/grass subformation) (38% cover); Forested wetland (Coastal floodplain wetland) (14% cover), Rainforests (Littoral rainforest) (12% cover); with the remaining areas (each with less than 10% cover of the mapped area) including; Heathlands (Coastal headland heaths), Wet sclerophyll forest (shrubby subformation) and Freshwater wetlands. All naturally vegetated areas require the appropriate hazard reduction management practice to be implemented with respect of environmental sensitivities, in due recognition of risk management and ecological values and thresholds.

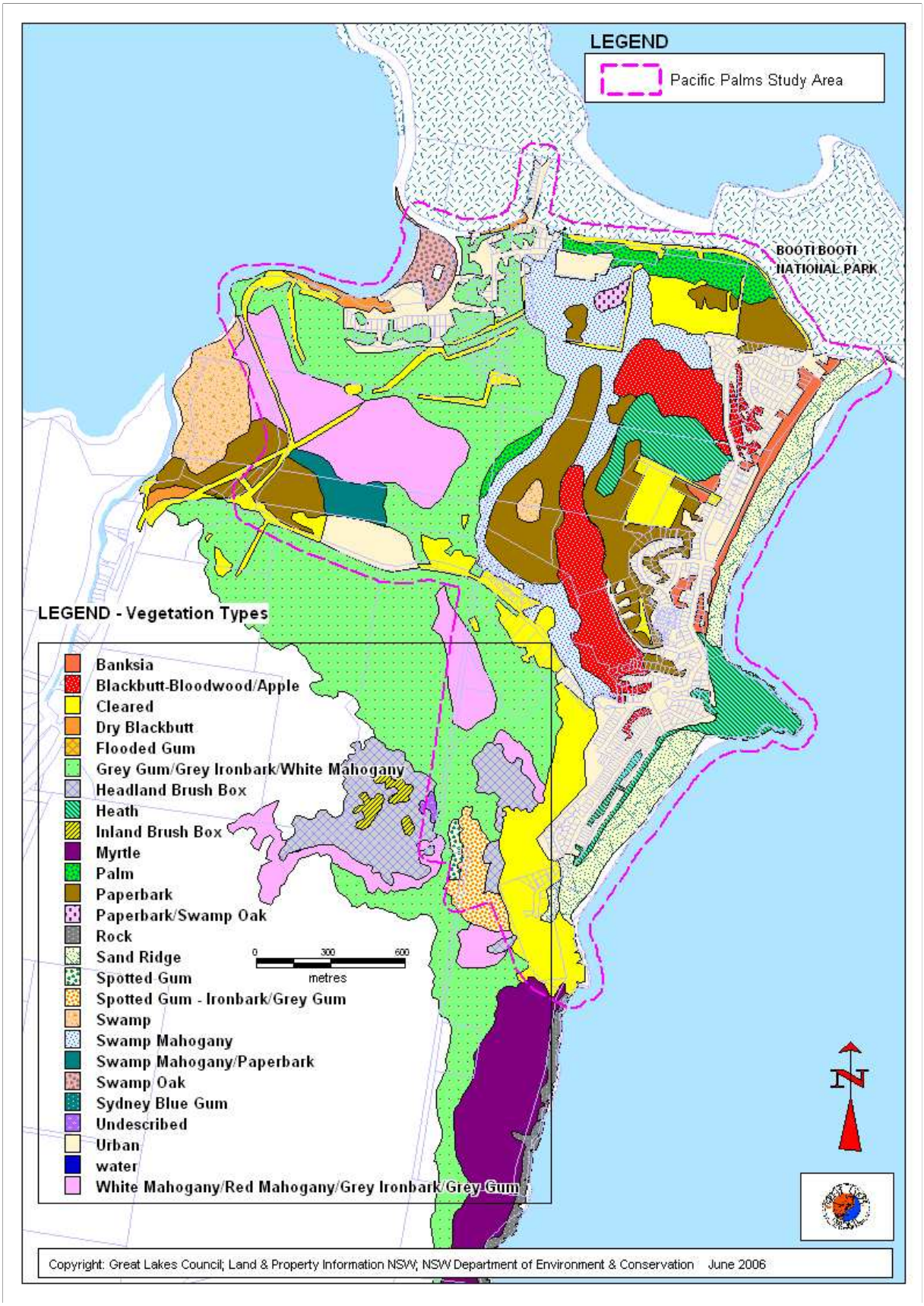


Figure 8: Vegetation within the study area.

From this analysis, it is evident that there are several vegetation communities' that exist that are likely to be classified as Endangered Ecological Communities (EEC) on the TSC Act. These include Coastal Saltmarsh, Littoral Rainforest and Swamp Oak or Swamp Sclerophyll Forest on Coastal Floodplain. These areas are of high conservation value and require management practices to protect these areas. Other vegetation communities mapped in the Pacific Palms environs are also considered regionally rare, regionally vulnerable, severely depleted, a private land priority for conservation, and/or have a 100% conservation target within the Lower North Coast of NSW (refer to Appendix X).

The conservation values of Council natural areas within the study area provide an important buffer and contribute to habitat and environmental services in the local landscape. As such, proper recognition of the inherent values of such vegetation is considered essential in any fire management regime for Pacific Palms. For example Blueys and Boomerang Beach Crown Reserves are within the area defined by DEC as Key Regional Habitat and Regional Corridor, which extends into the adjacent conservation area of BBNP.

By recognising local vegetation types and understanding the complexity of fire, the enhancement and conservation of the environment can be achieved. These forest types have been grouped as vegetation formations (Keith 2005) (Figure 9) and are used to identify the desired targets for the frequency and intensity of prescribed burning. These have led to the identification of fire regimes to meet biodiversity thresholds[9] for fire management planners within various vegetation formations (Figure 10).

In addition Council has liaised with the DEC (Parks and Wildlife Division) regarding information within the maintained Aboriginal Heritage Information Management System (AHIMS) search for Aboriginal Objects and Aboriginal Sites within the study area. The hazard reduction proposals identified within the plan meet guidelines by the DEC and have no impact on existing recorded sites on Council managed land.

Clause 21 of Great Lakes Local Environmental Plan, 1996 makes provision for significant 'Heritage items' and guides their enhancement and protection. Within Great Lakes, Schedule 2 indicated there are no recorded heritage items listed as local, regional or of state significance within the study area.

[9] Refer to Table 17 or appendix XI

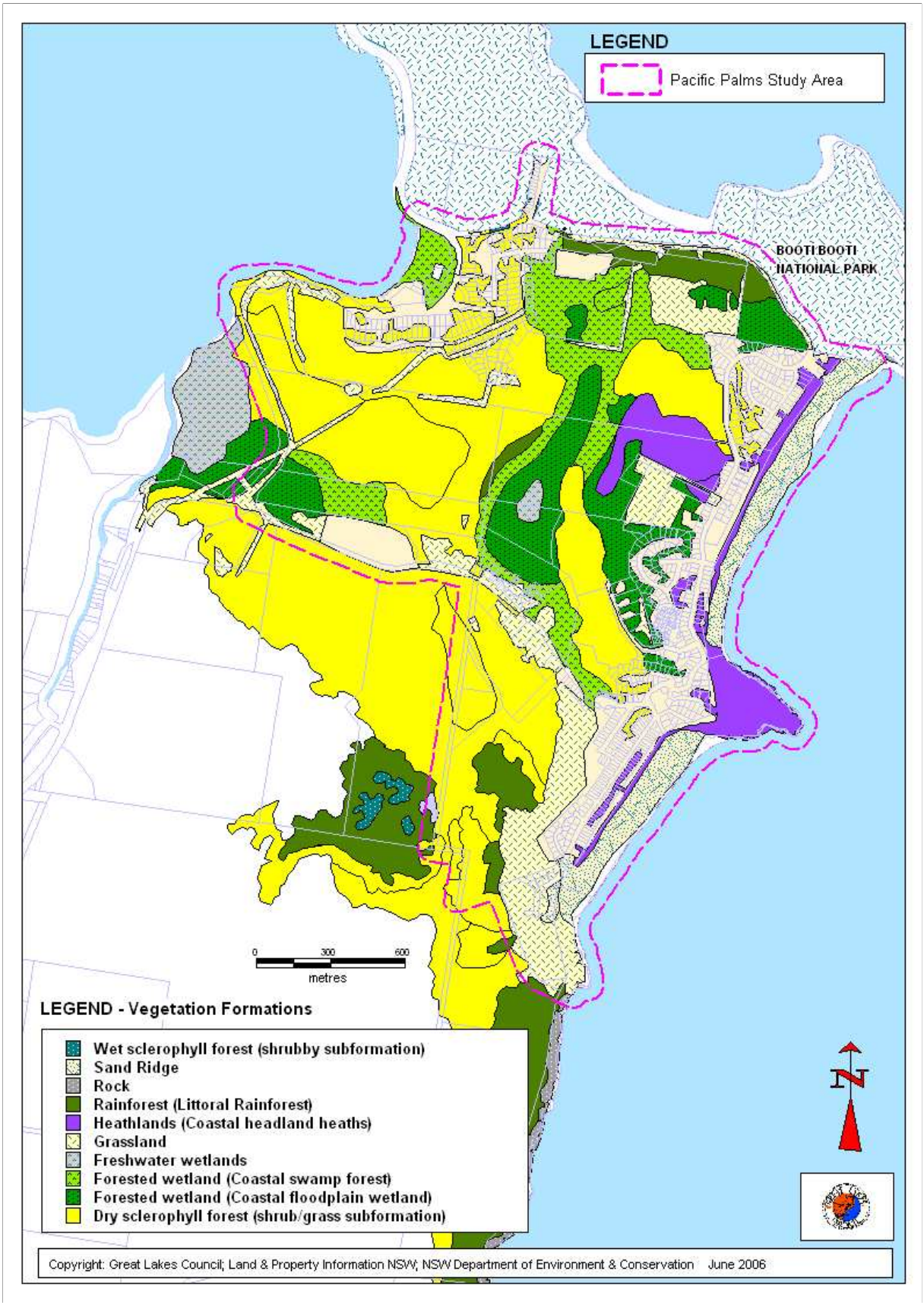


Figure 9: Vegetation formation for fire management

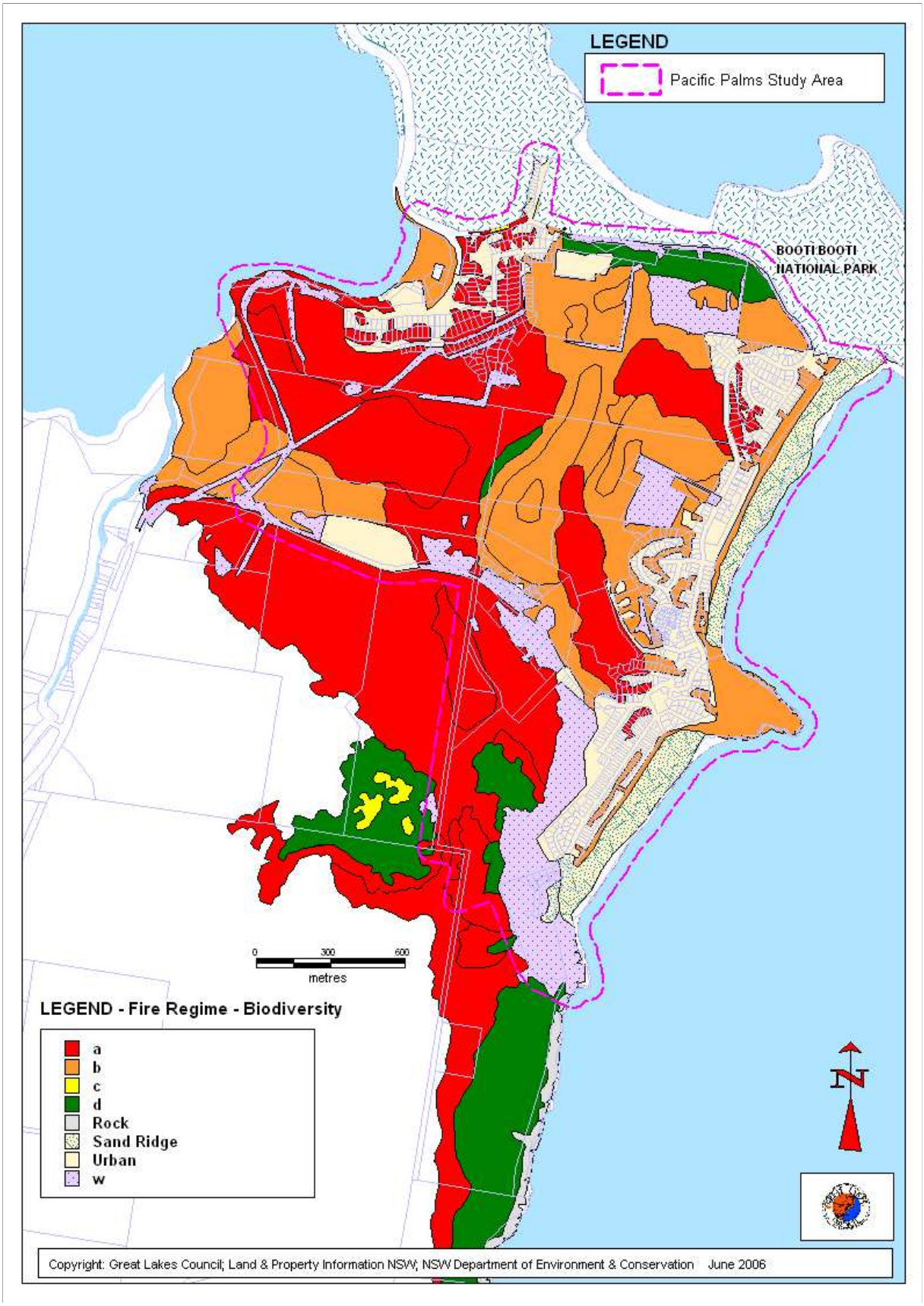


Figure 10: Biodiversity fire regimes applied to local vegetation

Water Supply/Fire Fighting Water Supply/Aerial Access

Elizabeth Beach, Boomerang Beach and Blueys Beach have reticulated water. Fire hydrants provide water to fire fighters in the event of fire incidents. Wallis Lake also provides an unlimited water supply for protection and suppression during aerial operations.

There is a designated helicopter-landing pad south of the study area in Smiths Lake located within a public reserve adjacent to Smiths Lake Bowling Club. Other helicopter landing sites that may be used by approval during emergencies (south of Pacific Palms) are within DEC BBNP, The Ruins, Works Depot.

Fire history

Fires are known have regularly occurred within and neighbouring Pacific Palms study area and being within 8 kilometres of the coast fires are often influenced by variable coastal weather. Planned prescribed burns and wild fires have also burnt the forested and coastal heath areas. Locally fires have occurred mostly in spring, when the relative humidity is lower. Wildfires may also occur in late winter and early spring.

Wildfire have occurred in the vicinity of Pacific Palms during various bushfire seasons including; 1982-83, 1984-89, 1990-91, 1992-93, 1994-95 and 2003-2005 (DEC 2005b and NSW RFS 2005b). To the west of Pacific Palms a large wildfire in 1979-80 burnt predominantly west of the Lakes Way. The majority of these wildfires are from the northern boundary of the study area, with few recorded south of the area. However Reserve 5240 was burnt during the fire in July 2004 in the southern area of the study area.

Private properties owners are known to undertake burning for land management purposes and hazard reduction through the non-bushfire season. These low or moderate intensity burns, do not threaten Pacific Palms and the rural areas during optimum manageable weather conditions.

Fire Trails/Fire Advantages/Control Lines

Fire trails are designed to provide access for fire fighting personnel and fire fighting units during incidents or planned fire operations. The fire trail register managed by the RFS records registered fire trails across the State. Council and private property have a variety of fire trails and fire advantages (including unformed roadways) within the study area that are identified as strategic fire advantages.

There are fire trails within Council managed land in this plan. The categories of fire trails that exist within Great Lakes LGA are recorded as being of primary access for fire appliances sizes (heavy, medium and light) and secondary access by light fire appliances (sometimes medium—heavy).

Various existing fire advantages along primary and secondary roadways within the study area, which include the Pacific Palms internal road system and The Lakes Way collectively

assist in fire operations. Wallis Lake prevents fires directly spreading to the study area from the west, however in extreme fire events, spotting may occur across ridgelines.

Weather

The Australian Bureau of Meteorology (BOM) identifies climate zones by rainfall incidents and defines the Great Lakes LGA to be within a warm humid, mainly summer rainfall sub tropical zone. However, the area is at the boundary of the uniform rainfall and the mostly summer rainfall zones. Typically the local climate is warm—temperate, with generally warm to very warm summers and mild to cool winters.

Climatic data is available for four areas within or immediately adjacent to the LGA, at Forster, Coolongolook, Girvan State Forest and Nelson Bay (Bureau of Meteorology). Climatic details of these areas and historical relative humidity records (1961–1990) for Williamtown are documented in Appendix XI.

During the fire season the mean daily minimum temperature, on the coast is 13°C in October and rises to a mean daily maximum of 27.5°C in February. Monthly rainfall is highest in February and reducing from highest to lowest in January, December, March, November, April, and October respectively.

The BOM assist fire fighting authorities to predict fire weather and monitor bushfire weather during fire fighting operations. The local fire season is typically during the spring early summer, when the climate is hot with occasional strong winds from summertime cold fronts, which can lead to extreme fire danger periods. Lack of rain, low relative humilities and high winds contribute to increased fire danger (BOM 2005b). In most years, the summer rainfall in January brings the normal fire season to an end, although some drier years have extended beyond this period.

BOM records have shown that major fires in New South Wales such as the January 1994 experienced the worst conditions such as when a deep low-pressure systems occurring near Tasmania, brought strong, dry, westerly winds to the coast (BOM 2005b).

BOM provide fire weather warnings (bushfire alerts) during the bushfire danger period to the NSW RFS who broadcasts conditions and requirements, such as total fire bans and the issuing of fire permits for the lighting of fires.

The drought indices (forest/grassland) are derived from the Keetch Byram Drought Indices (KBDI) and collectively with temperature, relative humility, wind speed, rainfall and duration identifies the fire danger rating.

The fire danger indices assist authorities to declare fire danger ratings (none, low, moderate, high, very high & extreme) and to work out fire behaviour in relation to predicted rates of spread that is affected by the soil dryness (KBDI). As the forest fire drought index (FFDI) increases so does the fire rating (RFS 2003c).

The local coastal wind patterns distinctly change from the morning to the afternoon in which patterns are affected by coastal sea breezes.

Generally prevailing fire weather winds during winter and spring within Great Lakes LGA are predominantly from the southwest—northwest and shifting winds in summer from the west—northwest to the southeast—northeast from afternoon sea breezes. Southerly changes up the coast also cause unpredictable fire weather conditions, which push strong hot winds preceding the cold front often with moist cooler conditions following.

Resources

Within the LGA there is a fleet of fire fighting appliances from 23 locations. The distances to Pacific Palms from other brigade stations, local to Pacific Palms are shown in Figure 11. Pacific Palms has well-maintained roadways including the main tourist drive being The Lakes Way. This allows efficient response time throughout the township when neighbouring brigades are required.

