Fire Mitigation Plan
~ Nerong ~

Great Lakes Council

January 2006

EXECUTIVE SUMMARY

Great Lakes Council, Fire Mitigation Plan – Nerong has been prepared for Nerong Village and environs.

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

The insight and greater understanding into fire management planning by community and planners, provides the mechanism primarily to protect life and property.

The major bushfire risk in Nerong and the area mapped as being Bushfire Prone Land guides fire management strategies in development assessment and strategic planning as well as planning for and implementing hazard reduction works.

The outcomes of this Plan have been based on fire risk assessments and

Endorsed by Great Lakes Council: 13 December 2005
Updated: January 2006

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Funding was made available through a three-way partnership between the Federal Government, State Government and Great Lakes Council.

implementation of hazard reduction within and adjacent to Nerong.

The bushfire mitigation program identifies fire management zones such as asset protection zones, strategic fire advantage zones, land management zones and exclusion zones and highlights fire prevention, mitigation and suppression of bushfires.

The management of hazardous fuels or mitigation against imminent bushfires through cooperative education programs with other fire fighting authorities prepares the community for such events.

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SECTION 2

Fire Management Responsibilities and Obligations

The fire management guidelines within the Plan specifically apply to Council managed land, however the neighbouring fire management strategies on adjacent land were considered, when identifying strategies for bushfire mitigation.

Under the RF Act public authorities and all land managers are responsible for complying with the Act, to prevent the occurrence of fires and to mitigate, against the spread of fires from entering or leaving managed or maintained land.

Requirements of the RF Act include:

In the event of a fire, owners/occupiers are required to extinguish fire, when aware of a fire, and if possible, regardless of the fire being lit by the occupier, notify the RFS of the fires existence or requirement of assistance to prevent the spread onto neighbouring properties.

When landholders light fires and they obliged to notify public authorities that are located on lands within 8 kilometres of there estate. This includes notifying the Parks and Wildlife Division of DEC (formerly NPWS) and the DPI (Forests) (formerly State Forests), in addition to contacting the RFS and neighbours.

During the Bushfire Season persons who wish to light a fire require a current Fire Permit to be issued by the RFS.

Additionally landholders are obliged to implement hazard reduction works when notified by the RFS to undertake bushfire hazard works, under *section 66* of RF Act.

Within Great Lakes a large number of assets are adjacent to and within forested areas (often of high conservation value), which are managed by various agencies, authorities and private landholders. As a coordinated approach, the RFS promotes cooperation through legislation and the preparation of *Bush fire risk management Plan* and the *Operations Plan*, through the Lower Hunter Zone Bush Fire Risk Management Committee (BFMC). Consultation with representatives is very important to the BFMC and Council is one of the key stakeholders on this committee.

Fire management plans and fire mitigation policies are prepared and implemented by various stakeholders as discussed further within this section.

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. Pro-active fire planning and implementation to mitigate against fires and their affects, allows Council and the RFS to cooperatively achieve sound and rational fire management planning results. Appendix II (GLC 2004c) identifies Council fire management objectives which contribute to the direction and outcome of the plan.

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.

Council promotes and provides community education throughout the year to residents and the wider community through reference to documents, fire information from other authorities, and the provision of resources, brochures and signs to improve awareness and preparedness. Community awareness strategically assists in managing the risk as guided by the *Lower Hunter Zone Bush Fire Risk Management Plan* (BFRMP).

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 Bushfire Hazard Reduction Certificates for Council managed land;*
- ✓ *Responsible for the identification of Bushfire Prone Lands within the Council Area under section 146 of the EP&A Act. The BFRMP incorporates this information, meeting obligations under the RF Act and certifying 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 Bushfire Safety Authorities;*
- ✓ *Ensures DCP address bushfire hazard management and Council development controls in Bushfire 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.*

Being adequately prepared for fires and their effects on home-owners, land mangers, residents, rural properties and essential services, ensures that during extreme fire events the probability for the survival of life and property is duly achieved.

Council actively undertakes fuel reduction programs on Council Land by staff and volunteer programs, where maintenance has been identified within asset protection zones. The Council values the support of volunteers and volunteer schemes in undertaking fire protection works.

Bushfire Management Committee

Bushfire Management Committee's meet requirements under the RF Act and are responsible for fire management within the local rural fire district. Great Lakes are within the Lower Hunter Zone Bushfire Management Committee, which includes members from 3 LGA's. An officer and a Councillor represent Great Lakes Council on the Committee. The Committee is responsible for the coordination of fire suppression and hazard reduction activities as part of the statutory requirements of the RF Act.

The committee prepares the Lower Hunter Zone BFMC, *Bush Fire Risk Management Plan (BFRMP)*, the *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, jointly with the RFS.

Great Lakes Council Local Disaster Plan

Within the State DISPLAN, Council has a committee member on the Great Lakes Local Emergency Management Committee (LEMC) which is responsible for determination of a local emergency and appointment of the Incident controller of the appropriate combat agency during fires in urban and rural areas.

Overall control and the coordination of support resources for bushfire operations is the responsibility of an Incident Controller selected, or appointed by the Commissioner of the NSW Rural Fire Service, from the RFS, DEC (Parks and Wildlife Division), DPI (Forests) or NSW Fire Brigades. During a Section 44 bushfire emergency, a Local Emergency Operations Controller (LEOCON) may be requested to coordinate non-fire fighting support to an Incident controller.

The *Great Lakes Council Local Disaster Plan* (DISPLAN) assists in the arrangements at local level to prevent, prepare for, respond to and recover from emergencies in compliance with the *Section 29(1) of the State Emergency and Rescue Management Act* (SE&RM Act). Council

must establish and maintain a Local Emergency Operations Centre (LEOC) for the Local Emergency Operations Controller (LEOCON) as required.

During any incident or emergency Council also provides: support to combat agencies and functional area agencies as required; facilities for reception and registration of evacuees; assist, at their request, the Police Service, NSWFB, Ambulance Service, RFS, Bulahdelah Volunteer Rescue Association (VRA) and the State Emergency Service (SES).

Fire fighting authorities, agencies and representatives of stakeholder groups work cooperatively to develop evacuation plans identified in the *BFRMP*. Within the DISPLAN evacuation arrangements and plans are prepared that identify and specify areas likely to require evacuation, identifies egress, notification arrangements, refugee areas and provision for the care of injured animals.

Council also assists in other emergency management prevention, preparedness or recovery operations, including emergency management training, for which the Council's training and equipment is suitable.

NSW Rural Fire Service

The NSW Rural Fire Service (RFS) work cooperatively with Council to ensure the effective management with Council and RFS funding, management, maintenance, support, of fire and emergency operations. The RFS is responsible for the coordination of bushfire fighting and provides 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. The RFS also assist other emergency service organisations at incidents and at emergencies under the control of those organisations.

The coordinated fire suppression and mitigation of fire with Council and with other authorities and land managers, ensures villages and rural areas have fire combat agencies to provide the ability to protect life and property within the rural fire district.