The Council in liaison with the RFS certify the existing number of resources and upgrades proposed by the RFS. Annual funding from the Council ensures the upkeep and improvement of vehicles and fleet vehicle.

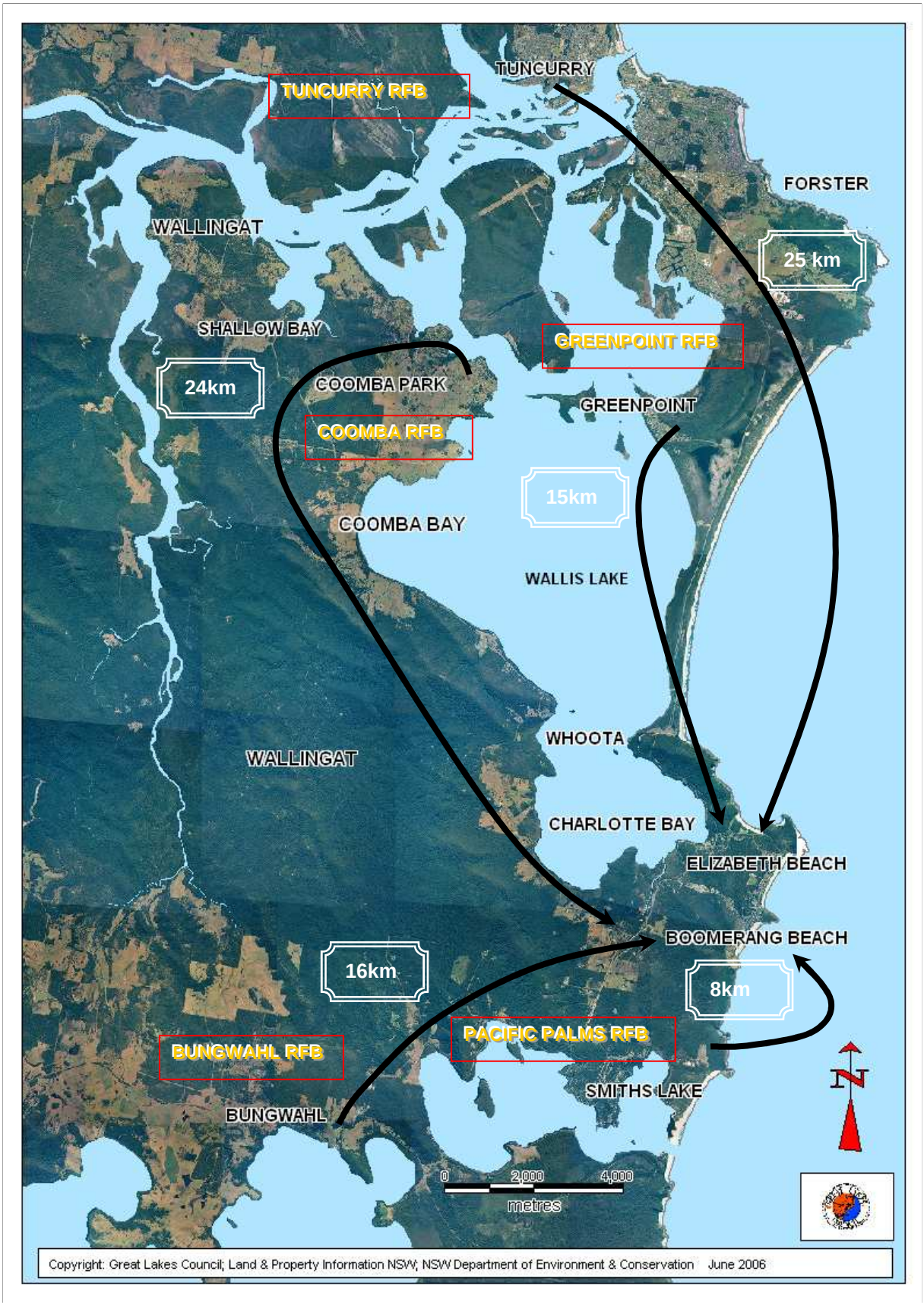


Figure 11: Distance to Pacific Palms from other Rural Fire Brigade Station locations.

Key Fire Issues for the Study Area

Throughout the preparation of the plan fire issues have been highlighted, being both of a positive and negative nature. From this summary of fire issues, land managers can easily identify, both at a planning level and during operational fire management, issues to be considered.

Key Fire Issues
❖ A large number of assets occur within Pacific Palms, which potentially requires protection during fires.
❖ Bush fire mapping identifies areas of Pacific Palms as having a range of bush fire risks from moderate to major.
❖ Continuous vegetation adjoins private properties in Pacific Palms, which subsequently may increase fire threat to surrounding residences.
❖ Spotting may occur across sand ridges within the reserve areas adjacent to residential properties, which require active fire management works to reduce potential.
❖ Reticulated water within Pacific Palms and the lake provides additional water supply for fire fighting.
❖ A proportion of private landholders have created various FMZ's and fire trails that need to be recognised and complimented in proposed community land management.
❖ Landholders adjacent to Council reserves need to prepare their assets against fire to increase self-protection and awareness.
❖ Bushfire Prone Land requires building standards to be applied to developments reducing impact of fire on homes and properties.

SECTION 8

Management Strategies

Management strategies for each asset protection zone, strategic fire management zone, land management zone or fire exclusion zone outlined, guide manager decisions. These have been mapped and identified within each reserve or managed land. To assist with understanding the codes on the figures, refer to identification (ID) seen within Table 6, which identifies the relationship with the figures.

Table 6: Terminology used on figures within the plan.

ID	Description
LP	Life and property
A1	Asset Protection Zone reference number (preceded by locality code)
S1	Strategic Fire Management Zone reference number (preceded by locality code)
C1	Land Management Zone for conservation reference number (preceded by locality code)
E1	Fire exclusion zone reference number (preceded by locality code)
Hs	Cultural heritage including Cultural Heritage and Aboriginal Heritage
Fl/ Fa	Threatened flora/ Threatened fauna
EEP/ ECC	Endangered populations/ Endangered ecological communities

The key elements to hazard reduction activities are those strategies identified by Council within Table 7.

Table 7: Specific strategies applied to fire management zones.

1	Create and/or maintain APZ and SFAZ specifications on Council land for adjacent existing developments.
2	Create and/or maintain fire advantage lines to provide access for fire fighters.
3	Promote to the community, education on importance of hazard reduction and Council proposed works.

Table 11 contains relevant fire objectives and hazard reduction works applied to a particular zone, which may vary depending on the proposed management techniques.

Council has taken into consideration neighbouring fire management strategies adjacent to Council land. It is recognised that private landholders and other authorities have evolving management practices and fire strategies may alter from existing works in the future.

Therefore an annual review of fire management strategies both in the field and those referenced within other contemporary planning documents is important to ensure management is cohesive and evolutionary.

Asset protection zones

Using the criteria described within the Plan for determining APZ's a total of 18 APZ's have been identified within Council Land and reserves (Figure 12-14 and Table 8 & 9). Consideration of existing APZ's on adjacent properties, enable Council fire management strategies meet fire protection requirements.

Strategic Fire Advantages

Two (2) SFAZ's are recorded in reserve area and road reserves within Council land which are fire trails (Figure 12-14 and Table 10).

Mechanical slashing within SFAZ's within bushland areas including public reserve areas, drainage reserves and road reserves, assist in protecting assets, strengthening adjacent APZ's or providing strategic areas to be used during fire operations.

Council road reserves adjacent to managed major and minor roads use mechanical hazard reduction methods. This roadside slashing along the road verge to a distance of 2.5 metres either side in both urban and rural areas widens the existing fire break (being the bitumen or gravel roadways) and assists in mitigating the spread of fire to adjacent properties.

Fire advantages are used during fire operations to limit the spread of bushfires or used as a control line. The line/area constitutes fuel reduced areas (limiting fire spread), whether natural like rainforests; rivers; lakes; rocks) or man made (fire trails; road; APZ's and SFAZ's).

Change is imminent and references to these are intended as a guide only, as other management and planning decisions by managers may alter suitability in the future.

Land Management Zones

Fifteen (15) LMZ's (C) have been identified within Council Land ((Figure 12-14 and Table 11). Council has mapped these zones and identified the vegetation communities within each zone. The fire management objectives in each LMZ vary depending on existing use (e.g. recreation) and/or environmental sensitivity are identified within Table 12. Biodiversity thresholds are described within Table 15 for Pacific Palms study area. The implementation of ecological based fire regimes of irregular mosaic burn patterns and minimal intervals between burns is important for managing bushland areas within larger zones.

Regeneration of disturbed areas within reserves consistent with management of public reserves and recreation areas objectives is important when managing for fire and the conservation of areas.

Where existing management within this zone does have cleared land, the land management type; whether lease area or commercial buildings, fire protection legislation applies to developments.

Ecological Considerations

Within the study area there are communities that appear to satisfy the criteria for listing as endangered ecological communities (EEC). The TSC Act guides the conservation and enhancement of these areas. Fire management planning incorporates legislation and objectives of biodiversity enhancement in areas nearby or within communities such as these.

In addition the Code has provisions for the protection of biodiversity including guidelines for burning in SFAZ's and LMZ's by identifying fire regimes for each zone (Table 15).

The Wallis Lake Foreshore area is within the riparian zone and requires protection when the existing fire regime has either exceeded or do not support burning for biodiversity.

Areas classified as being SEPP 26 or SEPP 14 is significant and management of theses areas is important to ensure their continued enhancement to conservation values.

Fire Exclusion Zone

Seven (7) FEZ's have been identified within Council Land. The fire regime has either been exceeded (within areas of high conservation values) or the vegetation type does not support burning for biodiversity (Figure 12-14, Table 12). This includes areas where any occurrence of fire inhibits the ability of vegetation to fully recover to former complexity within vegetation types including estuarine and saline wetlands and rainforest. Areas classified as being SEPP 26 or SEPP 14 is significant and management of theses areas is important to ensure their continued enhancement to conservation values.

Figure 12: The overview of FMZ's within bushfire affected land in Pacific Palms.

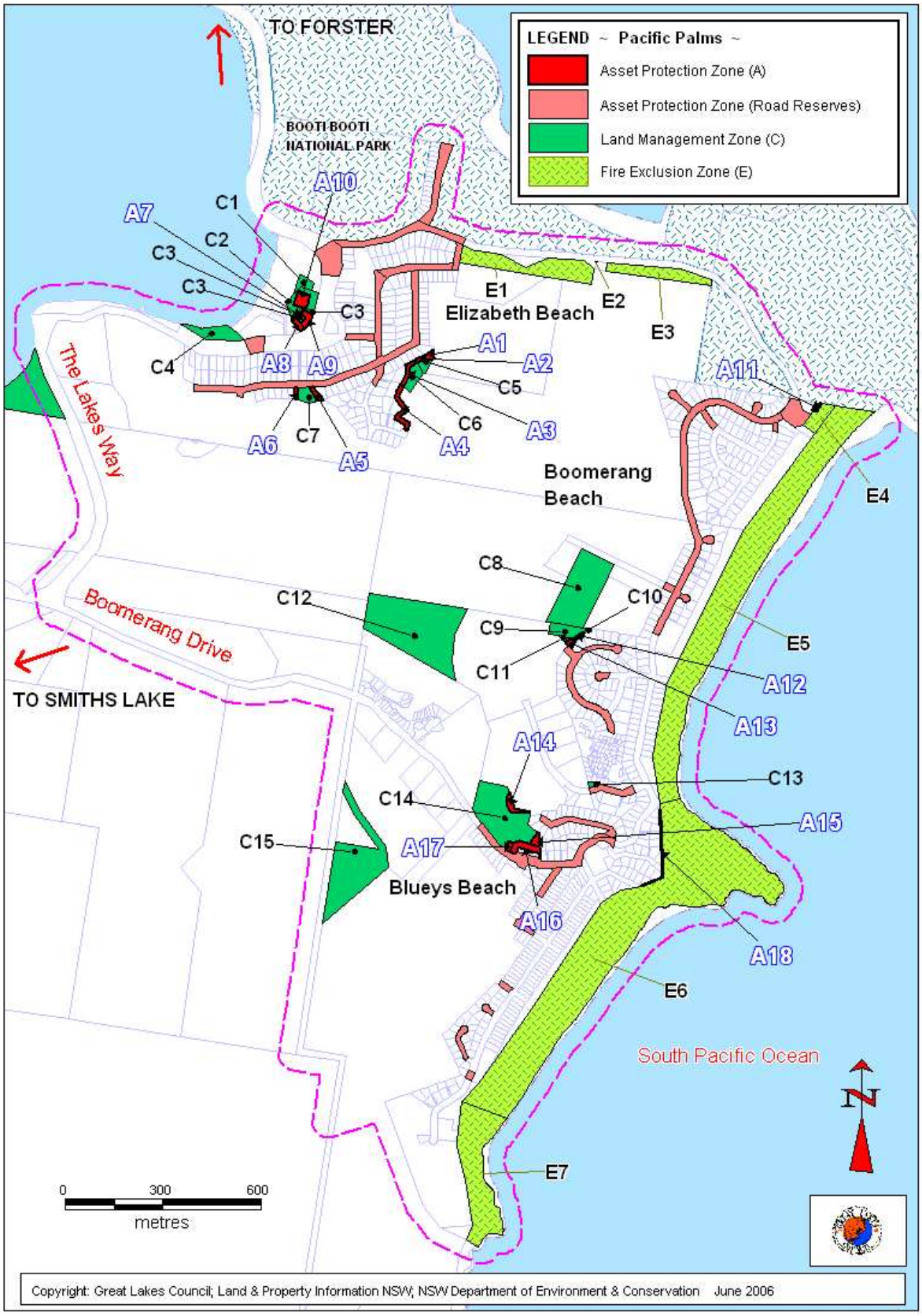


Figure 13: Fire management zones within Pacific Palms

Figure 14: Fire trails within Pacific Palms.

Table 8: Specific fire objectives applied to APZ's.

Reserve ID	APZ Code (PP)	Council Managed Land	Reserve	Zone Objective	Width (m)	Length (m)	Area (Ha)	Maintenance Type	Frequency of Maintenance[10]
Pacific Palms									
5	A1	RES 5275	RES 5275	• To protect the bushland interface south of the property linking with the reserve.	20	35	0.0563	Hand removal / Slashing	Annual (Herb/shrub cover)
5	A2	RES 5275	RES 5275	• To protect the bushland interface south of the property linking with the reserve.	12	30	0.0357	Hand removal / Slashing	Annual (Herb/shrub cover)
6	A3	Lot 16 DP 1047733	Lot 16 DP 1047733	• To protect the bushland interface south of 5 properties linking with the reserve.	12	92	0.1133	Mowing/ Slashing	Annual (Herb/shrub cover)
Adjacent to 6	A4	Lot 4242 DP 1036056	Adjacent to Lot 16 DP 1047733	• To protect the bushland interface east of 5 properties linking with the reserve.	12	184	0.2184	Mowing/ Slashing	Annual (Herb/shrub cover)
4	A5	Public Reserve	RES 5276	• To protect the bushland interface west of the property linking with the reserve.	10-18	51	0.0646	Mowing/ Slashing	Annual (Grassy ground cover)
4	A6	Public Reserve	RES 5276	• To protect the bushland interface east of the property linking with the reserve.	11	39	0.0414	Mowing/ Slashing	Annual (Grassy ground cover)
2	A7	Pacific Palms Community Hall	RES 113 (Pt R93454)	• To protect the bushland interface NE of the Community Hall linking with the reserve.	5	57	0.0281	Hand removal	Annual (Herb/shrub cover)
2	A8	Pacific Palms Community Hall	RES 113 (Pt R93454)	• To protect the bushland interface SW of the Community Hall linking with the reserve.	15	42	0.0643	Hand removal / Mowing	Annual (Herb/shrub cover)
2	A9	Pacific Palms Community Hall	RES 113 (Pt R93454)	• To protect the bushland interface north—east of the Community Hall linking with the reserve.	20	75	0.1148	Hand removal / Mowing	Annual (Grassy ground cover)
1	A10	Pacific Palms Tennis Courts	RES 113 (Pt R93454)	• To protect the bushland interface surrounding the tennis courts & assets within the reserve.	40	43	0.1796	Hand removal / Mowing	Annual (Grassy ground cover)
7	A11	Public Reserve	RES 1009 (R210072)	• To protect the bushland interface east of the property linking with the reserve.	8	35	0.0234	Hand removal	Annual (Herb/shrub cover)

[10] Frequency of maintenance: Monitor fuel loads within APZ's and adapt frequency of mechanical fuel reduction to meet the maximum average fuel hazard level to be 8 tonnes/hectare.

Reserve ID	APZ Code (PP)	Council Managed Land	Reserve	Zone Objective	Width (m)	Length (m)	Area (Ha)	Maintenance Type	Frequency of Maintenance[10]
9	A12	Public Reserve	RES 5061	• To protect the bushland interface west of the property linking with the reserve.	8	45	0.0327	Hand removal / Mowing	Annual (Herb/shrub cover)
11	A13	Public Reserve	RES 5361	• To protect the bushland interface west of the property linking with the reserve.	15	26	0.0351	Hand removal / Mowing	Annual (Herb/shrub cover)
14	A14	Pacific Palms Tourist Centre	RES 5115	• To protect the bushland interface west & south of the property linking with the reserve.	1-18	126	0.1235	Hand removal / Mowing	Annual (Herb/shrub cover)
14	A15	Pacific Palms Tourist Centre	RES 5115	• To protect the bushland interface west of the 3 properties linking with the reserve.	9-25	43	0.0803	Hand removal	Annual (Palm debris) (Grassy ground cover))
14	A16	Pacific Palms Tourist Centre	RES 5115	• To protect the bushland interface north of the 10 properties linking with the reserve.	4-20	150	0.2122	Hand removal / Mowing	Annual (Palm debris) (Grassy ground cover))
14	A17	Pacific Palms Tourist Centre	RES 5115	• To protect the bushland interface surrounding the tourist centre within the reserve.	16	25	0.0395	Hand removal	Annual (Palm debris) (Grassy ground cover))
16	A18	Blueys Beach	R210072	• To protect the bushland interface east of 9 properties linking with the reserve	3	278	0.0778	Hand removal / Mowing	Annual (Herb/shrub cover)
				Total		**1376m**	**1.541ha**		

Table 9: Specific fire objectives applied to APZ's within road reserves.