Bushfire prevention and mitigation works by the community have been assisted by legislative changes, whereby RFS have been authorised to undertake environmental assessments on private property and certify hazard reduction works. Bushfire Hazard Reduction Certificates (BFHRC) issued under *Section 100F and 100G* of the *RF Act* enable works to be authorised and guided by specific conditions.

This authorises private property owners to implement hazard reduction works either as preventative hazard reduction works or works that have been initiated by the RFS as strategic bushfire hazard works within bushfire prone lands guided by the BFRMP.

Council has conferred to the RFS the responsibility of assessing bushfire hazards on private land or lands managed by authorities. 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 ensures rapid, efficient and effective management of 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).*

The NSWFB assists the community to recover after emergencies and cooperatively works with other emergency and support services (NSW Fire Brigade 2004).

The NSWFB have stations located in the Great Lakes LGA at Forster and at Tea Gardens, which are able to be deployed to rural areas for cooperative emergency response with other fire fighting authorities.

Department of Environment and Conservation (Parks and Wildlife Division)

The Parks and Wildlife Division of the DEC are a recognised fire authority and public land manager who implement fire and environmental management obligations under the TSC Act and other 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 undertake operational fire fighting cooperatively with other agencies and landholders. Fire management planning is integrated with Estate management and objectives and policies directed by various committees. Fire management planning outlines the DEC approach to fire suppression, mitigation and prevention that sustains ecological processes and principles,

meets planning objectives and 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.

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.

DPI (Forests) have established independently or where appropriate, cooperatively with other fire authority strategies for controlling wild fires quickly. Emphasis is on training and preparedness to combat fires through a fast deployment system, ability to detect fires early through fire towers and participate in simultaneous joint emergency operations, and integrate resources with other fire fighting authorities.

NSW Department of Lands

NSW Department of Lands (DL) has a responsibility to 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). Delegation to the local government authority of crown land management enable Council to cooperatively plan and implement fire management objectives.

Bushfire management is part of this where managers (jointly with the RFS) reduce bushfire risks and respond to bushfire on the reserve. DL undertakes hazard reduction on reserves to reduce the bushfire risk and meet guidelines within the BFMC BFRMP and the Code.

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.

To comply with bushfire prevention regulation minimum distances for vegetation removal beneath power lines are established and maintained. Such distances are for powerlines up to 22kV, where the minimum clear distance is 20m and for 33kV to 132kV it is 30 to 45 metres respectively. Distances to prune from poles and bare and covered insulated services of various voltages are also documented. When landholders undertake bushfire prevention works, beneath electricity wires, they should be in accordance with the *Vegetation Management Plan, 2001* (Country Energy 2001).

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's 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 is also obliged to provide a safe service and be environmental responsible, provide a reliable and secure network in accordance with its obligations to the community and the National Electricity Market (NEM). Issues including Bush Fire Risk Management are encompassed within asset management and operational strategies (TransGrid 2003).

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

MidCoast Water

MidCoast Water is responsible for the supply of water within Great Lakes LGA and the management of waste water through the facilities in Foster, Tuncurry, Hawks Nest, Bulahdelah and Stroud.

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

MidCoast Water ensures the provisions of adequate facilities and fire mitigation works so that fuels are managed as required in the various fire management zones.

Private Landholders

The broader community is actively undertaking hazard reduction works in and around homes. As landholders become aware of changes to fire regulation principally when building new structures or modifying an existing building, 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 RFS assists landholders in the implementation of hazard reduction works by authorising works. A standard application is submitted to the RFS, accompanying a plan for hazard reduction works through which the RFS assesses and undertakes an environmental assessment. The proposal is authorised through issuing a hazard reduction certificate, which is current for a 12-month period.

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.

The RFS provides advice on what to do in the event of a fire approaching homes and encourages people to be prepared for fire and to undertake a bushfire safety check. By having home, *"bushfire survival plans",* and undertaking planning to protect homes, this ensures that families are better able to protect themselves by following pre-determined steps and actions in the event of a fire."

Home bushfire survival plans:

Consider available and required fire fighting water supplies and fire equipment around the home.

Ensure personnel safety and survival, and decide the survival capability of the home and options of those not capable to stay to participate in protection works around the home.

Early evacuation (or relocation) should be considered well before the bushfire event (RFS 2005).

Research has shown that those that are able to be in attendance in a well prepared home have a higher likelihood of survival (RFS 2005).

Appendix III guides landholders with being prepared for bushfires by providing steps and options to take and assist in fire prevention and hazard reduction. Other sources such as the RFS website or the local fire control centres and Rural Fire Brigades ensure information brochures are widely accessible and available to the wider community.

- *<u>Key Fire Issue</u> - Implementation of fire mitigation programs ensure ongoing fuel management continued for protection of community assets.*

❖ *Key Fire Issue - The education of the community is essential to facilitate bushfire preparedness.*

SECTION 3

Bushfire Risk Description

Bushfire Risk

Legislation, fire planning documents, policies and procedures from various authorities and agencies including Council, RFS, DEC, DPI (Forests), NSWFB, provide the guidance to assist in protecting life and property, and to reduce fire threat to assets. They collectively aid direction during fire prevention, mitigation, and suppression and provide detailed specifications for reducing hazards, improving the preparedness for emergencies in the community with minimal negative impact on the environment.

A bushfire risk analysis and environmental assessment have been undertaken by Council to identify assets at risk and identify fire management strategies to mitigate fire and the effects on the community.

Bushfire risk is defined as the chance of the bushfire igniting, spreading and causing damage to assets within the community or reducing biodiversity of areas with inappropriate fire regimes.

Within the Bush Fire Risk Management Plan, the bushfire risk is ranked from extreme, major, moderate, minor and insignificant depending on the ability for assets (built/natural) to have the capability to withstand or recover from a fire event. The hazard rating is assessed as low medium or high (RFS 2002c).

Methodology

Field assessments are undertaken to provide data for analysis for land managers. The assessment process follows guidelines provided by the RFS, and is an acceptable process for fire managers to determine the bushfire hazard and risk analysis of bushfire. The assessment includes areas that are able to sustain fire, that as a result of igniting, cause damage to assets or the community.

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), Bushfire Prone Land, BFRMP ratings including the hazard and risk rating and the risk management zone.

The assessment outcomes are based on likely extreme weather conditions, and the ability of an asset to recover from or withstand the expected bushfire as a consequence on its fire resistance construction standard. This is when the most damage is expected as fire intensity is at its greatest and has the highest probability of causing uncontrollable destruction.

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 of spread of fire. 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. Fire ignitions may either be natural (electrical) or by intervention from people either intentionally as arson or accidentally by mechanical mishap, sparks or from cigarettes.

The Commissioner of the NSW Rural Fire Service has certified Bushfire Prone Land within Great Lakes Council under *section 146* of the RF Act. Bushfire Prone Land was identified using bushfire vegetation mapping categories[1]. This provides a basis for planners and fire manager's to identify areas where specific conditions apply to new developments and where hazard reduction activities are implemented 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 considering conservation and protection of life and property.

Recommendations for bushfire risk mitigation works are described within section 9. An environmental impact assessment reviews the impact of proposed works or a BFHRC (when minimal impact is determined a) will certify works before commencement.