APZ Code (PP)	Council Managed Land	Zone Objective	Total Area of Road Reserve (m)	Width of APZ	Maintenance Type	Existing Management
Pacific Palms						
Rd-A1	Lethbridge Road	• To protect adjacent residential properties. • To assist in mitigating the spread of bushfire from adjacent bushland interface.	0.6582	As per guideline within Plan.[11]	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A2	Lakeside Crescent	• As above	0.836	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A3	Mariana Avenue	• As above	0.1523	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A4	Pacific Parade	• As above	0.4624	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A5	Jacaranda Avenue	• As above	0.5145	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A6	Bellman Avenue	• As above	0.166	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A7	Hillside Parade	• As above	1.916	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A8	Palmtops Avenue	• As above	0.1152	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A9(a)	The Lakes Way	• As above	0.2548	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A9(b)	The Lakes Way	•	0.6502	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A10	Boomerang Drive (Carpark)	• As above	0.4758	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A11	Boomerang Drive	• As above	2.0424	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A12	Coast Avenue	• As above	0.0448	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A13	Terton Close	• As above	0.09	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A14	Peprico Place	• As above	0.1584	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A15	Cooper Crescent	• As above	0.1183	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A16	Angela Place	• As above	0.0754	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A17	Karnang Drive	• As above	0.0664	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A18	Marilyn Place	• As above	0.0534	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A19	Belbo Urie Crescent	• As above	0.9093	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A20	Carramatta Close	• As above	0.0883	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A21	Red Gum Road	• As above	0.2752	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A22	Head Land Road	• As above	0.4591	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A23	Boomerang Drive	• As above	1.1685	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)

[11] Width of APZ: Variable widths depending on setback of adjacent assets and adjacent relevant hazard reduction works.

APZ Code (PP)	Council Managed Land	Zone Objective	Total Area of Road Reserve (m)	Width of APZ	Maintenance Type	Existing Management
Rd-A24(a)	Croll Street	• As above	0.2148	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A24(b)	Croll Street	• As above	0.1043	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A25	View Street	• As above	0.0623	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A26	Samuel Street	• As above	0.0652	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A27	Alamau Street	• As above	0.0706	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A28	Ampat Place	• As above	0.1846	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)
Rd-A29	Newman Avenue	• As above	0.0494	• As above	Mowing/ Slashing	Public-sealed road (edges mowed)

Table 10: Specific fire objectives applied to SFAZ's.

Reserve ID	SFAZ Code (PP)	Council Managed Land	Reserve	Zone Objective	Width (m)	Length (m)	Maintenance Type	Vegetation Community Type
Pacific Palms								
Fire Trails (300m in Total)								
5 & 6	S1	Drainage Reserve	RES 5275 & Lot 16 DP 1047733	• To provide fire trail access to the internal area of the reserve.	6	152	Slashing / Unsealed road maintenance	▪ Grey Gum/ Grey Ironbark/ White Mahogany
Adjacent to 6	S2	Lot 4242 DP 1036056	Adjacent to Lot 16 DP 1047733	• To provide fire trail access to the perimeter of the adjacent development.	6	148	Slashing / Unsealed & Sealed access maintenance	▪ Grey Gum/ Grey Ironbark/ White Mahogany
				Total		**300m**		

Table 11: Fire management objectives applied to LMZ's

Zone Objective:	This will be achieved by :
❖ To protect the environmental values within the reserve and maintain biodiversity thresholds.	✓ Maintain adjacent FMZ's as per Tables 8-10 to minimize impact within LMZ's.
❖ To protect cultural heritage values within the reserve.	✓ Implement hazard reduction burns to maintain biodiversity.
❖ Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	✓ Implement hazard reduction activities to meet guidelines and conditions within the Code and the TSC Act, relating to mechanical and the use of fire within FMZ's to protect and enhancement of threatened species and their habitats.
❖ Protect riparian areas from inappropriate burning regimes.	✓ Implement Catchment management objectives adjacent to enhance Wallis Lakes.
❖ To manage reserves as per management plans or existing use.	✓ Regenerate disturbed areas and promote re-establishment within FMZ to minimise any negative impact.
	✓ Suppress bushfires to maintain fire regimes to enhance biodiversity.
	✓ Implementing current land management practices as per policies, procedures and management plans.

Table 12: LMZ's within the Pacific Palms study area.

Reserve ID	LMZ Code (PP [12])	Property Name	Reserve Number	Lot/ DP	Ha	Vegetation Community Type
1	C1	Pacific Palms Tennis Courts	RES 113 (Pt R93454) "	Lot 447 DP 45864 (Pt R93454) Pt Lot 2 DP 875579	0.5395 0.1766	▪ Swamp Oak "
2	C2	Pacific Palms Community Hall	RES 113 (Pt R93454)	Lot 432 DP 753168 (Pt R93454)	0.3353	▪ Swamp Oak
2	C3 C3 C3	Pacific Palms Community Hall " "	RES 113 (Pt R93454)	Lot 432 DP 753168 (Pt R93454)	0.0269 0.0177 0.0438	▪ Swamp Oak " "
3	C4	Lot 380 DP 753168	Lot 380 DP 753168	Lot 380 DP 753168	0.528	▪ Cleared ▪ Dry Blackbutt

[12] Locality abbreviation for Pacific Palms = F

Reserve ID	LMZ Code (PP 12)	Property Name	Reserve Number	Lot/ DP	Ha	Vegetation Community Type
4	C7	Public Reserve	RES 5276	Lot 24 DP 833985	0.325	▪ Grey Gum/Grey Ironbark/White Mahogany ▪ Cleared
5	C5	RES 5275	RES 5275	Lot 23 DP 833985	0.202	▪ Grey Gum/Grey Ironbark/White Mahogany ▪ Swamp Mahogany
6	C6	Lot 16 DP 1047733	Lot 16 DP 1047733	Lot 16 DP 1047733	0.3611	▪ Grey Gum/Grey Ironbark/White Mahogany
8	C8	Pacific Palms Sports Complex	RES 5032	Lot 54 DP 610055	2.604	▪ Cleared ▪ Paperbark
9	C9	Public Reserve	RES 5061	Lot 14 DP 253875	0.0469	▪ Paperbark
10	C10	Public Reserve	Lot 35 DP 1044735	Lot 35 DP 1044735	0.0151	▪ Paperbark
11	C11	Public Reserve	RES 5361	Lot 18 DP 804903	0.4002	▪ Paperbark
12	C12	RES 5256	RES 5256	Lot 7 DP 811686	0.0005	▪ Swamp ▪ Paperbark
13	C13	Public Reserve	RES 5245	Lot 17 DP 804903	0.041	▪ Paperbark
14	C14	Pacific Palms Tourist Centre	RES 5115	Lot 45 DP 200167	2.615	▪ Swamp Mahogany ▪ Blackbutt-Bloodwood/Apple
15	C15	Public Reserve	RES 5256	Lot 111 DP 1060098	3.016	▪ White Mahogany/Red Mahogany/Grey Ironbark/Grey Gum ▪ Grey Gum/Grey Ironbark/White Mahogany
				TOTAL	**11.30**	**Hectares**

Table 13: FEZ's within the Pacific Palms study area.

Reserve ID	FEZ Code (PP[13])	Property Name	Reserve Number	Lot/ DP	Ha	Vegetation Community Type
18	E1 E2 E3	RES 58 (R84278) " "	RES 58 (R84278) " "	Lot 7055 DP 1071165 Lot 7128 DP 1070576 Lot 7054 DP 1071153	1.987 0.0001 0.998	▪ Palm ▪ Cleared ▪ Palm
7	E4	Public Reserve	RES 1009 (R210072)	Lot 1 DP 248650	0.4148	▪ Banksia
16	E5	Boomerang Beach	R210072	Lot 7133 DP 1077044	11.75	▪ Sand Ridge ▪ Banksia ▪ Heath
16	E6	Blueys Beach	R210072	Lot 7040 DP 1077045	18.815	▪ Sand Ridge ▪ Heath
17	E7	Blueys Beach Foreshore	Blueys Beach	Pt Vacant Crown Land	3.65	▪ Sand Ridge ▪ Cleared ▪ Myrtle
				TOTAL	**37.62**	**Hectares**

[13] Locality abbreviation for Pacific Palms = PP

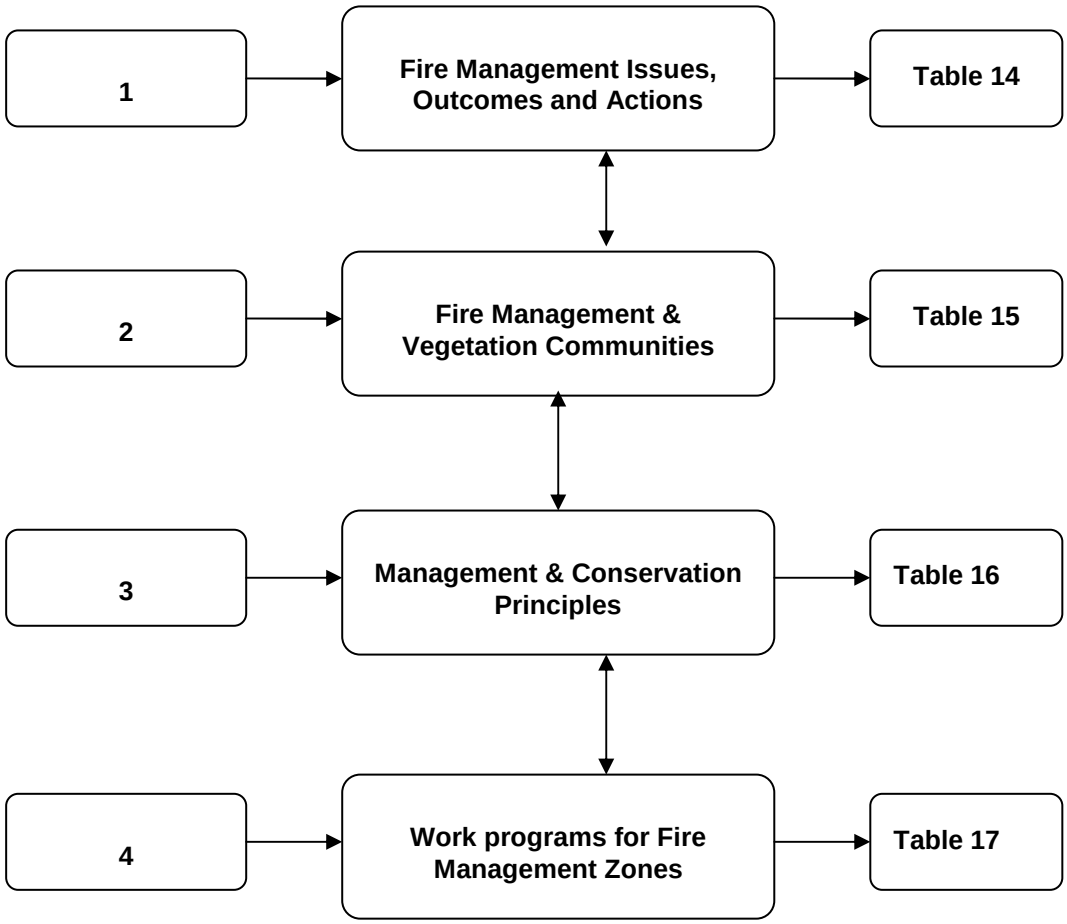
SECTION 9

Summary

Fire Mitigation

The plan has reviewed and provided strategic guidelines for planners and land mangers. The fire management outcomes reflect Council management requirements through the identification of specified on-ground works.

The key fire issues listed through the plan reiterate the direction of Councils fire management planning and the necessity to implement work program to mitigate against the bushfire risk. The chart below identifies the steps taken during the preparation of the plan and links the following tables presented in the concluding section of the plan.



These tables should be referred to for detailed management of each fire management zone. For example Table 17 summarises the on ground management of APZ's and SFAZ's can be implemented by a variety of methods including;

- ✓ Council parks maintenance (primarily slashing)
- ✓ Council open space maintenance (primarily mowing)
- ✓ Council road maintenance
- ✓ Council drainage reserve maintenance

The management of areas, described by width and length give an indicative size; at times the areas are variable for the total length hence the minor discrepancies. Reference to the map size and shape overcomes any issues.

As part annual works program, monitoring of fire hazards is important as this guides the slashing and mowing regimes within fire management zones. Assessment is in accordance with this Plan guidelines and using reference material such as the *Overall Fuel Hazard Guide Sydney Basin* (NPWS 2003) to assess fuel loads within Council Land. Slashing too frequent in bushland areas encourages introduced grasses and weeds to invade and in the long-term, changes vegetation structure (as grasses become more abundant with increased slashing frequencies.

Management Issues

Through the preparation of this plan key fire issues have been identified which have led to the subsequent outcomes to mitigate these issues (Table 14). The plan outcomes reflect management requirements by undertaking on ground works to specified requirements as discussed through various sections within the plan. The actions identified below guide Councils fire management strategies.

Table 14: Fire management issues and Council actions.

Key fire issues	Outcomes	Actions
❖ A large number of assets occur within Pacific Palms, which potentially requires protection during fires.	✓ Promotion of fuel management to owners is important to promote mechanical works within Pacific Palms.	✓ Request assistance for RFS to undertake community education.
❖ Bush fire mapping identifies areas of Pacific Palms as having a range of bush fire risks from moderate to major.	✓ In the event of a fire, adjoining properties to reserves will be fire affected.	✓ Provide fire management zones to reduce fuels.
❖ Spotting may occur across sand ridges within the reserve areas adjacent to residential properties, which require active fire management works to reduce potential.	✓ Potential threat from spotting across the ridge encourages land managers to reduce risks.	✓ Ensure asset protection zones are maintained to reduce impact from radiant heat.
❖ Reticulated water within Pacific Palms and the lake provides additional water supply for fire fighting.	✓ Promotion of fire hydrants for use by fire fighters.	✓ Awareness of fire hydrants system through appropriate authority.
❖ Continuous vegetation adjoins private properties in Pacific Palms, which subsequently may increase fire threat to surrounding residences.	✓ Assets require protection from fire threat.	✓ Reduce ground fuels within reserves.
❖ A proportion of private landholders have created various FMZ's and fire trails that need to be recognised and complimented in proposed community land management.	✓ Maintenance of these areas is important to ensure continued fire mitigation works to reduce fire effects to the community.	✓ Monitor fire fuel loads through work programs.
❖ Landholders adjacent to Council reserves need to prepare their assets against fire to increase self-protection and awareness.	✓ Landholders to implement hazard reduction programs and prepare properties in the event of a fire.	✓ Promote to the community the importance of preparation for fires.
❖ Bushfire Prone Land requires building standards to be applied to developments reducing impact of fire on homes and properties.	✓ Development consents for building specifications are affected by fire provisions in this area. ✓ Provide APZ & SFAZ adjacent to assets as per the guidelines within the Code. ✓ Implement fuel reduction works as guided by the BFRMP.	✓ Meet legislative requirements during development assessment. ✓ Meet requirements for protection of the community following guidelines for fire management.

Table 15: Biodiversity thresholds[14] and fire regimes to be applied to vegetation in Pacific Palms.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2004) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2004)	Vegetation Group (Category 1,2,3) PBFP	The Vegetation Formation (Keith 2004) Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Interval (BFEAC) (SFAZ/LMZ)
a	❖ Avoid 3 or more consecutive fires, with each of <5 years apart ❖ Avoid inter fire periods of >30 years ❖ Avoid 2 or more successive fires that totally scorch or consume the tree canopy ❖ Avoid 3 or more consecutive fires of low intensity	Blackbutt – Bloodwood/ Apple	41	1	Dry sclerophyll forests	5 /8
		Dry Blackbutt	37	1	Dry sclerophyll forests	5/8
		Grey Gum/ Grey Ironbark/ White Mahogany	62	1	Dry sclerophyll forests	5/8
		Spotted Gum – Ironbark/ Grey Gum	74	1	Dry sclerophyll forests	5/8
		White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	1	Dry sclerophyll forests	5/8
b	❖ Avoid 3 or more consecutive fires, with each of <8 years apart ❖ Avoid 3 or more consecutive fires, with each of the fires >15 years apart ❖ Avoid inter fire periods of > 30 years ❖ Avoid 2 or more consecutive fires that consume < 10t/ha of surface fuels	Banksia	107	2	Heathlands	7/10
		Heath	223	2	Heathlands	7/10
		Sand Ridge (Relic dune landscape)	233	na	Heathlands	
		Paperbark	31	1	Forested wetland	7/10
		Paperbark/ Swamp Oak	31/32	1	Forested wetland	7/10
		Swamp - #1	231	3	Freshwater wetlands	7/10
		Swamp Mahogany	30	1	Forested wetland	7/10
		Swamp Mahogany/ Paperbark	30/31	1	Forested wetland	7/10
		Swamp Oak	32	1	Forested wetland	7/10
c	❖ Avoid more than 1 fire every 30 years ❖ Avoid inter-fire periods > 200 years	Flooded Gum	48	1	Wet sclerophyll forests	25/30
		Inland Brush Box	53	1	Wet sclerophyll forests	25/30
		Sydney Blue Gum	46	1	Wet sclerophyll forests	25/30
d	❖ Any fire occurrence (a limited recovery ability exists)	Headland Brushbox	25	3	Rainforest	n/a
		Myrtle	23	3	Rainforest	n/a
		Palm	7	3	Rainforest	n/a
NA	Not Applicable (Primary/foredune landscape)	Rock/Sand	-	na	Other	n/a
		Sand Ridge	233	na	Heathlands/Beach	n/a
w	Use a, b, c, d options for biodiversity thresholds	Mixed Forest Regrowth Mixed Pine Mixed Woodland Vine Cleared/Grassland	220	1,2,3	Appropriate management practice	n/a w

[14] Biodiversity thresholds adapted from Bradstock et al 1995; NSW National Parks and Wildlife Service described within *the Draft Fire Management Strategies for Myall Lake National Park and Island Reserves, 2003a.*

Table 16: Conservation principles applied to hazard reduction works within each zone.

Type of Zone	Conservation Principle	Implementation	Monitoring
Asset Protection Zone **- slashing** **- tree removal**	Provide hospices within the area to maintain biodiversity; promote longevity of plants; buffer radiant effects from fire; reduce wind and provide habitat for fauna. Minimal thinning to meet canopy width specifications by the RFS. Tree removal of smaller, unhealthy, species with minimal impact on species using the habitat, in particular the Koala. Maintain habitat trees, seed trees and significant trees within zone.	Mechanical slashing of areas to protect assets. Tree removal by retaining stumps is preferred. Approval for stump removal of smaller trees assessed during site evaluation. Maximum overall fuel loads average is moderate.	Monitor fuels loads and changing vegetation community to guide slashing regimes to maintain appropriate fuel loads. Assess conservation values of the area and assess regrowth of slashed area and the impact on the local environment. Survey for threatened species.
Asset Protection Zone **-burning**	Burn area prescription to reduce fine fuels by 50-70% and elevated fuels by <50%. Ensure buffer zones within the burn area to protect impacts of erosion on steeper and riparian areas.	Fire regime is applied as frequently as needed to ensure the maximum overall fuel loads average is moderate.	Monitor fuels loads. Survey for threatened species.
Fire Advantages (Can be within Strategic Fire Advantages Zones or Asset Protection Zones) **- slashing** **- tree removal**	Natural or mechanical reduced fuels to provide corridors of lineal barriers or improved access to assist fire fighters to combat fire. Minimise soil erosion and ensure stumps are retained (below ground level) with approved tree removal.	Recognition of natural barriers or areas previously disturbed (not maintained). Within existing maintained areas (APZ/SFAZ), implement mechanical slashing of areas to reduce fuels to compliment management within APZ or SFAZ or adjacent zones.	Monitor accessibility and conservation values. Survey for threatened species.
Strategic Fire Advantage Zone **-slashing** **-tree removal** **(Mechanical or hand removal)**	Reduce fuels to provide corridors of lineal barriers or improved access to assist fire fighters to combat fire. Often related to drainage reserves, access & Services easements. Provide hospices within the area to compliment adjacent APZ or SFAZ. Minimise soil erosion and ensure stumps are retained (below ground level) with approved tree removal.	Mechanical slashing of areas to reduce fuels to compliment adjacent APZ. Maximum overall fuel loads average is high. Frequency less than within an APZ.	Monitor fuels loads. Survey for threatened species.
Strategic Fire Advantage Zone – burning	Burn area prescription to reduce fine fuels by 50-70% and elevated fuels by <50%. Mosaic burn 50-70% of the total area. Consider biodiversity thresholds for fire intensity and regularity.	Ecological based fire regimes of irregular mosaic burn areas integrated with protection of the community by providing fuel reduced areas, to compliment adjacent APZ or SFAZ. Maximum overall fuel loads average is high.	Monitor fuels loads. Survey for threatened species. Record fire frequency and intensity to meet prescriptions.
Land Management Zone **- burning**	Mosaic burn of up to 50% of the area to be burnt. Consider biodiversity thresholds for fire intensity and regularity.	Ecological based fire regimes of irregular mosaic burn areas. Protect riparian area conservation values.	Record fire frequency and intensity to meet prescriptions.
Fire Exclusion Zone	Hazard reduction and biodiversity burning excluded.	Conservation area.	Record fires.