❖ *Key Fire Issue - There are potential ignition risks of bushfires within reserves and adjacent roadsides.*

[1] 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 or removes fuel to minimise potential damage to life, property and the environment if a bushfire does occur.

Hazard reduction is also undertaken to protect economic resources (native and plantation forests of the DPI (Forests)) and to protect environmental assets (National Park Estate, State Forest Flora Reserves and State Forests).

A coordinated approach to fire management improves the effectiveness fuel management zones by linking like works over multiple ownership or management. Strategies can then achieve the collective outcomes that Council, agencies, authorities and landholders whilst also meeting broad outcomes of the BFMC.

Management of fuels

Graduated fuel management of hazards adjacent to developments 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 exclusion zones.

Asset Protection Zone (APZ) *is an area surrounding an asset where ground and elevated fuel 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 impact on the community and severity of wild fires. These areas complement works within APZ or other SFAZ and provide protection for fire fighters, egress and access to: assets, fire advantages, watering points, significant sites or essential services.*

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

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

(RFS 2003a, 2004a)

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 (Table 1). Council has adopted these fire management zones and strategies as defined within the BFRMP.

Identification and implementation of hazard reduction activities for existing buildings are guided by conditions within the RFS publication of the *Bushfire Environmental Assessment Code in 2003*. 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 of trees/shrubs) of existing plants is assessed site by site, to minimise impact on conservation values and improve community protection from the fires radiant heat and floating ember attack.

*The Planning for Bushfire 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 V).

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 assisted planners when implementing fire management under the various legislative documents and procedures.

The *Bushfire Environmental Assessment Code 2003 and the Planning for Bushfire Protection, 2001* guide hazard reduction work requirements for existing buildings as well as future developments and subdivisions. Hazard reduction options include: hand removal of shrubs; tree removal; clearing away fuels, raking up leaves and clippings, clearing out gutters; clearing by mechanical mowing, slashing, ploughing, trittering[2]; bulldozing; or reducing fuels by grading.

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

Table 1: Fire management zones.

Fire Management Zones[3]	Objectives	Type of works	Notes
Asset Protection Zone	❑ 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 ✓ works certified by Environmental Impact Assessment/The Code	▪ maintain average overall fuel levels (OFL) at medium whereby levels are below 8t/ha in OPA ▪ maintain fuels 5t and below per hectare in IPA ▪ Burn to reduce fine fuels by approximately 70-100%
Strategic Fire Advantage Zone	❑ 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 ✓ construct fire advantages/fire trails ✓ maintain existing fire advantages/fire trails ✓ works authorised within approved Development Applications ✓ 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	❑ 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
Exclusion Zone	❑ Minimise impact to conservation values within the area	✓ none applicable	▪ minimise works except for rehabilitation when required

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

Removed or fallen timber that is sorted into small, 1.5 metre high piles may be burnt. Alternately, the deliberate burning of abroad area (known as controlled or hazard reduction burning) can be used to reduce the amount of flammable fuel (Table 2).

Table 2. Options for hazard reduction

Methods of Hazard Reduction	Type of Activity
Raking or manual removal of fine fuels:	Remove fuels such as fallen leaves, twigs and bark on a regular basis.
Mowing grass:	Keep grass short and green.
Slashing and trittering:	This is an economical method of fuel reduction. To be effective, the cut material must be removed or allowed to rot before summer starts. Slashing and mowing may leave grass in rows, increasing fuel in some places. Trittering or turbo mowing also mulches the vegetation leaving the fuel where it is cut.
Removal or pruning of trees and shrubs:	The management of existing vegetation involves selective fuel reduction (removal, thinning and pruning) and retention of vegetation, which may have beneficial effects by acting as windbreaks and radiant heat barriers. Refer to the landscaping section of the RFS document, How to Establish and Maintain an Asset Protection Zone for Bushfire Protection.
Hazard reduction burning:	Removes excess ground litter and hazards through the use of fire. Controlled burning or prescribed burning of vegetation is more often used for strategic bushfire management by land management agencies. Before burning any vegetation the type of fire should be determined. Is it a pile to be burnt or burning an area of bushland? Call your RFS fire control centre or NSW Fire Brigade for advice on burning. Consult RFS Guidelines for Pile Burning and Guidelines for Low Intensity Burning

(Source: How can you reduce bushfire hazards?, RFS 2004c)

Pre fire planning and the active reduction of ground fuels assist in reducing the severity of an oncoming fire and the subsequent effect on land and householders. Fire intensity and flame height are reduced thus slowing the fire spread on the ground and reducing the opportunity for the front to move into the tree canopy. Such planning consequently reduces the risk of ember attack on assets and the ability to spot into adjacent areas and properties.
The BFEAC or other environmental assessment may be required to undertake mechanical fuel reduction activities or to initiate low—moderate intensity hazard reduction burns.

The RFS promotes the use of hand and mechanical methods when reducing fuels adjacent to assets, as these methods are easily executed by land managers and is typically safer than burning.

Encouraging a discontinuous vegetation layer ensures the environment is protected, when incorporating conservation of the remnant vegetation and reduction of elevated and ground fuels. 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.

Hazard reduction burning although an option, is limited in its practical applications. Successful implementation is affected by availability of resources, meeting approved prescriptions of the burn (directed by RFS), and meeting specific fire intensity requirements and is particularly influenced by the prevailing weather conditions on the day.

The RFS provide a selection of pamphlets and brochures to help managers and property owners understand hazard reduction. These include information on how to go about planning to reduce hazards, the steps required to be undertaken, who to go to for further information, how to get environmental approvals for hazard reduction works and the management of fuel reduced zones.

These can be sought at various locations and offices or on the RFS web site www.rfs.nsw.gov.au. These include publications such as '*Guideline for asset protection zones', 'Application instruction for a bushfire hazard reduction certificate', 'Before you light that fire'*, *'Guidelines for low intensity bushfire hazard reduction burning (for private landholders)',* and *'Guideline for pile burning'.*

The RFS assists landholders by actively promoting and encouraging the community to reduce hazards within Great Lakes Council area and provides the application form and environmental assessment process for approvals.

Council has conferred the responsibility to RFS to assess and issue bushfire hazard advice notices to owners and occupiers to reduce hazards on a property, under the RF Act, *1997*. Bushfire hazard reduction works meet works authorised under the *BFRMP.*

- *Key Fire Issue: Fire management zones assist in providing fuel reduced areas adjacent to assets.*

SECTION 5

Fire Preparedness and Community Education

Preparedness

The community is responsible for providing protection for themselves and fire fighters from fire threat. By being *"Fire Wise"* and actively preparing property and homes against fires, possible fire ignitions and threats are reduced. The RFS promote publications such as:

Bushfire Wise.
Home safety checklist.
Bushfire Home Survival Plan.
Use of sprinkler systems.

The information provides a background to regulations, how to prepare for grass and bushfires, what to do when fire approaches, what actions to take and consider and equipment required to assist during a fire event. There are several actions that can be undertaken when in a fire Readiness State 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.

This will assist residents and fire fighters to combat the fire, reduce fire intensity, increase the capability of buildings to with stand ember attack and prevent or reduce the spread of fires to neighbouring properties or assets.