Table 17: Specific works program applied to fire management zones.

(Refer to Table 8—11 for related strategies)

APZ Code (PP)	Location	Reserve	Width (m)	Length (m)	Area (Ha)	Maintenance Type	
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance						**1 - 4 (and/or) maintenance type options**	
PACIFIC PALMS							
ASSET PROTECTION ZONES							
A1	RES 5275	RES 5275	20	35	0.0563	Hand removal / Slashing	4
A2	RES 5275	RES 5275	12	30	0.0357	Hand removal / Slashing	4
A3	Lot 16 DP 1047733	Lot 16 DP 1047733	12	92	0.1133	Mowing/ Slashing	4
A4	Lot 4242 DP 1036056	Adjacent to Lot 16 DP 1047733	12	184	0.2184	Mowing/ Slashing	4
A5	Public Reserve	RES 5276	10-18	51	0.0646	Mowing/ Slashing	1
A6	Public Reserve	RES 5276	11	39	0.0414	Mowing/ Slashing	1
A7	Pacific Palms Community Hall	RES 113 (Pt R93454)	5	57	0.0281	Hand removal	2
A8	Pacific Palms Community Hall	RES 113 (Pt R93454)	15	42	0.0643	Hand removal / Mowing	2
A9	Pacific Palms Community Hall	RES 113 (Pt R93454)	20	75	0.1148	Hand removal / Mowing	2
A10	Pacific Palms Tennis Courts	RES 113 (Pt R93454)	40	43	0.1796	Hand removal / Mowing	2
A11	Public Reserve	RES 1009 (R210072)	8	35	0.0234	Hand removal	1
A12	Public Reserve	RES 5061	8	45	0.0327	Hand removal / Mowing	1
A13	Public Reserve	RES 5361	15	26	0.0351	Hand removal / Mowing	1
A14	Pacific Palms Tourist Centre	RES 5115	1-18	126	0.1235	Hand removal / Mowing	1
A15	Pacific Palms Tourist Centre	RES 5115	9-25	43	0.0803	Hand removal	1
A16	Pacific Palms Tourist Centre	RES 5115	4-20	150	0.2122	Hand removal / Mowing	1
A17	Pacific Palms Tourist Centre	RES 5115	16	25	0.0395	Hand removal	1
A18	Blueys Beach	R210072	3	278	0.0778	Hand removal / Mowing	1
		Total		**1376m**	**1.541ha**		
STRATEGIC FIRE ADVANTAGE ZONES							
S1	Drainage Reserve	RES 5275 & Lot 16 DP 1047733	6	152	0.0912	Slashing / Unsealed & Sealed road maintenance	1
S2	Lot 4242 DP 1036056	Adjacent to Lot 16 DP 1047733	6	148	0.0888	Slashing / Unsealed & Sealed road maintenance	1
		Total		**300m**	**0.18ha**		

PART 3

~ Appendices and References ~

APPENDIX I – Dictionary

Back burning: the application of fire to combustible matter so as to provide a fire break to control or suppress a fire or protect persons, property or the environment from an existing or imminent danger arising out of a fire, incident or other emergency.

Bush fire: includes a grass fire.

Bush fire danger period: a period fixed by or under section 81 or 82 of the *Rural Fires Act 1997.*as a bushfire danger period.

Bush fire hazard reduction certificate (BFHRC): a certificate referred to in section 100D of the *Rural Fires Act 1997.*

Bush fire hazard reduction notice: a notice under section 66 of the *Rural Fires Act 1997.* .

Bush fire hazard reduction work:

(a) the establishment or maintenance of fire breaks on land, and
(b) the controlled application of appropriate fire regimes or other means for the reduction or modification of available fuels within a predetermined area to mitigate against the spread of a bushfire, but does not include construction of a track, trail or road.

Bush fire prone land has the same meaning as it has in the *Environmental Planning and Assessment Act 1979*.

Bushfire risk management plan (BFRMP): a plan prepared under Division 4 of Part 3 for the purpose referred to in section 54 of the **Rural Fires Act 1997**.

Fire fighting appliance includes all vehicles, equipment and other things used for or in connection with the prevention or suppression of fire or the protection of life or property in case of fire.

Fire fighting authority means the following:

(a) the Service,
(b) New South Wales Fire Brigades,
(c) the National Parks and Wildlife Service,
(d) the Forestry Commission,
(e) any other body prescribed by the regulations for the purposes of this definition.

Fire permit: a permit issued under section 89 of the *Rural Fires Act 1997.*

Local authority means:

(a) in relation to land that is situated within an area within the meaning of the *Local Government Act 1993*—the council of the area.

Managed bushfire hazard reduction work means bushfire hazard reduction work that is carried out in accordance with a bushfire risk management plan.

Bush Fire Management Committee **(BFMC)***:* a Committee constituted under Part 3 of the *Rural Fires Act 1997.*

Plan of operations: a plan prepared under Division 4 of Part 3 for the purposes referred to in section 53 of the *Rural Fires Act 1997.*

Public authority means:

(a) any public or local authority constituted by or under an Act other than this Act, or
(b) any Government Department, or
(c) a statutory body representing the Crown, or
(d) a State owned corporation, or
(e) any person prescribed by the regulations as a public authority.

(*Rural Fires Act 1997 No 65)*

Definitions within the *State Emergency and Rescue Management Act 1989*

Combat agency *means the agency identified in Displan as the agency primarily responsible for responding to a particular emergency.*

Display *means the State Disaster Plan*

Emergency *means an emergency due to an actual or imminent occurrence (such as fire, flood, storm, earthquake, explosion, accident, epidemic or warlike action) which:*

(a) endangers, or threatens to endanger, the safety or health of persons in the State, or
(b) destroys or damages, or threatens to destroy or damage, property in the State, being an emergency which requires a significant and co-ordinated response.

Emergency services organisation *means the Police Service, Fire Brigades, Rural Fire Brigades, Ambulance Service, State Emergency Service, Volunteer Rescue Association or any other agency which manages or controls an accredited rescue* unit

APPENDIX II – Council fire management objectives

Council fire management objectives are defined within the *Great Lakes Council Management* Plan15, as seen below.

Purpose:

- ✓ *'To protect life and assets through the provision of services which prevent and mitigate the occurrence of fires and other emergencies. (Assets include but not restricted to economic, social, environmental and heritage values found on both public and private lands).*

Objectives:

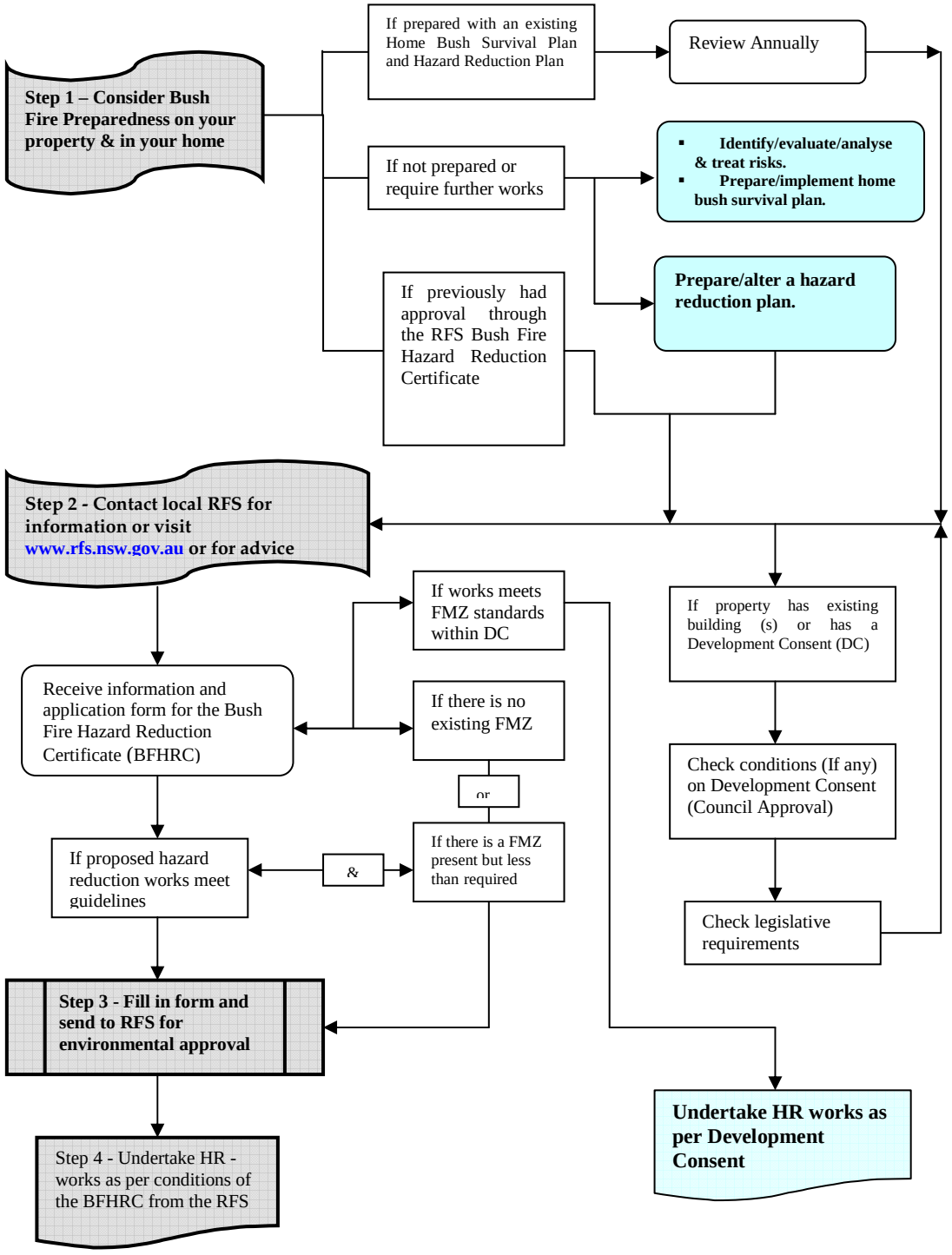
- ✓ *'Council shall provide financial support and resourcing requirements, as necessary, to enable the Rural Fire Service to effectively perform their responsibilities in accordance with the negotiated service level agreement.*

- ✓ *'Council shall provide financial support and resourcing requirements, as necessary, to enable the State Emergency Service to effectively perform their responsibilities in our local government area.*

- ✓ *'Council shall continue to evaluate and review the Disaster Management Plan for our local government area, in collaboration with the local Rural Fire Service, State Emergency Service and other relevant agencies, annually and where necessary due to legislative changes occurring from time to time.'*

[15] The current GLC Management Plan needs to be referred to for amendments to the purpose and objectives which may be changed from time to time.

APPENDIX III– What you can do to assist with fire mitigation and hazard reduction.



HR – Hazard Reduction
BFHRC – Bush Fire Hazard Reduction Certificate

FMZ – Fire Management Zone
DC - Development Consent through Council

Bush Fire Preparedness - Readiness of householders/property owners in the event of an imminent bushfire

APPENDIX IV – Fire Mitigation

The Local Environmental Plan (LEP) permits strategic bushfire hazard reduction within applicable zones across the Great Lakes LGA.

The LEP provides the mechanism to achieve bushfire objectives and protection measures and identifies criteria specified in bushfire prone areas appropriate to the potential level of the hazard.
DCP's support the objectives of the LEP and can detail bushfire protection measures necessary for the protection of life and property in the event of a bushfire event.

Two core documents including the NSW Rural Fire Service *Planning for Bushfire Protection (2001b) and the Bushfire Environmental Assessment Code (2003a)* assist with guiding specific fuel management practices and fire prevention works on both new and existing developments.

Referral to these along with other reference material from the NSW Rural Fire Service assist in planning for bushfire mitigation works.

The Building Code of Australia (BCA) provides guidelines to building in bushfire prone areas within the AS3959 Construction of buildings in bushfire prone areas.

These guides collectively assist the community and managers to:

- assess bushfire protection of properties
- recognise vegetation type and fire effects
- identify building setbacks
- consider the local environment
- reduce the impact of imminent bushfire attack
- provide adequate fire management zones
- implement fuel management practices and
- promote fire prevention programs to the community.

The bushfire risk assessment of hazards is undertaken which assist in the development of fire management zones known as *Asset Protection Zones* (APZ) and the *Strategic Fire Advantage Zones* (SFAZ).

Asset Protection Zones for existing structures
An APZ represents the area surrounding a development, which is managed to reduce the bushfire hazard to an acceptable level. Its main purpose is to provide a buffer between any habitable structure and the bushfire hazard, and progressively reduce fuel loads.

For bushfire planning purposes APZ's are generally included within the property being developed, however it may incorporate areas of land off the development site where such land has a compatible use (e.g. road, sporting field, or developed lot). Each APZ varies in form and width, according to vegetation type, slopes and **form of construction**. When slopes are greater, depths are increased to reduce impact from higher intensity fires.

Where existing assets require fire mitigation works the guidelines within the BFEAC assists in preparing fire management strategies for an area. Guidelines for maximum distances for APZ can be seen below:

Maximum Distance of an Asset Protection Zone from the Asset (or Adjacent Asset)		
	Residential & Special Purpose Buildings	*Major Buildings*
Upslope		
<18°	20 metres	20 metres
Downslope		
< 10°	20 metres	20 metres
>10 – 15°	30 metres	20 metres
>15°	40 metres	20 metres

(RFS 2006)

Asset Protection Zones for new developments
When considering "new development" including new, alterations or additions to residential or industrial buildings refer to *Planning for Bushfire Protection (2001)* to define fire management zones.

The table below extracted from this document shows the APZ minimum requirements that apply to both residential and special protection developments, for each vegetation groups and slope variations.

The APZ will comprise of two components, being the Outer Protection Area (OPA) and the Inner Protection Area (IPA).

Outer Protection Area
The OPA is located between the hazard and the IPA often linking with the area originally forming part of the bushfire hazard and is located on the bushland side of the perimeter road. In this area, vegetation is managed so cover is not continuous and fuel loads generally do not exceed 8 tonnes per hectare or in grasslands height should be maintained below 10 centimetres.

Within Bush Fire Prone Areas		APZ -Vegetation Group 1* (Forest [wet sclerophyll forest, dry sclerophyll forest])		APZ -Vegetation Group 2* (Woodlands, tall heath, and wetlands [scrub, open Shrub, closed heath])		Vegetation Group 3* (Rainforest [Closed Forest], open woodlands, grasslands †16)
	Slope	Residential	Special Protection	Residential	Special Protection	Both
Upslope	>5°	20 m	60 m	20 m	30 m	20 m
	5°–0	30 m	75 m	30 m	40 m	20 m
Downslope	>0 – 5°	40 m	80 m	35 m	50 m	20 m
	>5 – 10°	50 m	90 m	40 m	60 m	20 m
	>10 – 15°	60 m	100 m	50 m	80 m	20 m
	>15 – 18°	70 m	100 m	60 m	100 m	20 m

(RFS 2001b)

Outer Protection Area – cont

The fine fuel loadings are maintained so that the intensity of a fire is reduced along with a corresponding reduction in the level of direct flames, radiant heat and ember attack on the IPA. The depth of the OPA varies from 0–10 metres deep for residential development or up to 15 metres in depth for special protection developments.

Inner Protection Area

The IPA extends from the edge of the development to the edge of the OPA. Within this area, fuel loads are strictly managed so that there are minimal fine fuels **available** that can become involved in fire at close to the development and therefore minimises direct flame contact and radiant heat. Any vegetation within this area **must not provide a path for the transfer of fire** to the development — i.e. **fuels are discontinuous**.

While trees and shrubs or other vegetation may occur, the **canopy must not touch or over hang the building** and be far enough away from the dwelling not to ignite the house by direct flame or radiant heat emission. In addition, species that produce excessive amounts of ground fuel in a short period or fire danger period.

There is preference to retain smooth bark species over rough barked species. The more fibrous bark increases the fire hazard rating as they assist with the spread and spotting capabilities of a fire. Retain discontinuous vegetation to provide a barrier to reduce the effects from radiant heat and ember attack.

Perimeter Road, Fire Trail and Access Roads

The perimeter road or fire trail lies between the OPA and the boundary of the allotment or the reserve.
The fire trail can form part of the IPA that provides fire fighters access to structures and APZ's to conduct back burning or hazard reduction, property protection or provide refuge for fire fighters.

The PBFP guidelines identify specifications and design including construction standards, turn around areas, signage and environmental controls for perimeter road, fire trail and access roads.

* The APZ requirements are based on **Level 3 construction** in accordance with AS3959–1999. Where opportunities exist to increase APZ depth, then the site assessment methodology for bushfire attack, required setbacks and construction levels set out in Appendix 3.3 (of the *Guidelines*) must be applied.

† scrubland, , mallee also are within Group 3 vegetation but occurs western NSW areas.

16 Small remnants forests (less than 1ha) may be considered to be equivalent to the specifications for group 3 vegetation.

APPENDIX V – Mapping Bushfire Prone Land

In August 2002 amendments came into effect to the *Environmental Planning and Assessment Act 1979* and the *Rural Fires Act 1997to improve protection of people property and the environment from bushfires.*

*C*ouncils are required to map bushfire prone lands within their local government areas with consultation with the Commissioner of the NSW Rural Fire Service.

Councils are required to place specification of bushfire prone land on section 149 Planning Certificate. The Commission issues fire safety authority (section 100B of the *Rural Fires Act*) for special purpose developments of bushfire prone land.

The criteria for bushfire prone land mapping requires vegetation to be divided into 3 groups as per Appendix 2 in the *Planning for Bush Fire Protection (2001)* document:

a) **Vegetation Group 1** – Forest
b) **Vegetation Group 2** – Woodlands, tall heath and wetlands
c) **Vegetation Group 3** –Rainforests, open woodlands, grasslands, shrublands and mallee.

Once vegetation classes have been determined and mapped across a council area, application of **bushfire vegetation categories** to the vegetation groups must be completed. The *Guideline – Bush Fire Prone Land Mapping, NSW Rural Fire Service, 2004* defines the criteria for **Bush Fire Vegetation Categories**[17] **using the above mapped** Vegetation Groups and is as follows: –

(i) Vegetation Group 1 and 2, greater than 1 hectare – **Bush fire Vegetation Category 1**
(ii) A 100 metre external buffer to Bush fire Vegetation Category 1 vegetation polygon—**Buffer zone Category 1**
(iii) Vegetation Group 3, greater than 1 hectare – **Bush fire Vegetation Category 2**

A 30 metre external buffer to Bushfire Vegetation Category 2 vegetation polygon —Buffer zone Category 2

(iv) Areas less than 1 hectare within, or partially within
(v) 100m lateral separations from a bushfire vegetation category 1, are — **Bush fire Vegetation Category 2.** or
(vi) 30m lateral separations from a bushfire vegetation category 2 are — **Bush fire Vegetation Category 2.**

Vegetation **excluded** from the above mentioned vegetation groups include:

i. Areas of "Vegetation groups" 1, 2 and 3, less than 1 hectare and not less than 100m lateral separation from a Bushfire Vegetation Category 1, or not less than 30m lateral separation from a Bushfire Vegetation Category 2, are excluded; or
ii. Areas of "Managed grassland" including grassland on, but not limited to, public lands, grazing land, recreational areas, commercial/industrial land, airports/airstrips and the like are excluded; or
iii. Areas of managed gardens and lawns within curtilage of buildings;
iv. Managed botanical gardens;
v. "Agricultural lands" used for annual and/or perennial cropping, orchard, market gardens, nurseries and the likes are excluded; or
vi. Mangroves.

(RFS *2004b; 2004e)*

[17] The NSW Rural Fire Service owns bushfire prone mapping and is held in custody by Council

APPENDIX VI – Bush Fire Risk Description

A summary of the criteria for the identification of bushfire risk of an area, from the Lower Hunter Zone, Bush Fire Risk Management Plan can be seen within the table below:

Bush Fire Risk Description

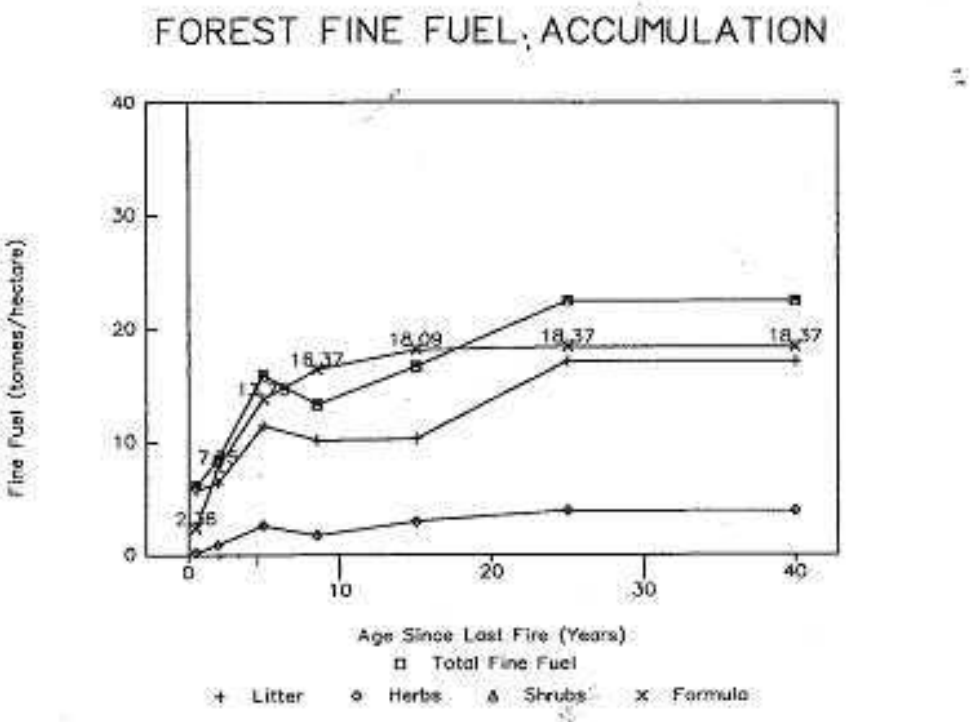
Development Type *X — absent, ✔— present)*	*Bushfire Threat*[18]	*Bushfire Risk*[19]	*Consideration to Asset Protection/ Building Design*[20]
Urban/bushland interface/ Multiple Occupancies	Within 100m	Extreme	✗
Urban/bushland interface/ Multiple Occupancies	Within 100m	Major	✔
Urban/bushland interface	100m – 2.5km	Major	✗ and ✔
Environmental/Ecological Assets	Any	Major	✔
Remote Rural Residential Development	Any	Major	✗ and ✔
Agricultural areas	Any	Moderate	✗

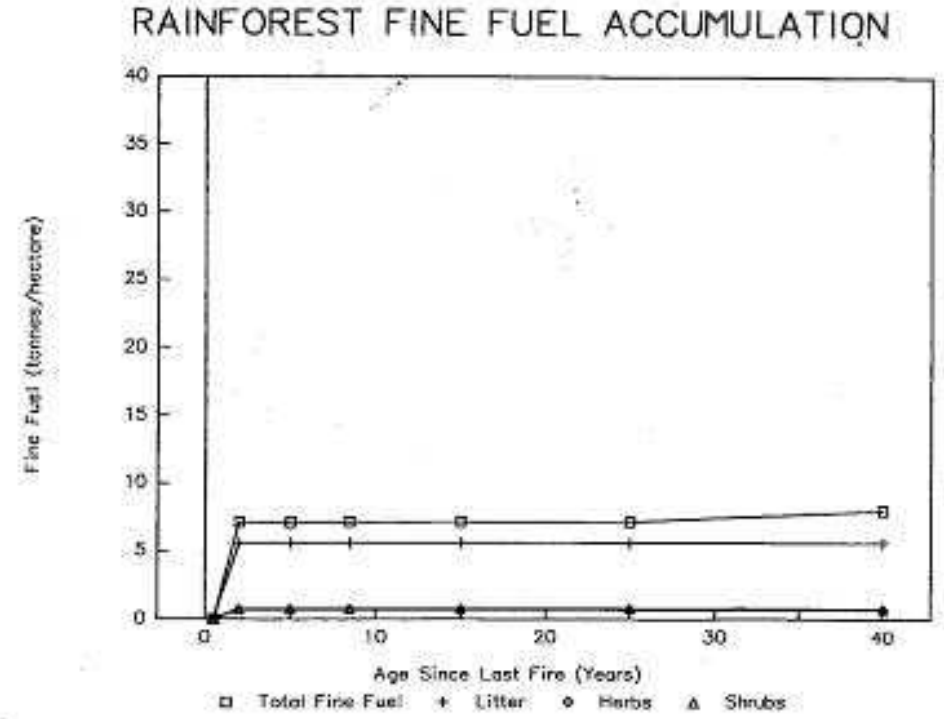
[18] How close assets are located to the hazard

[19] Level of risk as defined within the *Bushfire Risk Management Plan 2001*

[20] Consideration to fuel reduced areas (property protection), housing design and perimeter roads

APPENDIX VII- Fine Fuel Accumulation





(NPWS unpub.)

APPENDIX VIII – Biodiversity Thresholds for Vegetation Communities

Biodiversity thresholds[21] and fire regime to be applied to vegetation communities in Great lakes LGA.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP[22]	The Vegetation Formation (Keith 2004) Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Interval (BFEAC) (SFAZ/LMZ)
a	❖ Avoid 3 or more consecutive fires, with each of <5 years apart ❖ Avoid inter fire periods of >30 years ❖ Avoid 2 or more successive fires that totally scorch or consume the tree canopy ❖ Avoid 3 or more consecutive fires of low intensity	Blackbutt – Bloodwood/ Apple	41	1	Dry sclerophyll forests	5 /8
		Blackbutt/ Scribbly Gum	40	1	Dry sclerophyll forests	5/8
		Blackbutt/ Sydney Peppermint/ Smooth-barked Apple	42	1	Dry sclerophyll forests	5/8
		Dry Blackbutt	37	1	Dry sclerophyll forests	5/8
		Coastal Sands Blackbutt	37	1	Dry sclerophyll forests	5/8
		Forest Red Gum - #1	92	1	Grassy woodlands	5/8
		Grey Gum/ Grey Ironbark/ White Mahogany	62	1	Dry sclerophyll forests	5/8
		Ironbark	84	1	Dry sclerophyll forests	5/8
		Ironbark/ Smooth-barked Apple/ Stringybark	84/106	1	Dry sclerophyll forests	5/8
		Mahogany/ Ironbark/ Grey Gum/ Blackbutt	60/37	1	Dry sclerophyll forests	5/8
		Red Bloodwood	126	2	Grassy Woodlands	7/10
		Scribbly Gum	117	1	Dry sclerophyll forests	5/8
		Smooth-barked Apple	105	1	Dry sclerophyll forests	5/8
		Spotted Gum	70	1	Dry sclerophyll forests	5/8
		Spotted Gum – Ironbark/ Grey Gum	74	1	Dry sclerophyll forests	5/8
		Sydney Peppermint	128	1	Dry sclerophyll forests	5/8
		Sydney Peppermint/ Stringybark	115	1	Dry sclerophyll forests	5/8
		White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	1	Dry sclerophyll forests	5/8
b	❖ Avoid 3 or more consecutive fires, with each of <8 years apart ❖ Avoid 3 or more consecutive fires, with each of the fires >15 years apart ❖ Avoid inter fire periods of > 30 years ❖ Avoid 2 or more consecutive fires that consume < 10t/ha of surface fuels	Banksia	107	2	Heathlands	7/10
		Disturbed Heath	219/223	2	Heathlands	7/10
		Forest Red Gum - #2	92	1	Grassy woodlands	10/15
		Heath	223	2	Heathlands	7/10

[21] Biodiversity thresholds adapted from Bradstock et al 1995; NSW National Parks and Wildlife Service described within the *Draft Fire Management Strategies for Myall Lake National Park and Island Reserves, 2003a*.

[22] **Vegetation Group 1** - Forest (wet sclerophyll forest, dry sclerophyll forest)
Vegetation Group 2 - Woodlands, tall heath, and wetlands (scrub, open Shrub, closed heath)
Vegetation Group 3 - Rainforest (Closed Forest), open woodlands, grasslands (PBFP 2001)

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP22	The Vegetation Formation (Keith 2004) Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Interval (BFEAC) (SFAZ/LMZ)
		Heath Paperbark	31/223	2	Heathlands or Freshwater wetland	7/10
		Sand Ridge (Relic dune landscape)	233	na	Heathlands	
		Paperbark	31	1	Forested wetland	7/10
		Paperbark/ Blackbutt	31/37	1	Forested wetland	7/10
		Paperbark/ Smooth-barked Apple/ Sydney Peppermint	31/106	1	Forested wetland	7/10
		Paperbark/ Swamp Oak	31/32	1	Forested wetland	7/10
		Red Mahogany	68	1	Dry sclerophyll forests	7/10
		Red Mahogany/ Smooth-barked Apple	68/105	1	Dry sclerophyll forests	7/10
		Rough-barked Apple	129	1	Grassy woodland or Forested wetland	7/10
		Scrub	224	2	Heathlands	7/10
		Swamp - #1	231	3	Freshwater wetlands	7/10
		Swamp Mahogany	30	1	Forested wetland	7/10
		Swamp Mahogany/ Forest Red Gum	30/92	1	Forested wetland	7/10
		Swamp Mahogany/ Grey Gum	30/60	1	Forested wetland	7/10
		Swamp Mahogany/ Paperbark	30/31	1	Forested wetland	7/10
		Swamp Mahogany/ Swamp Oak	30/32	1	Forested wetland	7/10
		Swamp Mahogany/ Palm	30/7	1	Forested wetland	7/10
		Swamp Oak	32	1	Forested wetland	7/10
		Tallowwood - #1	45	1	Wet sclerophyll forests	10/15
		Tallowwood/ Grey Gum	45/60	1	Wet sclerophyll forests	10/15
c	❖ Avoid more than 1 fire every 30 years ❖ Avoid inter-fire periods > 200 years	Flooded Gum	48	1	Wet sclerophyll forests	25/30
		Flooded Gum/ Paperbark	48/31	1	Wet sclerophyll forests	25/30
		Inland Brush Box	53	1	Wet sclerophyll forests	25/30
		Ironbark/ Grey Gum/ Flooded Gum	60/48	1	Wet sclerophyll forests	25/30
		Moist Blackbutt	36	1	Wet sclerophyll forests	25/30
		Sydney Blue Gum	46	1	Wet sclerophyll forests	25/30
		Sydney Blue Gum/ Paperbark	46/31	1	Wet sclerophyll forests	25/30
		Tallowwood - #2	45	1	Wet sclerophyll forests	25/30
		Tallowwood/ Sydney Blue Gum	47	1	Wet sclerophyll forests	25/30
		Tallowwood/ Sydney Blue Gum/ Brushbox	47/53	1	Wet sclerophyll forests	25/30
d	Any fire occurrence (a limited recovery ability exists)	Fig/ Giant Stinger	6	3	Rainforest	n/a
		Fig/ Myrtle	6/23	3	Rainforest	n/a
		Headland Brushbox	25	3	Rainforest	n/a
		Mangrove	33	3	Saline wetlands	n/a
		Myrtle	23	3	Rainforest	n/a
		Palm	7	3	Rainforest	n/a
		Palm/ Myrtle	7/23	3	Rainforest	n/a
		Swamp - #1	231	3	Freshwater wetlands	n/a
		Swamp - #2	231	3	Saline wetlands	n/a

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP22	The Vegetation Formation (Keith 2004) Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Interval (BFEAC) (SFAZ/LMZ)
		Tuckeroo	24	3	Rainforest	n/a
		Yellow Tulipwood	22	3	Rainforest	n/a
NA	Not Applicable	Maritime Grassland	230	3	Grasslands. No prescribed fire on headlands[23]	n/a
		Pine	-	1 or 2	Other	n/a
		Rock/Sand	-	na	Other	n/a
	(Primary/foredune landscape)	Sand Ridge	233	na	Heathlands/Beach	n/a
w	**Use a, b, c, d** options for biodiversity thresholds	Introduced Scrub	221	1,2,3	Appropriate management practice[24]	n/a
		Mixed Forest Regrowth Mixed Pine Mixed Woodland Vine Cleared/Grassland	220	1,2,3	Appropriate management practice	n/a w

[23] Not described in BFEAC schedule
[24] W. Variable within each vegetation formation

APPENDIX IX – Vegetation formations for NSW

Vegetation formations for NSW (Keith 2004)

Vegetation dominated by trees (generally more than 5 m tall when mature).	
Wet sclerophyll forests (Grassy & shrubby subformation)	Tall forests (typically >30 m) dominated by tall straight-trunked eucalyptus, usually with soft-leaved shrubs, ferns or herbs in the understorey. Largely confined to moderately fertile soils in sheltered locations on the coast and escarpments where average annual rainfall exceeds 900 mm.
Forested wetlands	Forests or woodlands with an abundance of plant groups in the understorey that are unable to tolerate periodic inundation or waterlogging, particular sedges, rushes and reeds. Confined to damp, low-lying parts of the coast or adjacent to rivers, lakes or swamps in the inland.
Dry sclerophyll forests (shrubby & shrub/grass subformation)	Forests or rarely woodlands with in abundance of hard-leaved (sclerophyllous) shrubs in the understorey. Only rarely dominated by 'box' eucalypts. Ground cover often sparse and typically by sclerophyllous sedges, but may sometimes include reasonably continuous swards of grasses. Confined to coast, tablelands, and the western slopes where average annual rainfall exceed 500 mm, largely on infertile sandy or loamy soils.
Grassy Woodland	Woodlands, or rarely forests, typically 15-35 m tall through shorter at subalpine elevations. Ground cover continuous and dominated by perennial tussocks grasses, and are interspersed perennial herbs including 'geophhytic' orchids and lilies, but few ephemeral herbs and grasses. Shrubs generally sparse and typically not including chenopods or other drought tolerant species. Widespread on relatively fertile loam and clay loams of the coastal lowlands.
Saline Wetlands	Trees tolerant of (subjected to) tidal inundation, understorey sparse to non-existent. Restricted to tidal estuaries along the coast. (Mangrove Swamps)
Rainforests	Trees belonging to various plant families, their leaves broad and soft. Vines often occur in the tree canopies or understorey. Understorey typically includes ferns and herbs. Found on the coastal lowlands, islands and escarpment on fertile soils extending to restricted locations on the north-western slopes.
Trees absent, or present only as scattered emergent individuals.	
Freshwater wetlands	Dominated by shrubs, sedges, grasses or non-succulent herbs that tolerate permanent or periodic inundation or waterlogging with freshwater. Restricted to swamps with humic or gleyed soils on the coast, tablelands, western slopes and plains.
Saline Wetlands	Dominated by herbs (including succulents), grasses or rarely shrubs that tolerate periodic inundation or waterlogging with saline water. Restricted to tidal estuaries on the coast.
Heathlands	Vegetation dominated by hard leaved but not drought-tolerate shrubs, usually also with perennial sedges, herbs and grasses, though generally lacking ephemeral plants. Restricted to fertile soils, often on exposed sites along the coast and tablelands where average rainfall exceeds 800 mm.
Grasslands	Vegetation dominated by perennial tussock grasses with herbs. Shrubs rarely present. Generally found on clay soils on flat to undulating terrain on the coast, tablelands, western slopes and plains.

APPENDIX X - CRA Vegetation Unit Distribution and Conservation Value

The Lower North East Comprehensive Regional Assessment (CRA) and DEC (Parks and Wildlife Division) used broad scale mapping to assess the status of the ecosystem. The local vegetation community were ranked from highest regional priority to the lowest, including those ecosystems that are known to be vulnerable, rare, severely depleted and those that have private land priority.