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

These strategies and those undertaken by Council to prepare *before fires* occur curtail potentially volatile situation where properties may be threatened or worst case, be destroyed by fire.

❖ *<u>Key Fire Issue:</u> The education of the community is essential to facilitate bushfire preparedness.*

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 and considerations to the environment, when planning to implement fire mitigation activities.

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).

Consideration throughout the fire planning process to conservation objectives is important such as those referred to within the National objectives and targets for biodiversity conservation 2001-2005 (Department of Environment and Heritage 2001).

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.

Plant species that vegetatively regenerates (sprouters) are less vulnerable to fire. Fire sensitive plants, namely those killed by fire (kills crown or whole plant) tend to be seeders and such plants rely on regeneration by dormant seed in the soil. Too frequent fire can eliminate this seed source (Gill and Bradstock 1995). This fire response by plants makes the application of fire regimes a complex task, as the methods of survival of each species, must be considered to ensure persistence after fire.

Researchers conclude that the parallel between plant and animal populations is that high frequency fires alter vegetation structure and composition and subsequently can eliminate animal populations (Bradstock *et al* 1995).

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.

RFS and Parks and Wildlife Division of the DEC (and the former NPWS) geographic records of known and recorded fire history assist in identifying fire paths, known history of fire threats adjacent to communities and historical records of managed fires (hazard reduction burning) to reduce ground fuels.

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. . 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).*
- ✓ *More than 2 consecutive fires occur 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*).

The fire regime threshold for the management of flora and fauna within the SFAZ and land management zones has been adopted from the Parks and Wildlife Division of DEC (and the former NPWS). These guide desirable ecologically sustainable fire frequencies, and identify biodiversity thresholds for various vegetation communities. Fire regimes outside this domain are predicted to cause significant declines in populations, particularly if they prevail over 50% or more of the area of each community (NPWS 2003a; NPWS adopted table from Bradstock *et al* 1995; Keith 1996; NSW Forestry Commission 1989; Great Lakes Council 2004a & b).

This has been correlated with vegetation formation from Appendix A of the BFEAC (Appendix IX) and vegetation group categories from Appendix 2 of the Planning for Bushfire Protection,

2001 (Category 1, 2, or 3). The table also displays specific minimum fire regimes for SFAZ specifically defined within the Code when undertaking bushfire hazard reduction works.

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 (Parks and Wildlife Division) (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) and endangered ecological communities (within Schedule 1, Part 3) 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 Sclerophyll Forest on Coastal Floodplains of the NSW North Coast Bioregion (TSC Act).

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 3 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 works, wildfire and disturbances, as well as key management guidelines from threat abatement plans.

Table 3: 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[4], CAMBA[5], Bonn Convention[6])	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, 2003, 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).

❖ *Key Fire Issue - Environmental assessment is required for hazard reduction works.*

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

Recommendations

Assessors are able to refer to the following reports and documentation within the checklist before finalising hazard reduction activities:

Checklist	Reference Material Source
✓ Planning for Bushfire Protection, 2003	RFS
✓ Environmental Assessment Code For Asset Protection Zones And Strategic Fire Advantage Zones, 2003	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	GLC/DEC
✓ Updated fire history records	RFS/DEC
✓ Species impact statements	GLC/DEC
✓ Environmental impact assessments or reviews of environmental factors	GLC/RFS
✓ 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

Draft Fire Mitigation Plan

~ Nerong ~

SECTION 7

Nerong and our Living Environment

Location

Nerong village is approximately thirteen (13) kilometres south of Bulahdelah. The Village area covers 22.2 hectares and consists of residential properties, road reserves and various Council reserves and parks for recreation and environmental protection (Table 4).

Table 4: Parks and managed land within Nerong.

Key	Public Reserves	Location	Size (Ha)	Recreation type
N1	Whimbrel Park (RES 5050)	Whimbrel Park	2.677	Public Reserve
N2	Public Reserve (RES 5051)	Lot 118 DP 247531	0.156	Public Reserve
N3	Redbill Park (RES 5205)	Redbill Park	0.411	Toilets/Mown Park adjacent to lake
N4	Heron Park (RES 5058)	Heron Park	0.189	Mown Park adjacent to lake
N5	Public Reserve (RES 5058)	Lot 12 DP 851162	0.086	Mown Park
N6	Waterhen Park (RES 5206)	Waterhen Park	0.102	Mown Park/Boat access to lake
N7	Public Reserve (RES 5321)	Lot 143 DP 734840	0.496	Mown Park
N8	Drainage Easement	Lot 13 DP 851162	0.036	Mown Drainage Reserve
N9	R 210002	Lot 7007	0.496	Mown Foreshore Reserve
		TOTAL	**4.649**	

Nerong was developed with a boat harbour which is used regularly by residents and visitors and allows boating enthusiasts to boat down Nerong Inlet and into the Bombah Broadwater within Myall Lakes. The adjacent Council parks within Nerong are available for community recreational use.

The Parks and Wildlife Division of the DEC manage the adjacent Myall Lakes National Park (MLNP), which surrounds Nerong on three sides, except on the southern boundary where private rural property extends to the south. The entire area abuts a combination of dry forest and mixed dry forest/swamp communities (sclerophyll forest) on all sides.

The rural living setting and appealing aesthetics, which attracts residents to Nerong, can provide elevated views across the village to adjacent forested areas. The undulating terrain provides in some cases secluded localities and a spacious feeling within the village. The current statistics shows 44% of the residential properties have dwellings.

The slopes range from 0-5°C in the lower areas to 15°C on the higher hill slopes within the western area of the village. Greater increase in slopes gives fires the ability to run in places at a greater rate of spread.

Fires are a natural occurrence in Nerong and are greatly influenced by slope, aspect and fuel types. Knowing and understanding the influence of these on fire behaviour is important when reviewing fire management in these areas.

Road Access

Nerong is accessed via Whimbrel Drive from the Pacific Highway, which allows access into the inner Village area. The wide formed bitumen roadways (7-12 metre) are kerbed and guttered (K&G). Council and neighbouring property owners maintain the road verge, which provides additional fuel reduced areas and protected areas adjacent to residential properties.

The furthermost distance to the east side of Nerong via the roadway is 1.3 kilometres. The close proximity to the highway (44 metres) allows ease of egress for residents, visitors, fire fighting units, as well as an important escape route.

Community Assets

The Great Lakes Local Environmental Plan 1996 define zones within the Nerong environs as a Village (Zone No. 2) and this is surrounded by a National Parks and State Recreation Area (Zone 8 (a)) being Myall Lakes National Park and Conservation (Zone 7(b)), on private property to the south.

Current statistics show 68 residential properties with dwellings exist within Nerong village. These comprise a mixture of permanent residents and absentee owners with increased visits between December and April. The Great Lakes Council, Supplementary State of the Environmental Report, 2002/2003 records the population distribution for Nerong rural area being 103 and 287 for Nerong State Forest area .

Nerong has a mixture of dwellings built to the Australian Building Standard AS 3959 since the approval of the subdivision in 1974. 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 Bushfire Services before legislative changes took affect in 2003 to improve building in bushfire prone lands:

- Policy for Bushfire Protection for Rural dwellings/subdivisions (1993),
- Policy for fire management for council controlled natural areas (1996), and
- The Department of Bushfire Services, “Planning for Bushfire 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 that comply

with both standard and non-bushfire standards (depending on the criteria of the fire assessment). Additionally, The Code provides guidelines for fire protection of existing buildings.

The Council promotes the use of Waterhen Park, Redbill Park and Heron Park for barbeques and picnicking adjacent to the Harbour. The maintained areas also provide fire protection by reducing available fuels in an APZ and SFAZ. The boat harbour and accompanying boat ramp at Waterhen Park provides boating and fishing enthusiasts' access to the waterways within Myall Lakes.

Myall Lakes National Park is part of Myall Lakes system and is 44,172 hectares in size and surrounds Nerong to the north and south-east areas directly adjacent to the village area and across the highway on the western side. It provides access to recreational facilities for camping and day use including boating, fishing and bushwalking that visitor's can enjoy.

Public Utilities

Electricity infrastructure in the area is maintained by both Country Energy who are responsible for domestic transmission lines on the north and west side of Nerong and TransGrid for the larger 330 KVA lines, that run parallel to the highway on the western side of Nerong. The Service line is the main feeder line, which provides services to properties within the village area.

Reticulated sewage is not available therefore sewage management within Nerong is maintained by individual property owners (on-site systems). These systems require a license by Council and are to comply with operational monitoring processes. However, MidCoast Water have undertaken community consultation to gain an understanding on community needs within Great Lakes LGA (MidCoast Water 2003).

Telstra provides and maintains the communication network services to Nerong through underground and overhead lines. The main service lines are black plastic-coated which supply the underground wires supplies to householders.

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.

Natural and Cultural Heritage

The 25.6 hectares of the village zone, which includes approximately 4.14 hectares of Council parks, is located entirely totally within the Myall Lakes Catchment (NSW Department of Land and Water Conservation 2003a) and is immediately adjacent to Myall Lake. While the village area is relatively small, it forms part of a wider catchment area. It therefore requires ongoing management to enhance and manage biodiversity and influences environmental values

within and adjacent to the village. Evidence of disturbances in Nerong from development and the extent of forest surrounding Nerong can be seen in Figure 3.

Council parks, road reserves and residential properties link with surrounding vegetation within Myall Lakes National Park (MLNP). Within Nerong, the vegetation structure is predominantly open forest, although many areas lack some of the sub dominant and ground cover layers as a consequence of human interaction (ie slashing).

Figure 3: Development within Nerong.

Council Officers have conducted a detailed vegetation study and mapping project within the investigation area for this Plan. This involved a review of aerial photograph interpretation and targeted traverse (ground-truthing). Vegetation communities were delineated on the basis of the height/ density and major floristics of the canopy as well as other structural descriptors and land use influences. From this review, 18 natural vegetation communities were identified, along with 5 modified forms of these natural community types.

The communities are identified by forest type as 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 4. 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.

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Figure 4 : Vegetation Communities within Nerong

The wider vegetation formations in which these vegetation communities occur present include dry sclerophyll scrub forest, dry sclerophyll grassy woodland, dry sclerophyll scrub/grass forest, swamp sclerophyll forest and semi mesic grassy forests within and adjacent to residential properties of Nerong. Further, there are areas of wetlands.

From this analysis, it is evident that a number of the communities are likely to be classified as Endangered Ecological Communities (Freshwater Wetland and Swamp Sclerophyll Forest on Coastal Floodplain) listed on the TSC Act. These areas are of high conservation value and would legally require management practices to protect these areas. Other vegetation communities mapped in Nerong are also considered regionally rare, regionally vulnerable, severely depleted and on private land priority for conservation and have a 100% conservation target within the Lower North Coast of NSW (refer to Appendix X).

The NPWS describe vegetation within *Mall Lakes National Park and Myall Coast Reserves Plan of Management (2002a).* The MLNP includes dry open forest/woodlands[7], dominated by Smooth Barked Apple (*Angophora costata*) and/or Blackbutt (*Eucalyptus pilularis*) and Old Man Banksia (*Banksia serrata*). These occur on well-drained quaternary sands and sediments generally on lower slopes or low-lying crests where deep sands exist like those within the vicinity of Nerong. Dry open forests are often found on sedimentary, acid volcanic rock types and Quaternary sands, and are dominated by spotted gum (*Corymbia maculata*) and grassy open forests dominated by Smooth Barked Apple (*Angophora costata*) and Tallowwood (*Eucalyptus microcorys)* with each having variations within individual communities. Principle indicators of the communities are Grey Iron Bark (*Eucalyptus siderophloia*), Small fruited Grey Gum (*Eucalyptus propinqua*) and Tallowwood. Fringing the lake system to the east and south (low lying areas) is swamp forest dominated by Broad Leaved Paperbark (*Melaleuca quinquenervia*) and Swamp Oak (*Casuarina glauca*). Refer to Figure 3 for mapped forests types.

MLNP which generally surrounds Nerong is recognised for the significance of its vegetation distributions, plant and animal diversity, and a catchment system supporting an estimated 41 flora and fauna species listed as endangered or threatened. The MLNP contains recorded migratory bird species and has been listed as being of international significance as a RAMSAR Wetland of International Importance. MLNP conserves significant natural features such as the large coastal brackish lake system not greatly modified by human activity (NPWS 2002a).

The conservation value of the local landscape is significant as remnant and regenerating vegetation adjacent to and within the National Park conserves and protects many environmental communities, (NPWS 2003a) including those considered to be endangered, severely depleted or inadequately conserved in the NSW North Coast.

[7] Source: NPWS 2002a, Great Lakes Council 2004b

The conservation values of Council natural areas within Nerong are within a contiguous forest area that links with this significant area of MLNP. These areas therefore 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 Nerong.

Sections of Whimbrel Reserve are within the area defined as Key Habitat and the entire study area is within Regional Corridor, which extends into the adjacent conservation area of MLNP (NPWS, 2005b).

The conservation and protection of significant cultural heritage (Aboriginal and non-Aboriginal heritage) is important when undertaking any activity. *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 not list any heritage items as local, regional or of state significance within the study area. There are no known, recorded archaeological sites within or neighbouring Nerong.

However the *Draft Great Lakes Heritage Study, 2004* has identified proposed items with heritage significance pending exhibition and final determination. Those items' include the Timber Milling Village of Nerong and includes specific items such as the Old Village site, the Well for the sawmill, Boiler and other remains, and the Old wharf site and remains located within Myall Lakes National Park.

Water Supply/Fire Fighting Water Supply/Aerial Access

Nerong residents supply household water from privately installed rainwater tanks. Since the introduction of the more recent regulations, new residential properties are required to provide an additional specified fire fighting water tank and connections, which are available for fire appliance use during a fire event for protection of that dwelling.

Nerong has various access points to the harbour providing unlimited water supply for protection and suppression operations.

There are no designated helicopter landing pads within Nerong however there are various ones located within Bulahdelah, or by approval during emergencies within MLNP, at Bombah Point Depot (DEC (Parks and Wildlife Division)) and Tomboy. The Nerong Inlet provides continuous supply of water for aerial water bombing by helicopters.