Forest Type	CRA Name	Current area Lower North East CRA (Ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
92	Escarpment Red Gum	20,498	27.4%	▪ Vulnerable ▪ Severely Depleted ▪ Highly Inadequately Reserved ▪ Private land priority	No
129	Rough-barked Apple	2,636	18.8%	▪ Vulnerable ▪ Severely Depleted ▪ Private land priority	No
32	Swamp Oak	4,868	22.7%	▪ Vulnerable ▪ Severely Depleted ▪ Private land priority	No
107	Banksia	4,196	47.8%	▪ Vulnerable ▪ Private land priority	No
31	Paperbark	12,866	NA	▪ Vulnerable	No
224	Scrub	3,073	NA	▪ Vulnerable	Yes
68	Red Mahogany	65	100	▪ Rare ▪ Highly inadequately Reserved ▪ Private land priority	No (*)
45	Tallowwood	746	85.3%	▪ Rare ▪ Private land priority	No (*)
33	Mangrove	1,001	NA	▪ Rare ▪ Private land priority	No (*)
223	Heath	14,286	NA	▪ Rare ▪ Private land priority	No (*)
126	Red Bloodwood	5	100%	▪ Rare	Yes (*)
230	Natural Grassland	138	NA	▪ Rare	No (*)
231	Swamp	9,130	NA	▪ Rare	No (*)
6, 7, 22, 23, 24, 25	Rainforest	256,326	NA	▪ Rare	No (*)
36	Dry Grassy Blackbutt-Tallowwood	59,390	44.0%	▪ Severely Depleted ▪ Highly Inadequately Reserved ▪ Private land priority	No
60, 62	South Coast Shrubby Grey Gum	151,030	42.2%	▪ Severely Depleted ▪ Highly Inadequately Reserved ▪ Private land priority	No
42	Blackbutt-Sydney Peppermint-Smooth-barked Apple	1,382	38.8%	▪ Severely Depleted Private land priority	No
106	Stringybark-Apple	81,300	38.9%	▪ Severely Depleted ▪ Private land priority	No
84	Ironbark	89,985	43.0%	▪ Severely Depleted	Yes
30	Swamp Mahogany	2,177	46.9%	▪ Private land priority	No
48, 48/31	Wet Flooded Gum-Tallowwood	6,161	65.6%	▪ Private land priority	No
48	Coastal Flooded Gum	8,753	57.7%	▪ Private land priority	No
70, 74	Dry Foothills Spotted Gum	17,688	53.8%	▪ Private land priority	No
47	South Coast Tallowwood-Blue Gum	71,217	67.1%	▪ Private land priority	No
106, 128	Smooth-barked Apple-Sydney Peppermint-Stringybark	9,517	57.6%	-	No

Forest Type	CRA Name	Current area Lower North East CRA (Ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
41?	Dry Heathy Blackbutt-Bloodwood	2,889	58.5%	-	Yes
53	Open Coastal Brushbox	64,878	62.8%	-	Yes
37	Coastal Sands Blackbutt	17,312	64.0%	-	Yes
60	Dry Grassy Tallowwood-Grey Gum	178,516	67.6%	-	No
62	Grey Gum-Stringybark	16,056	69.5%	-	Yes
46	Southern Wet Sydney Blue Gum	41,695	72.8%	-	Yes
105	Smooth-barked Apple	18,751	73.7%	-	No
40, 117	Heathy Scribbly Gum	23,471	74.8%	-	Yes
117	Lowlands Scribbly Gum	9,724	84.3%	-	Yes
36	Mid Elevation Wet Blackbutt	6,981	88.6%	-	Yes
62	Moist Open Escarpment White Mahogany	38,495	90.2%	-	Yes
36	Wet Foothills Blackbutt-Turpentine	50,264	92.6%	-	Yes
115	Sydney Peppermint-Stringybark	13,778	99.4%	-	Yes
234	Rock	6,576	NA	-	Yes

(Great Lakes Council 2004a)

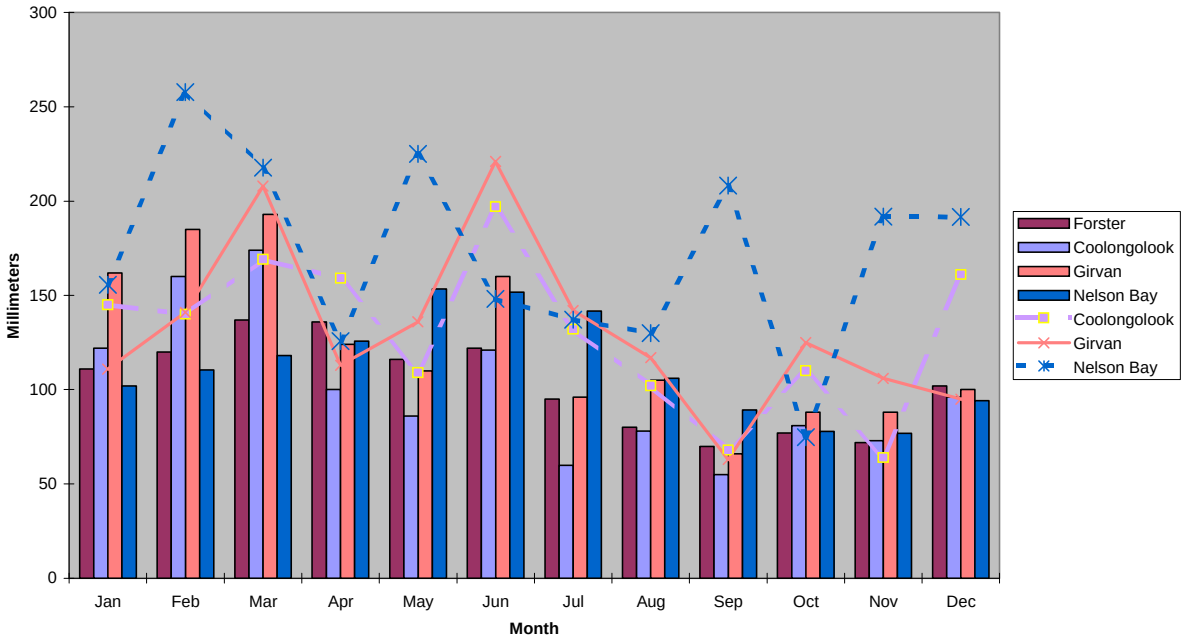
APPENDIX XI – Climate

Climatic details of the Upper Hunter and Lower Hunter weather districts.

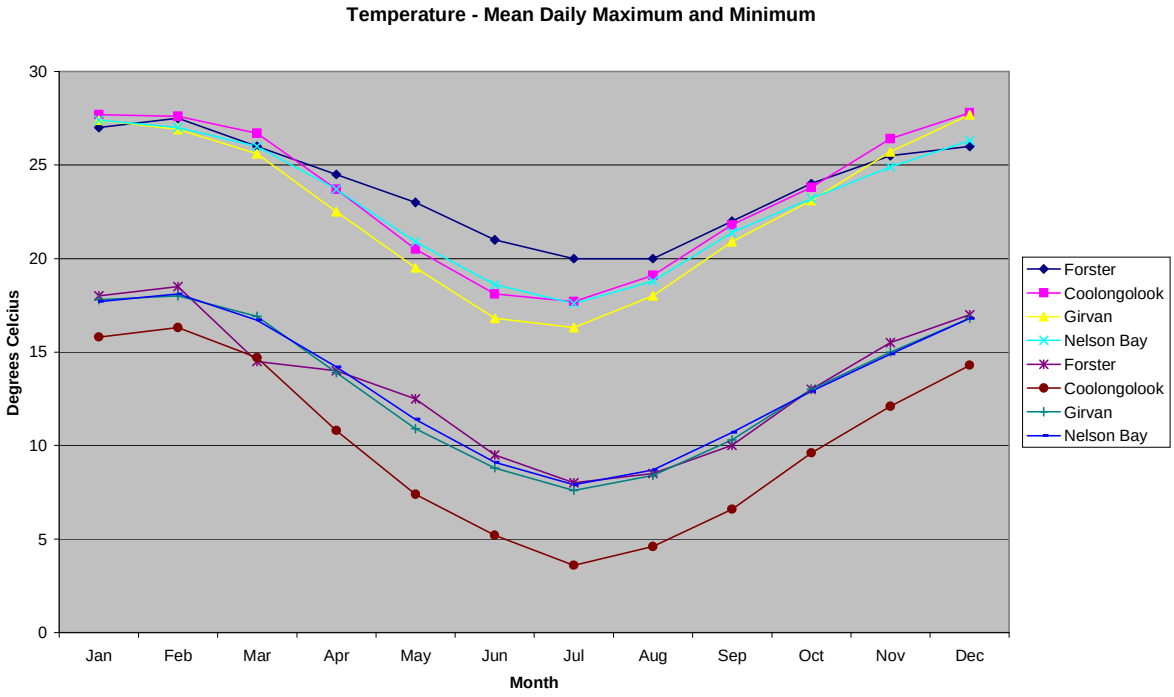
Climate Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANN
Mean Daily Max. Temp (°C)													
Forster	27.0	27.5	26.0	24.5	23.0	21.0	20.0	20.0	22.0	24.0	25.5	26.0	23.9
Coolongolook	27.7	27.6	26.7	23.7	20.5	18.1	17.7	19.1	21.8	23.8	26.4	27.8	23.5
Girvan	27.4	26.9	25.6	22.5	19.5	16.8	16.3	18.0	20.9	23.1	25.7	27.7	22.6
Nelson Bay	27.4	27	26	23.7	20.9	18.6	17.6	18.8	21.4	23.2	24.9	26.3	23
Mean Daily Min. Temp (°C)													
Forster	18.0	18.5	14.5	14.0	12.5	9.5	8.0	8.5	10.0	13.0	15.5	17.0	13.3
Coolongolook	15.8	16.3	14.7	10.8	7.4	5.2	3.6	4.6	6.6	9.6	12.1	14.3	10.3
Girvan	17.8	18.0	16.9	13.9	10.9	8.8	7.6	8.4	10.3	13.0	15.0	16.8	13.1
Nelson Bay	17.7	18.1	16.7	14.2	11.4	9.1	7.9	8.7	10.7	12.9	14.9	16.8	13.3
Mean. Rainfall (mm)													
Forster	111	120	137	136	116	122	95	80	70	77	72	102	1238
Coolongolook	122	160	174	100	86	121	60	78	55	81	73	96	1205
Girvan	162	185	193	124	110	160	96	105	66	88	88	100	1477
Nelson Bay	102	110.4	118.1	125.8	153.4	151.7	141.7	106	89.2	77.9	76.8	94.3	1347.4
Highest Daily Rain													
Forster	-	-	-	-	-	-	-	-	-	-	-	-	-
Coolongolook	145	140	169	159	109	197	132	102	68	110	64	161	197
Girvan	111	141	208	113	136	221	142	117	63	125	106	95	221
Nelson Bay	155.7	257.8	217.7	125.7	225	148.1	137.2	130	208.3	74.9	191.8	191.5	257.8

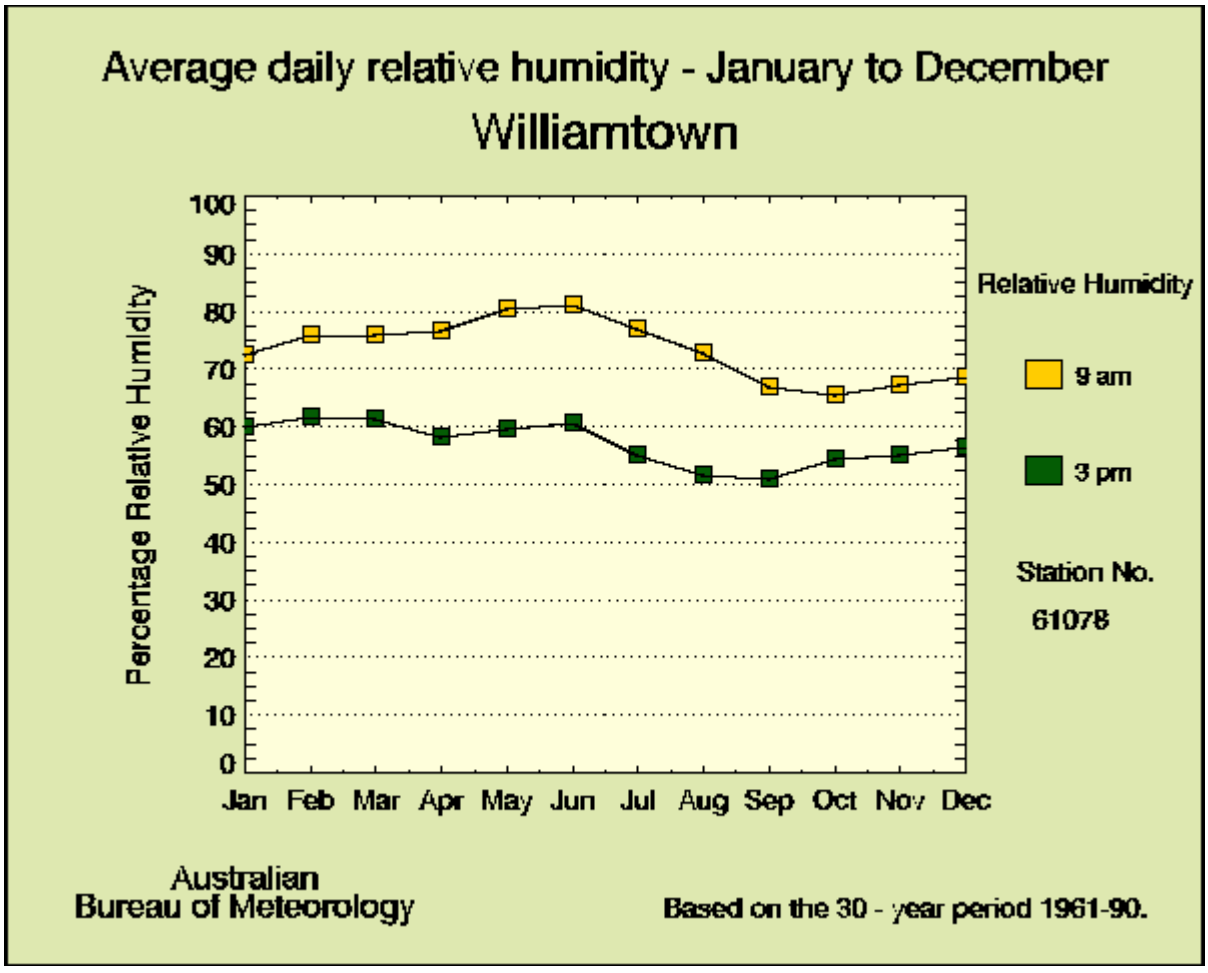
(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)

Rainfall - Mean maximum (bar) and highest daily rain (line)



(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)





(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)

APPENDIX XII – Review of Environmental Factors

REVIEW OF ENVIRONMENTAL FACTORS

FOR

Hazard Reduction Activities

Within the Fire Mitigation Plan ~ Pacific Palms

REVIEW OF ENVIRONMENTAL FACTORS

GREAT LAKES COUNCIL

Activity Name:	Hazard reduction works within fire management zones including asset protection zone (APZ) and strategic fire advantage zone (SFAZ).
Plan Name:	Fire Mitigation Plan - Pacific Palms
Location of Activity:	Pacific Palms – 20km South of Forster
Activities:	The creation and ongoing maintenance within the APZ and SFAZ.
Reserves and managed land:	Refer to section 7 within the Plan. There is a total of 49 hectares of 18 reserves affected by bushfire.

(1) Planning – Relevant Legislation

No	Act/Regulation	Comments
1.1	***Local Government Act 1993***	The proposed activities are compatible with the *Local Government Act 1993* and Great Lakes Council management practices.
1.2	***Environmental Planning and Assessment Act 1979***	Part 5 of the *Environmental Planning and Assessment Act 1979* requires an 'Environmental Assessment' to be conducted for all 'activities'. This REF is an 'Environmental Assessment' for the purpose of Part 5 of the Act. An 8-Part test of significance for potential threatened species is required under the *Environmental Planning and Assessment Act 1979*.This REF is the assessment of the activities Section 5A of the *Environmental Planning and Assessment Act 1979* requires the application of an 8 part test to assess the impact of 'activities' on threatened species, populations or ecological communities, or their habitats as declared under the *Threatened Species Conservation Act 1995*.
1.3	***Threatened Species Conservation (TSC) Act 1995***	All assessments within attachment 1 and 2, to determine the requirement for an 8-part test were conducted as part of this REF. This concluded that the proposed activities will have minimal impact on threatened species, populations or ecological communities, or their habitats as declared under the *Threatened Species Conservation Act 1995* and hence the proposed activities is permitted under the Act.
1.4	***Local Environmental Plans, DCP's***	Proposed activities comply with Local Environmental Plan and Development Control Plans.
1.5	***Rural Fires Act 1997***	The proposed activities will assist Council to meet its statutory obligations under the *Rural Fires Act 1997*, and Regulations that specifically requires land owners/occupiers to prevent and minimise the spread of bush fires.
1.6	***NSW Heritage Act 1977***	There are no items listed under the *NSW Heritage Act 1977* within Council managed land affected by the activities.
1.7	***Plan of Management***	Council has generic plans of management (POM) for bushland reserves. The activities proposed are not inconsistent with approved generic POM. The proposed activities are also in accordance with providing ongoing protection of life and property of the community and within Councils management objectives.

No	Act/Regulation	Comments
1.8	***Council Policies***	The proposed activities are in accordance with "Fire Management For Council Controlled Natural Areas, 1996" and the Fire Mitigation Plan – Pacific Palms (The Plan). The Plan provides fire management guidelines and incorporates statutory obligations to manage bush fire risks, to protect life and property, prevent and control bush fires. Concurrently, it considers and provides for public recreation, biodiversity and the conservation of the natural and cultural heritage of the area.
1.9	***Regional/District Strategies of Plans***	Booti Booti National Park borders the study area of Pacific Palms and is managed by the DEC.
1.10	***Other Planning Controls or Agency approvals***	• *SEPP 14 (Coastal Wetlands)* - Under Section 4 of State Environmental Planning Policy No.14 (Coastal Wetlands). There are recorded sites that occur within the study area. • *SEPP 26 (Littoral Rainforest)* - Under Section 4 of State Environmental Planning Policy No.16 (Littoral Rainforests). There are littoral rainforest areas that occur within the study area. • *SEPP 44 (Koala Habitat)* - Under Section 5 of State Environmental Planning Policy No.44 (Koala Habitat Protection). Koalas have been recorded locally and there are recorded both preliminary and potentially core Koala habitat within the study area.
1.11	***Commonwealth Matters (eg Ramsar, World Heritage, National Estate)***	• *RAMSAR* - Proposed activities are not within a site listed under the RAMSAR convention. • *World Heritage* - Proposed activities is not within a World Heritage Area. • *National Estate* - Proposed activities is not in an area listed on the National Estate Register.
1.12	***Protection Of The Environment Operations Act 1997 (the POEO Act)***	s133 Prohibition by EPA of burning in open air or incinerators – (1) EPA is of the opinion that weather conditions are such that the burning of fires in the open while those conditions persist will contribute or is likely to contribute to air pollution to such an extent that the making of an order under this section is warranted. (2) The EPA may, by order published in accordance with this section, prohibit, unconditionally or conditionally, the burning of fires in the open or in all or any specified classes of incinerators. s134 Directions by authorised officers concerning fires 1 (b) air pollution from the fire is injurious to the health of any person or is causing or is likely to cause serious discomfort or inconvenience to any person. s139 Operation of plant The occupier of any premises who operates any plant (other than control equipment) at those premises in such a manner as to cause the emission of noise from those premises is guilty of an offence if the noise so caused, or any part of it, is caused by the occupier's failure: (a) to maintain the plant in an efficient condition, or (b) to operate the plant in a proper and efficient manner. s145 Littering generally - (1) Offence of littering. A person who deposits litter in or on a public place or an open private place is guilty of an offence. Schedule 2 Regulation-making powers - 6 Open fires or incinerators. The regulation or prohibition of the burning of fires in the open or in incinerators. 6B Emission of air impurities air impurity includes smoke, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, mists, odours and radioactive substances.