Fire history

Fires are known to have regularly occurred within Nerong Environs (10 kilometre radius) during the past 30—years. Planned prescribed burns and wild fires have burnt much of the higher elevated-forested areas within DEC (Parks and Wildlife Division) and DPI (Forests) estate.

Fire have occurred in the vicinity of Nerong during various bushfire seasons including; 1968–69, 1974–75, 1977–78, 1979–80, 1980–81, 1982–83, 1987–88, 1988–89, 1990–91, 1991–92, 1994–95, 1995–96, 1996–97, 1997–98, and 2002–2003. During this 37 —year period, fires were recorded during 15 fire seasons. Fire paths are consistent with following ridgelines within the State Forest, National Parks and private property in the local area (DEC 2005b and NSW RFS 2005b).

Fires within the National Park estate have occurred mostly in late winter and spring, when relative humidity's are lower in and early spring with 81% of these fires being from suspected arson and unknown causes, (NPWS 2003a).

Within 3 kilometres of Nerong, 3 wild fires during the 1987–88, 1988–89 and 1991–92 fire seasons threatened Nerong and burnt within a short distance of the village. The use of existing fire trails and fire advantage lines such as a constructed dozer lines behind residential properties in Nerong, assisted in preventing the fire spread into the residential area.

A smaller fire approximately 3 kilometres south of Nerong has occurred within the Nerong State Forest and was fanned by extreme weather conditions in February 2004. Day temperatures rose to 42^{o}C with low relative humidity less than 10% providing ideal and erratic fire behaviour. Existing fire advantages near the ignition point aided the containment of the fire.

The Parks and Wildlife Division of the DEC have implemented prescribed burns adjacent to the northern edge of Nerong in 1997–97, 1996–97, and 2004–2005 to provide fuel reduced zones to protect the village area. The DEC and DPI (Forests) implemented prescribed burns in compartments (in former State Forest area) and National Park areas as part of their active fire management policy west of Nerong. These were recorded in 1971–72, 1984–85, 1985–86, 1991–92, 1994–95, 1995–96 (DEC 2005b and NSW RFS 2005b).

Recently the DEC have undertaken hazard reduction burns within the APZ and SFAZ to reduce fuel to the north and eastern side of Nerong as part of implementing the parts of the Fire Management Strategy for Myall Lakes National Park.

Rural properties outside the surrounding State Forest and National Park are known to indiscriminately burn for land management purposes and hazard reduction through the non–bushfire season. These low or moderate intensity burns, do not threaten Nerong 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, DEC and DPI (Forests) have a variety of

fire trails and fire advantages within Nerong, MLNP, Nerong State Forest and in the surrounding area that are identified as strategic fire advantages.

Fire advantages can be natural or man made and are for the purpose of providing a control line during fire operations to assist in fire suppression.

Fire advantages can be used for access, backburning, or providing a barrier for the oncoming fire to burn too. Natural features such as creek lines, rivers, swamps, wet gullies, rainforests, moist forests, rocky areas, cliff lines, water bodies, are sought during fire operations to provide strategic suppression options.

Other features such as dozer/grader lines, contour banks, dams, ploughed fire breaks, access tracks (existing/dormant), APZ's, SFAZ's all assist during operations and in reducing the spread of fires either during wildfire's or when undertaking hazard reducing burning.

Various existing fire advantage lines to the north and west which include the village road system and highway assist in fire operations. Nerong Inlet prevents the spread of fires into the village from the east.

There are no fire trails within Council managed land in Nerong, however there are a number within the adjacent National Park. The RFS category of fire trails that exist within Shearwater are recorded as being of primary access for all (heavy, urban, medium and light) fire appliances sizes and secondary access by light fire appliances.

Fire advantage lines are also located within private property and the adjacent National Park and may be accessed by the small—medium size fire appliances or utilised as fire control lines during fire incidents.

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.

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). The Parks and Wildlife Division of the DEC fire records reflect 70% of fires in Myall Lakes National Park occur in spring (NPWS 2003a) when weather conditions are more conducive to spreading easily.

The Keetch-Byram Drought Indices (KBDI) index increases with time since rain (thus facilitating a reduction in soil moisture). The range is from 0-200 which is a measure in millimetres (saturation-dry ie amount in millimetres required to saturate soil). The drought indices (forest/grassland) are derived from the KBDI and collectively with temperature, relative humility, wind speed, rainfall and duration identifies the fire danger rating.

The type and arrangement of available fuel, topographic parameters and climatic conditions collectively affect fire behaviour. Fire behaviour can be predicted once the fire rating is derived. 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. As the forest fire drought index (FFDI) increases so does the fire rating. Hazard reduction burning can be carried out within particular drought indices providing environmental and climatic conditions can be applied to meet fire prescriptions. The RFS preferred FFDI for undertaking low intensity hazard reduction burns is between 2 and 15 depending on fuel loads (NSW RFS, 2003c).

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. These are suspended during total fire bans.

BOM assist fire fighting authorities by predicting fire weather during fire incidents and hazard reduction burns. This updated fire weather information assists in operational decisions and implementation of strategies and of crew placement. Wind shifts can be 90 degrees from cold fronts moving across the fire ground that can dramatically affect tactics and safety.

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).

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 are documented in Appendix XI.

During the fire season the mean daily minimum temperature, on the coast is 13^{o}C in October and rises to a mean daily maximum of 27.5^{o}C in February. Monthly rainfall is highest in February and reducing from highest to lowest in January, December, March, November, April, and October. Historical relative humidly records (1961-1990) for Williamtown from the BOM show that records range from 66-82% and 50-62%, 9am and 3pm respectively (BOM 2005d).

The driest seasons are during winter and spring, during which hazard reduction burning can be implemented. The KBDI however influences the ability to safely undertake these works. Records from the BOM show that variability over the years does not provide a consistent

pattern of ideal conditions, needed for hazard reduction. Drought conditions during the winter and spring period during some of the past few years have not been conducive for control burns. 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.

The coastal wind patterns distinctly change from the morning to the afternoon in which patterns are affected by coastal sea breezes. Comparison of Williamtown and Port Macquarie show the wind shifts from west to the north-west to south-east to the east for Williamtown and south-west to the north-east, 9am and 3pm respectively (BOM 2005e).

Generally prevailing fire weather winds during winter and spring within Great Lakes LGA are predominantly from the south-west to north-west and shifting winds in summer from the west to north-west to the south-east to north- east in the afternoon's. Southerly changes up the coast also cause unpredictable fire weather conditions, which push strong hot winds preceding the cold front that often experiences moist cooler conditions.

Resources

The responsibility of identification and of supply of adequate resources within the rural fire district lies with the RFS to ensure communities affected by a fire event are protected against injury or damage from fire. In the event of an incident, other fire fighting authorities such as the DEC, DPI (Forests) and the NSW FB can provide additional resources to combat fire within bushland areas adjacent to Nerong or the NSW FB to assist in structure fires. Appliances from brigades within a 30 kilometres are available (Figure 5) to combat fires within MLNP or as support units to RFS fire fighting resources within Nerong.

RFS brigades outside the local area within the Lower Hunter Zone are available to assist as additional resources during incidents. Appliances from Great Lakes, Port Stephens and Dungog LGA, can be out of area crews depending on requirements and circumstances at the time.

Nerong is adjacent to the Pacific Highway and allows response time to be reduced when travelling on the highway from Bulahdelah and North Arm Cove rather than when on a secondary road.

Various plans and policies of the RFS assist in guiding fire suppression, planning and mitigation of fires. These include documents such as, *Plan of Operations, Standard Operating Procedures 5.1.7, and Fire Ground Standard Operating Procedures, 1999,* which define vehicle requirement type and the number to be responded for various incidents. The standard operating procedures operationally guide RFS managers and volunteer fire fighters.

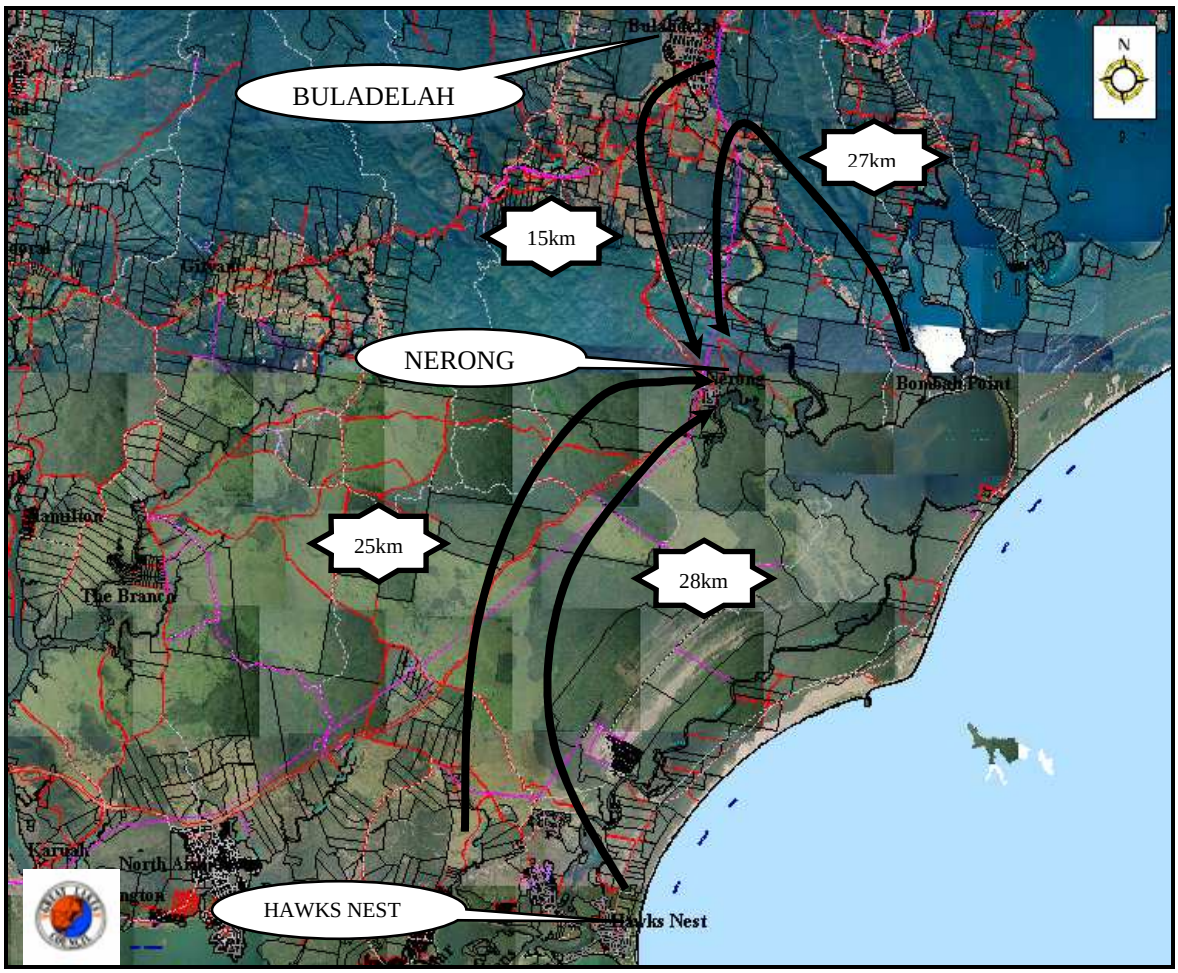


Figure 5: Distance to Nerong.

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.

The RFS is able to provide fire fighting appliances to Nerong for both bush and structural fires. Bulahdelah Rural Fire Brigade provides the 1st response and North Arm Cove Rural Fire Brigade provides the 2nd response to fires within this area (Table 5) for both bush and structure fires. Refer to Appendix XII for Fire fighting appliance size. Additional resources (not listed) are sourced locally when required to assist in incidents.

Table 5: Response of resources to Nerong

Fire Authority	Brigade/Depot	Fire Appliance Location	Travel Distance to Nerong	Run Time (minutes)	Fire Appliance Type
NSW RFS	Bulahdelah	Bulahdelah	15km	9	Category 10, 1 & 9
NSW RFS	North Arm Cove	North Arm Cove	28km	18	Category 2 & 9
DEC	Bombah Point	Bombah Point	27km	30	Category 2 & 9 (X2)
DEC	Booti Booti	Booti Booti	46km	50	Category 2 & 9 (X2)
NSW FB	Tea Gardens	Tea Gardens	28km	20	Urban Pumper

Key Fire Issues for Nerong

Throughout the preparation of the strategy key 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 Nerong often with absentee owners.
❖ Nerong is surrounded by contiguous vegetation, rated as a major fire risk by the NSW Rural Fire Service.
❖ In extreme fire weather conditions the fire path is aligned with the ridgeline.
❖ Parks and reserves contain recreational facilities that need protection.
❖ Adjacent Myall Lakes National Park and private landholders have asset protection zones, strategic fire advantage zones, fire trails and fire advantage to assist in fire operations.
❖ Hazard reduction burning occurs in Myall Lakes National Park.
❖ Landholders need to have properties prepared to protect assets as in the rural area as fire fighting resources are sought from outside Nerong.
❖ Area is serviced by fire fighting vehicles from nearby towns and locations.
❖ Potential fire ignitions adjacent to Pacific Highway or from lightning strikes during the spring and summer months.
❖ The majority of Nerong are mapped as Bushfire Prone Land.
❖ Bushfire Prone building standards apply to some structures that occur in Nerong with on-site water supplies available.

SECTION 8

Overview of Bushfire Risks to Nerong

Nerong's major bushfire risk category is a result of the close proximity of bush land areas directly adjacent to the village and that some building construction designs are not built to design as defined for "*bushfire prone lands*". . The management of fire hazards through reducing fuels within bushland areas assists in the protection of the community is Councils priority. This vegetation management lessen the impact on residents, visitors and fire fighters during a fire incident within the area.

Bushfire risk analysis is a mechanism to undertake risk assessments on assets including life and property, natural heritage 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. During fire suppression operations offensive and defensive fire suppression techniques are applied to protect assets, depending on fire intensity and fuel loads and the existence of APZ's and SFAZ's.