No	Act/Regulation	Comments
1.13	***Native Vegetation Conservation Act 1997/ Tree Preservation Order (TPO/, The* Bush Fire Environmental Assessment Code for NSW (RFS 2006)**	The Bush Fire Environmental Assessment Code for NSW, 2006 (the Code) is an environmental assessment where certified authorities are consenting bodies including Local Governments. Conditions for hazard reduction works under these guidelines enable works to be undertaken without the requirement for a review of environmental factor (REF). If the proposed works are beyond the Codes guidelines then reference to the Native Vegetation Act or the Councils TPO is required. Existing works are both within the guidelines of the Code and this REF. Council has undertaken the preparation of a REF, to clarify works in more detail. Any additional fire mitigation works in Pacific Palms would either require a HRC or a more detailed REF.

(2) The Activities

Assessment

Council managed land within the study area has been assessed for fuel loads, bush fire risk, fire threat and ecological considerations. The field environmental and habitat assessment enables details within each reserve to be collated to ensure hazard reduction works comply with legislative constraints and biodiversity thresholds. Further, within the Plan section 4 details guidelines hazard reduction and section 5 for ecological consideration.

The assessment outcomes are based on likely extreme weather conditions, and the ability of an asset to recover from or withstand the expected bush fire as a consequence on its fire resistance standard. This period is when the most damage is expected as fire intensity is at its greatest.

To determine local habitat attributes a field assessment was undertaken to determine:

- Structural vegetation;
- Presence and frequency of habitat trees;
- Size class of trees;
- Density of shrub and ground covers;
- Presence of fallen timber;
- Presence of rock outcrops;
- Presence of wet area and water bodies;
- Extent of movement corridors;
- Extent of faunal refugia; and
- Implied conservation significance.

From this site assessments, and desktop analysis it is possible to identify if any potential significant habitat features exist. A list of potential threatened species assists in determining the effects on species and the local biodiversity.

Fire assessment

Bushfire management and mitigation measures are also guided by other documents such as the Lower Hunter Zone, Bush Fire Management Committee, Bush Fire Risk Management Plan (BFRMP).

Within section 3 of the Plan it states: *'Field assessments are undertaken to provide data for analysis for managers. The assessment process follows a guideline provided by the RFS, and is an acceptable process for fire managers to determine the bush fire hazard and risk analysis of bush fire within and adjacent to Council managed land.*

The contributing factors to the assessment include the distance of the bush fire hazard to the asset (Threat) and, where the potential severity is influenced by the bush fire or by bush fire hazards

(Risk). The overall fuel hazards are given as low, moderate, high, very high and extreme ratings. The assessment includes using factors such as;

- ✓ Vegetation type and separation distance of canopies;
- ✓ Overall fuel loads, (bark, surface, elevated);
- ✓ Slope;
- ✓ Fuel quantity; and
- ✓ Size of combined risk areas.

The assessment is assisted by using the guide NSW National Parks and Wildlife Service, (2003b) Overall Fuel Hazard Guide Sydney Basin NSW Edition May 2003 (Ed. G. McCarthy). NSW National Parks and Wildlife Service, Hurstville.

The hazard assessment also considers fire resistance construction standard of a building (or asset) (no standard, level 1, 2 or 3), Bush Fire Prone Land, BFRMP ratings including the hazard and risk rating and the risk management zone.

Assessment	**Pacific Palms**
Bush Fire Prone Land	**The majority of the study area are recorded as having bushfire prone lands**
Life and property hazard rating	**Insignificant, Minor, Moderate and Major**
Environmental and ecological risks	**Insignificant, Minor and Major**
Construction standard of neighbouring assets	**No standard, Level**, 1**-3**

Future Management

The public reserves, reserves and drainage reserves will be continued to be managed for the protection of life and property and to mitigate the spread of fire within the reserves.

Impact on neighbouring properties

Graduated fuel management of hazards adjacent to development is important to ensure provisions are in place to assist in reducing the risk and the threat of fire whilst still maintaining at least a degree of the visual and environmental amenity of the area. These zones are commonly referred to as fire management zones including asset protection zones, strategic fire management zones, land management zones and fire exclusion zones.

The management of these zones is a tool to assist in the monitoring and management of fuels that impact on a development, either nearby or at a distance from the asset. Each zone has specific management strategies that can be implemented to meet management objectives (Refer to section 4 of the Plan for further details).

Signs

Community education plays an important part to Councils management and implementation of fire mitigation works. Notification of neighbouring properties of intended work ensures mitigation works are promoted and encouraged with adjoining property owners.

Public education through signage of asset protection zones promotes fire management objectives to the wider community and assists in the long-term maintenance of the fire management zones (FMZ's).

Reversibility of Proposed Activities

According to the Fire Mitigation Plan - Pacific Palms the dominant vegetation formations surrounding the Pacific Palms is Dry sclerophyll forest, Forested wetland and Rainforests.

The Code certifies the mechanical mowing/ slashing and hand removal within APZ's and slashing within APZ's and SFAZ's. There are no conditions as part of the Code relating to any known threatened species within the areas of proposed works.

Mechanical hazard reduction by machinery may be reversed, as regeneration of forested areas is possible if slashing is removed from the area. Minimal impact by mowing/ slashing and hand removal on the vegetation ensures the biodiversity of the whole area is retained.

By reducing fuels adjacent to assets and other fire management zones this assists in reducing the fire intensity, which ultimately reduces the fire effect on the fauna and flora at the time of the fire.

Hazard reduction by burning within the described SFAZ's reduces fuels adjacent to residential and urban areas. By undertaking this burn it also assists in the protection of the town water supply and communication tower within the reserve.

(3) Alternatives

Hazard Reduction by Burning verses mechanical slashing:

While this alternative would achieve fire management objective hazard reduction by burning would have a greater environmental impact than frequently slashing within an APZ.

The area that has been identified to be hazard reduced provides adequate protection for residences of Pacific Palms by mechanical slashing.

Do nothing:

Council have an obligation to protect life and property around Pacific Palms. Council are required to meet its statutory obligation under Section 63 of the *Rural Fires Act (1997)* to minimise the spread of fire.

Fire fighting authorities would also have less ability to contain fires that within the rural/urban interface or access fire advantages around the village if no fuel reduction works were undertaken.

(4) The Existing Environment

4.1 The location

Area (ha)	The proposed activities cover approximately 1.54 hectares within APZ's and 0.18 hectares within SFAZ's, within managed land and reserves
General Location	Within the Villages of Elizabeth Beach, Boomerang Beach and Blueys Beach.
Neighbouring properties	Private property with variable setbacks with adjoining reserves.
Implied conservation values	Low to high conservation values within the various reserves.
Key Habitat	Key Habitat is recorded within the majority of the study area, which links north into Booti Booti NP.
Key Corridor (Fauna)	Occurs throughout the Pacific Palms area which links with Booti Booti NP.
Soils	The Pacific Palms has a variety of soil landscapes including; estuarine landscape in low lying areas on the lake fringe; erosional landscape on the undulating hillslopes; Colluvial landscape occurs on higher ridgeline; aeolian landscape (the majority of the area); and beach landscape. Acid sulphate soils occurs in low lying areas of Pacific Palms and the majority is LWd4(p) and LWd2 with much smaller occurrences of LEs1(p), LWa4, Lap4, LLm and NEm.

4.2 Field assessment

Slope (°)	Low lying areas, undulating landscape with slopes general 3-10 degrees though may be greater than 15 degrees on steeper hillslopes. Conditions apply to steeper slopes.
Drainage/ Watershed	The APZ's and SFAZ's mechanical works including mowing, slashing and hand removal are within most areas of 0-5 degrees, 5-10 degrees slopes with few areas within 15—18 degree slopes.
Riparian areas	Several of the reserves occur within riparian zones. Conditions on hazard reduction works apply within these areas.
Vegetation	The detailed vegetation survey by Council identified 22 forest types as described within the GLC Vegetation Strategy, 2004 in summary (in decreasing size) including; Grey Gum/Grey Ironbark/White Mahogany, Cleared, White Mahogany/Red Mahogany/Grey Ironbark/Grey Gum, Paperbark, Myrtle, Swamp Mahogany, Blackbutt-Bloodwood/Apple, Headland Brush Box, Heath, Swamp, Palm, Banksia, Spotted Gum - Ironbark/Grey Gum, Swamp Mahogany/Paperbark, Swamp Oak, Dry Blackbutt, Inland Brush Box, Paperbark/Swamp Oak, Sydney Blue Gum and Flooded Gum.
Habitat trees (Hollows/dead)	Hollow bearing trees are present but not impacted by fire mitigation works. Habitat values for hollow-dependant fauna are minimal.
Size class of trees	Tree heights are generally between 8-15 metres for forested wetland forest; 12-20 metres dry sclerophyll forest (to 22m on drier ridgelines); 18-22 metres wet sclerophyll forests with generally a 40-60% cover in drier communities (occasionally 30%) and 60% cover in wetter communities.

Shrub and ground cover	Small trees and shrubs present, with ground covers present in most communities. Within dry sclerophyll forests shrubs are dry in nature and are sparse to a height of 3-metres, occasionally 4-metres within Spotted gum and Spotted Gum-Ironbark/Grey Gum. Ground cover is sparse to moderate to 0.5-metres. Within the forested wetland forests the small trees grow to 6-metres and shrubs form a moderately dense layer from 1- 2-metres. The ground cover layer can also be dense to 1-metre. Within each, vegetation community the species diversity is variable.
Fallen timber	There is evidence of some larger timber retained on the ground as well as smaller timber found amongst the litter layer.
Rocky outcrops	Some present in higher ridgelines on the coast.
Wet areas	Riparian zones are adjacent to the lake and within forested wetlands. Gahnia is found in wetter areas within various forests in Pacific Palms. Conditions apply to these and within drainage lines within FMZ's.
Corridors	The reserve areas although disjunct provide a habitat corridor which links with the adjoining bushland areas and provide corridors through and around the urban area.
Faunal refugia	Within the various public reserves and drainage easement remnant vegetation provides habitat for birds and smaller arboreal animals. Reserve 58, 5256, 5260, 5115, 5061, 1009 and R10072 support larger areas, and are very important to local species for habitat and refuge. It provides movement, dispersal through the reserves and into the very large high value remnant habitats.
Evidence of Threatened species	None recorded in the field during this assessment.
Noxious weeds	Noxious weeds have been recorded within Pacific Palms area including; Bitou bush, Blackberry, Crofton weed (W3 category weeds); Mist Flower, Mother-of-Millions, Pampas Grass, Giant Parramatta Grass (W2 category weeds), Prickly Pear (W4f category weed). There are also environmental weeds within some of the reserves including Lantana, Asparagus weed (Ferny and Ground), Morning Glory (Coastal and Dunny Creeper), Cassia, Noogora Burr, Water Primrose and *Acacia saligna*.
Cave, mines or tunnels	None recorded.
Past Disturbance	Clearing and mowing has occurred in areas maintained as open space areas and reserve areas. In additional in some cases unauthorised clearing by neighbours has encroached within reserve, often leading to escaped garden plants or dumping of rubbish. There is minimal invasion of weeds or noxious weeds identified within fire management zones.
Fire disturbances	Wildfires have occurred within some of the reserves.
Fire Assessment	Within proposed FMZ's; there is a variation of fuel loads within the reserves in Pacific Palms. Ongoing maintenance in managed open space areas resulted in low fuel loads. Reserves conserved for environmental protection and not managed for open - space had higher fuel loads present. Bark fuels – Low, moderate, high and very high (0 to 5t/ha) Surface fuels – Low. Moderate, high and very high (<4 to 12 t/ha) Elevated fuels – Low. Moderate, high and very high (0 to 6t/ha)

	Overall Fuel Loads = Low to very high where bark hazard is high. Overall Fuel Loads = Moderate to extreme where bark hazard is very high.
Fire advantages	The APZ's and SFAZ's provide advantage lines for fire fighters behind residential properties. Access on managed reserves across mown open space areas enable fire fighters good egress in the event of a fire.
Water points	Fire hydrants, boat ramps or lake edge.
Additional comments regarding fire assessment	Adjoining properties are required to undertake hazard reduction works, which is certified by the NSW Rural Fire Service.

4.3 Significant features

Conservation Significance (National/state/local natural or cultural heritage values)	There is some mapped vegetation communities within reserves that have state significance, as they are known or likely to be endangered ecological communities (EEC). This includes 'Swamp Sclerophyll Forest on Coastal Floodplains of the North Coast Bioregions', swamp Oak on Coastal Floodplains, Littoral Rainforest and Coastal Saltmarsh. In a regional context those forest community considered vulnerable are: ▪ 31 Paperbark is within a modified forests being highly significant forest community (APZ works). ▪ 30/ 31 Swamp Mahogany/ Paperbark (APZ works) ▪ 31/32 Paperbark/ Swamp Oak (APZ) Forests communities considered regionally rare with a 100% conservation target in the Lower North East of NSW are: ▪ 37 Dry blackbutt and 45 Tallowwood. ▪ 45 Tallowwood ▪ 32 Swamp Oak (APZ works) ▪ 30/32 Swamp Mahogany/ Swamp Oak ▪ 33 Mangrove Existing reserves and reserve management can serve to protect these areas from further degradation by unauthorised works. Fire mitigation works occurs within 4 of these vegetation communities however impact is minimal and is often within the transitional zone, which often has formerly been disturbed. The activities will not affect any wetland areas or riparian areas and will have a minimal, short-term effect on the environment. The size of the works is minimal compared to the remaining area within the reserves.
Plants (ROTAP's or threatened species, communities, critical habitats and regionally significant species)	Two (2) plants are listed under Schedule 2 of the *Threatened Species Conservation Act, 1995, which* occur in the vicinity of Pacific Palms but not within the study area.

Animal (regionally rare or threatened species, communities, critical habitats)	Twenty-four (24) threatened species are known to occur within the study area or 5km radius of activities in Pacific Palms, based on site records and data contained in the wildlife Atlas NSW. A procedure for determining which of these species requires assessment under Section 5A of the EP&A Act has been undertaken within Attachment 1 & 2.
Water Catchment values including identified high conservation value subcatchment	Pacific Palms study area is adjacent to the BBNP and within the Wallis Lake Catchment area. Conservation of the transitional zones on the lake edge is important to many vegetation communities found within the zone.
Known or potential for Indigenous heritage values	The Lower Hunter Zone BFMC Bushfire Risk Management Plan does not identify any archaeological or aboriginal heritage sites in or around Pacific Palms. In addition the DEC (Parks and Wildlife Division) maintained Aboriginal Heritage Information Management System (AHIMS) search for Aboriginal Objects and Aboriginal Sites did not identify any aboriginal sites within Council land where FMZ are proposed.
Historic heritage values (eg. historic places, movable heritage or relics)	The proposed activities do not impact on any areas of historic values recorded in Pacific Palms.
Recreation	There will be minimal impact to recreational pursuits as the activities within the reserves are mechanical works which can occur at the same time public are visiting the reserve due to the small area of the reserve is being maintained.
Scenic and visually significant	Dry sclerophyll shrub/ grass forests and forested wetlands surround the proposed activities within the various sites. The mechanical works will ensure the over storey shrubs and trees remains intact. The ground covers will be most affected with some impact on the shrub layer. The area will be slashed which ensure a ground cover remains within the fire management zones (although reduced in height). There is minimal impact on the soil by slashing/ mowing or hand removal. Where appropriate slash >5cm above the ground. The regrowth of the area ensures that plants can continue to mature and set seed. The frequency of works in the forest area ensures the fuel loads are maintained below 8 tonnes per hectare. Grassed areas are periodically mown more frequently to ensure grass height remains to meet the required guidelines.
Education	Council encourages community education, which meet Council policies and guidelines within the FMP.
Interests of external stakeholders (eg. apiarists, leaseholders)	The proposed activities are within 18 different reserves in Pacific Palms with adjacent residents being of most interest to the works. The public exhibition of the Fire mitigation Plan- Pacific Palms enables the community to make comments on the activities proposed. In addition neighbouring properties will be advised by letterbox drop of the proposed activity of notified through other media such as radio or press release.

(5) Environmental Impacts

	Yes or No[25]	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
5.1 Physical issues			
1. Does the proposal disturb ground features including filling or excavation?	No	N/A	
2. Does the proposal affect a waterbody, watercourse or wetland?	Yes	Minimal	Minimal compaction by heavy machinery (tractor) when slashing. Removal of debris repeatedly on an area may result in minimal soil disturbance. Erosion will be monitored throughout the implementation and completion of the works. Appropriate erosion control measures (sediment traps) will be put into place to prevent soil erosion as necessary. Works in riparian zones will be strictly controlled and minimised.
3. Does the proposal change flood or tidal regimes, or is it affected by flooding?	No	N/A	
4. Does the proposal use or transport hazardous substances?	Yes	Minimal	A small amount of fuel will be used in mowers and whipper-snippers, which are carried in certified fuel containers in accordance with the Dangerous Goods Act.
5. Does the proposal generate or dispose of gaseous, liquid or solid wastes?	No	N/A	
6. Will activity emit dust, odours, noise, blasts or radiation in the proximity of residential areas?	Yes	Minimal	Increased noise generated from machinery mowing or slashing the areas.
7. Does the proposal affect coastline or dunes, alpine areas, karsts features, unique landforms or groundwater recharge areas?	Yes	Minimal	Weed removal only within 100m of the Mean HWM conducted in a manner that retains dune stability in these sensitive areas.
8. Does the proposal affect erosion prone areas or areas with slopes greater than 18°?	No	N/A	No steep slopes >18° are present. Those from 15-18° require erosion control netting or retention of fallen logs to reduce and prevent erosion.
9. Does proposal affect subsidence or slip areas?	No	N/A	
10. Does proposal affect areas with acid sulphate, sodic or highly permeable soils?	No	Minimal	Works below SL or 1-2m below SL affects acid sulphate soils. However the mechanical works within reserves will not be below SL and have minimal surface soil disturbance from machinery driving over the area while mowing or slashing. The acid sulphate soil risk

[25] If yes is selected, both other columns need to be completed. If no, just select n/a in the likely impact column.

	Yes or No[25]	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
			only occurs within when works are below ground level.
11. Does the proposal affect areas with salinity or potential salinity problems, or groundwater recharge areas?	No	N/A	
12. Is the proposal within a SEPP 14 - Coastal Wetland or SEPP 26 -Littoral Rainforest or equivalent?	No		
5.2 Biological Issues			
5.2.1 Flora			
1. Have you accessed flora databases?	Yes		Refer to Attachment 2.
2. Has the site been surveyed for flora, including ROTAPs and threatened species?	Yes		No ROTAP or threatened species were found within the proposed FMZ's.
3. Were any habitats or species of significance or potential significance noted (eg. wildlife corridors, remnant vegetation, inadequately reserved plant communities)?	No	N/A	There is no threatened plant species within Council managed however two (2) were found within a 5km radius of activities. No 8-part test of significance is required.
4. Does the site have cultural landscape values?	No	N/A	
5. Is the vegetation to be cleared or modified including any ROTAPs, threatened species or communities?	Yes	Low	The vegetation is be modified, within the ground and shrub layers with no impact on ROTAP species. Hospices are to be retained to provide habitat and discontinuous vegetation structure.
5.2.2 Fauna			
1. Have you accessed all available NPWS fauna databases (eg. Wildlife Atlas)?	Yes		DEC threatened fauna and flora records have been viewed and details in particular of threatened species are within Attachment 1.
2. Has the site been surveyed for fauna, including for threatened species?	Yes		No threatened species were found within the FMZ's.
3. Were any habitats or species of significance (including threatened species) or potential significance noted?	Yes		Twenty-four (24) threatened species are known to occur within the study area or 5km radius of activities in Pacific Palms, based on site records and data contained in the wildlife Atlas NSW. No 8-part tests of significance are required to assess the likely impact of the activity (Attachment 1 &2).
4. Does the activity displace or disturb fauna or create a barrier to movement?	Yes		The mechanical slashing will disturb some fauna temporarily. The reduced habitat is very small in size and the hospices and adjacent conservation zone provides habitat

	Yes or No[25]	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
			for smaller reptiles, birds and insects.
5.3 Community Issues			
1. Does the proposal affect the existing use of community services or infrastructure including access or increased visitation?	Yes	Minimal	Some APZ's will allow access to the rear of houses. Leaving hospices to reduce visual access into these areas and thus interest from pedestrian access can reduce impact on adjoining properties. Some areas require barriers such as bollards or gates to restrict access, where any such access is inappropriate. Policing of the private storage of equipment in any APZ will be conducted.
2. Does the proposal affect or change the transport requirements of an area?	Yes	Minimal	Machinery/ lawn mowers will be unloaded from vehicles on the roadside but disturbances only temporary.
3. Does the proposal affect sites of importance to local or broader community for their recreational or other values?	No	N/A	
4. Has consultation with the potentially affected community been undertaken?	Yes		The community has been notified of the Fire Mitigation Plan – Pacific Palms that details the proposed activities. The Plan will be publicly exhibited.
5. Does the proposal affect the use of, or the community's ability to use, natural resources, especially water?	No	N/A	The public uses the open space areas that are also FMZ's. The community in these areas prefers the short grass.
6. Does the proposal affect the visual or scenic landscape?	Yes	Minimal	The proposed activities will cause short-term visual changes to the landscape, as the area will be able to be accessed and viewed from the adjoining properties.
5.4 Ecological Communities and General Impact			
1. Is the activity likely to cause a threat to the biological diversity or ecological integrity of a community?	No	N/A	
2. Is the activity likely to introduce noxious weeds, vermin, feral species or genetically modified organisms into an area?	Yes	Minimal	The disturbance of the ground layer species may enable weed species to invade. Ongoing weed management will control the spread of weeds in these areas.
3. Is the activity likely cause a bushfire risk? or changes the fire regime	Yes	Medium/positive	The FMZ's are primarily to provide protection to the community in the event of a fire. The reduced ground fuels reduce the chance of fire.

	Yes or No[25]	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
4. Is the activity likely to have any other potential impact on flora, fauna or ecological communities?	No	N/A	
5. Bushfire prone areas	Yes		The majority of the study area are recorded and mapped as being bushfire prone land.
5.5 Cultural Heritage Issues			
5.5.1 Aboriginal heritage			
1. Have you accessed the NPWS Aboriginal sites register?	Yes		A DEC Aboriginal Heritage Management System (AHIMS) search revealed no sites within the areas proposed for hazard reduction activities.
2. Has an assessment been carried out in order to determine the likelihood of occurrence of Aboriginal relics or places of significance?	Yes		No further aboriginal sites were located during field inspections.
3. Does the proposal affect Aboriginal relics or places of significance or importance to the Aboriginal community?	No	N/A	As some areas have not previously subject to slashing, trittering or removal of many trees (or significant trees) the DEC (Cultural Heritage Division) was contacted. No trees greater than 100cm were identified for removal.
4. Does the proposal affect areas nominated or declared as Aboriginal Places?	No	N/A	
5. Does the proposal affect areas subject to land claims or Native Title claims?	No	N/A	
5.5.2 Historic heritage			
1. Has the area been surveyed or assessed for heritage items or historical archaeological sites?	Yes		While there were known historic sites within Pacific Palms, no known historic areas were identified as being within areas where hazard reduction works have been proposed.
2. Does the proposal affect known heritage items or historic archaeological relics?	No	N/A	
3. Has a conservation plan or other conservation assessment been prepared for the place? If so, is the proposed activity in accordance with the conservation plan or assessment?	No	N/A	

	Yes or No[25]	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
6 Biological issues during construction			
6.1 Natural Resource Use Issues During Construction and Operation			
1. Is the activity likely to result in the degradation of the reserve or any other area reserved for conservation purposes?	Yes	Minimal	The removal of some ground covers and shrubs within a small proportion of the reserves will have minimal effect on conservation values of the area.
2. Is the activity likely to involve the use, wastage, destruction or depletion of natural resources including water, fuels, timber or extractive materials?	Yes	Minimal	Removal of shrubs and ground covers from the area to a local refuge area ensures green waste does not remain in the FMZ's.
3. Is the activity likely to have any other impact on natural resources?	No	N/A	

Summary of environmental impacts

The overall impacts of the proposed activities are considered to be low. The activities are considered to have a positive impact on neighbouring properties. The main impacts will be the mechanical hazard reduction of the FMZ, which is localised, with short-term displacement of some fauna. These impacts, however, are not considered to be significant for the following reasons:

- The area that is involved is small compared to the total adjacent reserve area.
- Erosion controls will be implemented as required.
- No recorded threatened plant species is known to occur within the proposed activities area.
- The proposed activities will have no or minimal impact on the threatened fauna of the area (Refer to Attachment 1 & 2).

(6) Environmental Safeguards

The proposed activities within the fire management zones are to ensure activities meet legislative and policy guidelines. In addition to ensure environmental safeguards (Fire Mitigation Program) are implemented options for conditions guided by the Code, planning documents and legislation.

Environmental Safeguards

No.	Action
1	Prior to any hazard reduction works, the required APZ width within this plan is measured from the boundary of the reserve. N.B. In order to determine the required width of the APZ, the setback from the adjacent asset (house etc) combined with existing slope determines the maximum width as per the Code and defined specifically within the Plan. The APZ shall be staggered depending on the setback (of assets) within adjacent properties, to further minimise the area affected.
2	Under scrubbing shall be conducted sensitively, with selected understorey clumps marked to be retained. The area to be retained is approximately 30% of the total area.
3.	All trees and shrubs in excess of 3m to be retained, except where canopy separation or access trail is required. Determination for removal must be by an authorised Council Officer.
4.	Large fallen logs (where applicable) shall be retained, with care taken where epiphytes exist.
5.	Trees greater than 3m to be marked/approved for removal in consultation with the Parks and Recreation Section. In this case, trees shall be selected based on bark hazard (flammability), health, desirability (feed trees etc) and shall be clearly marked or area described for action.
6.	All Cabbage Tree Palms greater than 500mm shall be retained, as this is a protected plant.
7.	Rainforest shrubs and fire retardant plant species shall be selectively retained within the APZ.
8.	Protect & retain all bush rock.
9.	The works shall target noxious weeds and environmental weeds.
10.	Remove fuel reduction work debris from site to an authorised area for disposal. Approval to store removed fuel before disposal must be sought from an authorised officer.
11.	The DEC (Cultural Heritage Division) must be contacted to assess impact of proposed works when: ▪ Areas that have not previously been subject to slashing, trittering or removal of many trees (or significant trees) or trees are greater than 100cm diameter (at breast height) are identified for removal. Conditions will be given that apply to proposed works.
12.	Skirting (removal of lower branches) to separate tree canopy from the ground or understorey vegetation should be used in preference to tree removal where appropriate in consultation with the Parks and Recreation Section.
13.	Undertake field survey for target threatened species when specified within the REF, to ensure safeguards can be implemented to protect species, which occur or have moved into the area (Refer to the REF for further details).
14	In steeper areas retain fallen logs to assist in reducing and preventing soil erosion by placing across the slope to slow soil movement.
15	Herb and shrub layer retention at the base of the trees or left as clumps or hospices to provide cover for fauna.

Conditions as guided by the Code.

The following mechanical hazard reduction conditions are for works formally identified in the Plan. The list is to be reviewed for various FMZ as alternative conditions apply each zone.

Hazard Reduction Conditions: Mechanical

✓	Preference shall be given to the retention of smooth barked trees and large trees with hollows.
✓	Trees and shrubs up to 3 metres in height may be removed as part of the hazard reduction activity approved as described within this report or specified on site by an authorised Council Officer.
✓	Dangerous trees may be removed with the approval of Great Lakes Council.
✓	Slashing and trittering shall not be carried out on slopes exceeding 18 degrees.
✓	The works shall be carried out in a manner to ensure the retention of topsoil on the ground surface.
✓	Council shall comply with any relevant management actions identified in the NPWS Threatened Species Hazard Reduction schedule.
✓	Council shall comply with any relevant management actions identified through referral to NPWS Cultural Heritage Division with regard to Aboriginal heritage sites>.
✓	Soil moved by ploughing or blading shall be redistributed evenly over the effected area. Natural or assisted re-vegetation of the effected area is to be encouraged in order to prevent soil erosion.
✓	Where a fire break is to have a slope length greater than 60 metres, slashing/trittering is the preferred hazard reduction method. Mowing may be used when existing maintenance type compliments management objectives.
✓	This REF does not permit the use of graders and dozers to clear native vegetation.
✓	This REF does not permit the re-shaping of the soil surface or the redirection of overland flows.
✓	Hazard reduction works are not permitted within 10 metres for APZ/ or 20 metres for SFAZ of a stream, wetland, lake or swamp.
✓	This certificate does not permit the removal of trees on slopes greater than 18 degrees.
✓	Herbicides shall not be permitted within 10 metres of any riparian area.
✓	Herbicides shall only be used in accordance with the *Pesticides Act 1999, the Protection of the Environment Operations Act 1997* and the directions on the herbicide container label.
✓	Restricted mechanical works within coastal dune vegetation within 100m of mean high water mark (HWM), freshwater wetlands and rainforests except the manual removal of noxious and environmental weeds.

Conclusion & Recommendation

In considering the degree of impact of fire management works overall, high ranking is triggered if a number of individual categories are considered to be high, or if one particular category is particularly significant. Tick statement that applies.

☐	**The proposal is not likely to have a significant impact on the environment. No further assessment is required. The proposal is recommended for unconditional approval**
☑	The proposal is not likely to have a significant impact on the environment. No further assessment is required. The proposal is recommended for conditional approval.
☐	**The proposal is likely to have a significant (medium or high) impact on the environment. It is recommended that an EIS / an EIS and SIS be prepared.**
☐	**the proposal will have a significant impact on the environment and or community/cultural values and it is recommended that the proposal not proceed**

Attachment 1

Wildlife Atlas

Search of the NSW Department of Environment and Conservation (DEC) Wildlife atlas of threatened fauna and flora species present within a 10km radius from within Pacific Palms study area.

Data from the database was extracted in June 2006 and contains data from sources including government agencies, non-government organisations and private individuals. (N.B. These data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. (DEC 2006). 'Copyright NSW Department of Environment and Conservation)

Flora

Family	Species	Within the Study Area	Outside study area	Threatened Species	ROTAP Code
Euphorbiaceae	*Chamaesyce psammogeton*	×	Within BBNP	E1	
Myrtaceae	*Syzygium paniculatum*	×	Within BBNP	V	3RCi

Fauna

Family	Scientific Name	Common Name	Within the Study Area	Outside study area (5km of activity)	Legal Status
Class -Aves					
Procellariidae	*Pterodroma leucoptera leucoptera*	Gould's Petrel	×	✓	E1
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	×	✓	E1
Accipitridae	*Pandion haliaetus*	Osprey	✓	✓	V
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	×	✓	V
Columbidae	*Ptilinopus magnificus*	Wompoo Fruit-Dove	×	✓	V
Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	✓	✓	V
Strigidae	*Ninox strenua*	Powerful Owl	✓	✓	V
Tytonidae	*Tyto novaehollandiae*	Masked Owl	×	✓	V
Tytonidae	*Tyto tenebricosa*	Sooty Owl	×	✓	V
Climacteridae	*Climacteris picumnus*	Brown Treecreeper	✓	×	V
Class - Mammalia					
Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	×	✓	V
Phascolarctidae	*Phascogale tapoatafa*	Brush-tailed Phascogale	×	✓	V
Phascolarctidae	*Phascolarctos cinereus*	Koala	✓	✓	V
Petauridae	*Petaurus australis*	Yellow-bellied Glider	✓	✓	V
Pteropodidae	*Petaurus norfolcensis*	Squirrel Glider	✓	×	V
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	✓	✓	V
Pteropodidae	*Syconycteris australis*	Common Blossom-bat	×	✓	V
Molossidae	*Mormopterus norfolkensis*	Eastern Freetail-bat	✓	✓	V
Vespertilionidae	*Miniopterus australis*	Little Bentwing-bat	✓	✓	V
Vespertilionidae	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	✓	✓	V
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	✓	×	V
Muridae	*Pseudomys gracilicaudatus*	Eastern Chestnut Mouse	✓	×	V
Otariidae	*Arctocephalus pusillus doriferus*	Australian Fur-seal	✓	×	V
Class - Amphibia			□	□	
Myobatrachidae	*Crinia tinnula*	Wallum Froglet	✓	×	V

Attachment 2

Section 5A EP&A Act 1979 – 8-Part Test of Significance

Threatened Species Considerations:

- *Is the activities likely to significantly affect threatened species, populations or ecological communities, or their habitat (include the eight-part test (s.5A EP&A Act 1979)*. (Note: A species impact statement is required if an activities is on land that is, or is part of critical habitat or there is likely to be a significant effect as determined under s.5A of the EP&A Act 1979).

There are a number of threatened species (flora and fauna) that has been identified to occur within the study area (and 5km radius from activities). Those that pertain to estuarine and water way areas, which do not inhabit forest areas, have been excluded form the assessment as works are not within these areas.

Those remaining are those defined as potential subject threatened species *"considered likely to occur within habitats of the study area that are impacted by hazard reduction works".* A preliminary assessment of the impact on species in the following table details a summary of habitat attributes and species requirements with regard to the impact of works on the species. An 8-Part Test is only required where there is a risk/chance of potential impact arising from the works such that significance of these risks can be ascertained.

Common Name / Status	**Comments - Section 5A Assessment requirement**	**Assessment Not required ☒ (No significant impact) Required ☑**
Koala	Being an arboreal marsupial inhabits forest and woodland communities. Koalas rely on over storey trees and shrubs for food and shelter, with preference to local species such as Tallowwood and Swamp Mahogany. There is both core and secondary habitat within the study area with recorded sites of a known koala population locally. The activities are modifying the shrub and groundcover layers found within the FMZ's and does not affect Koalas preferred tree species for resting or feeding. Although under SEPP 44, there are listed Schedule 2 Koala feed trees, which do occur in some reserves. The minimal vegetation modification would not impact adversely on this species.	☒
Little Bentwing Bat	Critically relying on caves for roosting sites, but forages through the understorey of woodlands and forest areas. No caves were located in the FMZ's for which these species may inhabit. No other structures locally are known to support this species in Pacific Palms. The small modification of the area would not adversely affect the lifecycles of this species.	☒
Large Bentwing Bat	A predominant cave dweller relies on caves for roosting and maternity sites but forages for food through forested areas. No caves were located in the FMZ's for which these species may inhabit. No other structures locally are known to support this species in Pacific Palms. The small modification of the area would not adversely affect the lifecycles of this species.	☒
Grey Headed Flying Fox	The Grey-headed Flying fox predominantly occurs in subtropical and temperate rainforests, heaths and swamps. Locally recorded in Wetland Forests in Pacific Palms may utilise tree species during flowering periods. They forage on the nectar and pollen in particular in *Eucalyptus*, *Melaleuca* and *Banksia's* all which occur within the study area. The proposed activities will only modify surface (leaf litter) and near surface (shrubs) fuels and will have no impact on tree canopies where the Flying-fox feeds and roosts. However, no Grey-headed Flying-foxes have ever been sited within the proposed FMZ's.	☒

Common Name / Status	Comments - Section 5A Assessment requirement	Assessment Not required ☒ (No significant impact) Required ☑
Greater Broad-nosed Bat	The preferred habitat of this species appears to be old growth cool temperate or wet sclerophyll forests. They roost in tree hollows or buildings. There are recorded sites locally in Pacific Palms in areas where there are tree hollows present and uses vegetation gaps for foraging areas. FMZ works will have no impact on these species as no tree removal is proposed.	☒
Masked Owl	Relying on presence of high densities of tree hollows for nesting this species occupies drier more open forests than the Powerful Owl, where it forages mainly on ground mammals. Known to frequent modified forest areas and bushland fringes foraging for prey with a home range up to 1,100 hectares. The limited area modified for fire mitigation works has minimal impact on this species.	☒
Yellow-Bellied Glider	Prefers tall mature forest in regions of high rainfall. There are a minimal number of habitat trees locally or known hollows for this species to frequent. Winter flowering eucalypts and sap-site trees determine local distribution. Although likely to inhabit the area there are no significant impacts on this species.	☒
Wallum Froglet	Requirements of this species are within the fringes of freshwater swamps and forested wetlands, which are within low-lying areas. When water levels are high this species may frequent the surrounding fringes including those found within these vegetation formations. A specific site survey assessing the population presence within proposed APZ was undertaken. No populations were located or suitable habitat, which is exposed to ephemeral inundation, was present within fire mitigation work areas.	☒
Eastern Chestnut Mouse	The eastern chestnut mouse inhabits in low numbers wet heathlands and is most common in dense swamp forest/ sedge habitats. Optimal habitat appears to be in vigorously regenerating wet heathland burnt from 18 months to four years previously. As the heath matures the larger Swamp Rat becomes dominant and the Eastern Chestnut Mouse numbers drop again. The area assessed does not appear optimal for the Eastern Chestnut Mouse, but given the density and type of the groundcover present, there may be potential visitation or use of the land by this species for lifecycle purposes, such as dispersal or foraging. Obviously, the land would form a high quality buffer between the urban landscape and the more preferred habitats. Feeding occurs at night through grassy and sedge understorey with components of the diet varying seasonally. The limited area modified for fire mitigation works has minimal impact on these species. Hospices are retained which provides cover and foraging areas.	☒
Squirrel Glider	In coastal areas, the nocturnal Squirrel Glider occupies Blackbutt, Bloodwood and Ironbark forest with heath understorey. The gliders are more likely to inhabit mature or old growth forest, as they require abundant tree hollows for refuge and nest sites. The proposed FMZ's have minimal hollows present. Squirrel Gliders have been recorded nearby to the proposed fire mitigation works however works occur within the understorey and not within the canopy where roosting sites occur.	☒

As a consequence it is concluded that there would be insignificant impact on the lifecycles, habitat disruptions or conservation status of the potential species due to factors such as:

- The small area of works in relation to the adjacent larger are of the reserve retained for conservation;
- The minimal impact on species as they do not inhabit the understorey which has minimal modification;
- The retention of key habitat features including the protection of tree hollows and important vegetation;
- The retention of hospices and over storey and canopy species;
- The environmental safeguards and conditions enclosed within the Plan; and
- The low impact nature of proposed activity and the ability of the bushland area to sustain fire within biodiversity thresholds.

The discussion in the above table and the resultant conclusion; that there is not significant impact on species, additional Species Impact Statement (SIS) is not deemed required for any of the species.

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