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

There is an extensive coverage of continuous vegetation communities on the Lake edge and to higher elevations along Range to the north-west and north-east. These areas are likely to sustain bushfires if ignited, and have a fire path leading to Nerong (Figure 6).

Various advantage lines exist both naturally and man made including roads, transmission lines, waterways, lakes and wet gullies. These are all used during fires as control lines however spotting which can occur during extreme fire weather conditions, with low humidity, high air temperatures, high winds and fuel levels, may be as far as 5 kilometres across such advantage lines.

Nerong abuts Myall Lake and provides water sources for residents, fire fighters and aerial water bombing craft. This moister environment can assist in providing environmental conditions to slow the movement of fires and reduce the longevity of fires by providing sea breezes, moist conditions and changes in vegetation type and available ground fuels.

The pattern of urban development within townships and villages, often divided by vacant properties is conducive to ignition of fires from ember attack. Fire fingers are able to extend

amongst both developed and undeveloped residential properties, along road verges, through back yards and vacant blocks (Figure 7).

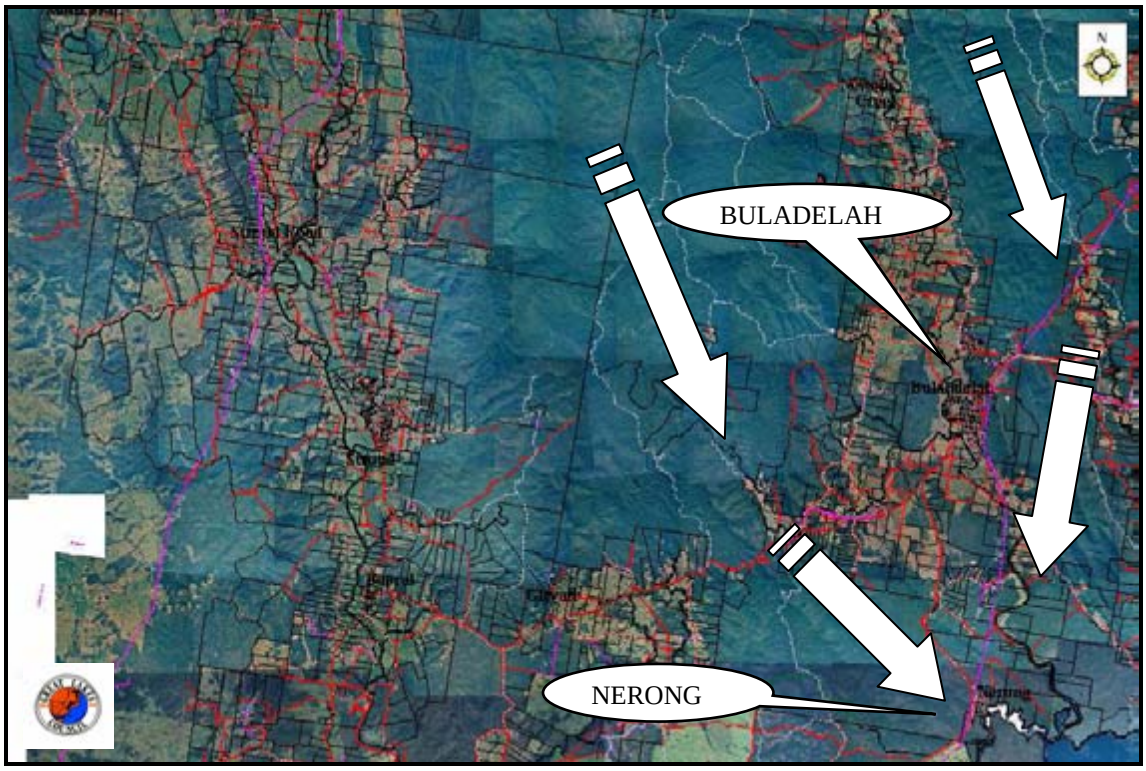


Figure 6: Bushfire Risk north-west and north-east of Nerong.

Figure 7: Areas where fires can burn on vacant properties within Nerong (orange).

Risk to Life and Property

The Lower Hunter Zone BFMC, Bush Fire Risk Management Plan (BFRMP) identifies Nerong as being within a *major bushfire risk* area and is also entirely within *bushfire prone land*.

Nine localities have been identified where life and property[8] are directly threatened in Nerong (Table 6) Within these areas fire management zones have been identified including APZ and SFAZ's and management strategies for each within Section 9. The higher the risk, the more chance fire has greater impact on the asset or the community. The bushfire risk within Appendix VI describes the risks extracted from the BFRMP. The closer the bushfire risk the higher the risk. The spread of fire from adjacent bushland to the rural/residential interface and the spread of fire from road verges are a risk to 174 properties within Nerong (Figure 8).

Bushfire prone land developments require further bushfire assessment to be undertaken as part of development assessments submitted to Council (referral to the RFS). Legislation requires new development to met standards within the *Planning for Bushfire Protection Guidelines, 2001 (PFBFP).* The standard of construction (level 1, 2 or 3) is derived through the development assessment process for fire protection, guided by the ASA 3959 and the PFBFP documents.

Table 6: Risk to life and property.

Code	Location	Description of risk	BFRMP Risk Rating (2002)
LP1	Nerong Township – West and South	Western residential edge including 30 residential properties (10 houses), 51 residential properties within the western internal section of Nerong and bushland interface W & N of Nerong linking with MLNP & the Pacific Highway.	Major
LP2	Nerong Township – West	Western residential edge and rural/urban interface adjacent to the Public Reserve, south of Whimbrel Drive and west towards the Pacific Highway and MLNP.	Major
LP3	Nerong Township – South-east	South-east residential edge adjacent to and within MLNP including houses Egret Street, Whimbrel Drive.	Major
LP4	Nerong Township - South & Whimbrel Drive - South-east	Southern residential edge including houses along Whimbrel Drive and east of Plover Place and 8 residential properties opposite MLNP on the south-eastern residential edge of Whimbrel Drive.	Major
LP5	Nerong Township – Central & North internal	8 residential properties within the eastern internal section of Nerong east of Whimbrel Drive and 17 internal residential area west of Whimbrel Drive and encompassed by Curlew Crescent.	Major
LP6	Nerong Township - North	Northern residential edge along Redbill Road to Whimbrel Drive and within Myall Lakes National Park (MLNP).	Major

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

Code	Location	Description of risk	BFRMP Risk Rating (2002)
LP7	Nerong Township – East	4 residential properties (2 houses) of the eastern residential edge adjacent to MLNP and including houses along Redbill Road, Heron Street and Spoonbill Close.	Major
LP8	Adjacent to Redbill Park	2 residential properties (2 houses) on the northern edge of Nerong opposite MLNP.	Major
LP9	Adjacent to Heron Park - South-east	6 residential properties (5 houses) on south-eastern edge of Nerong, 8 residential properties within the north-eastern internal section of Nerong north of Spoonbill and 8 residential properties within the north-eastern internal section of Nerong west of Heron Street.	Major

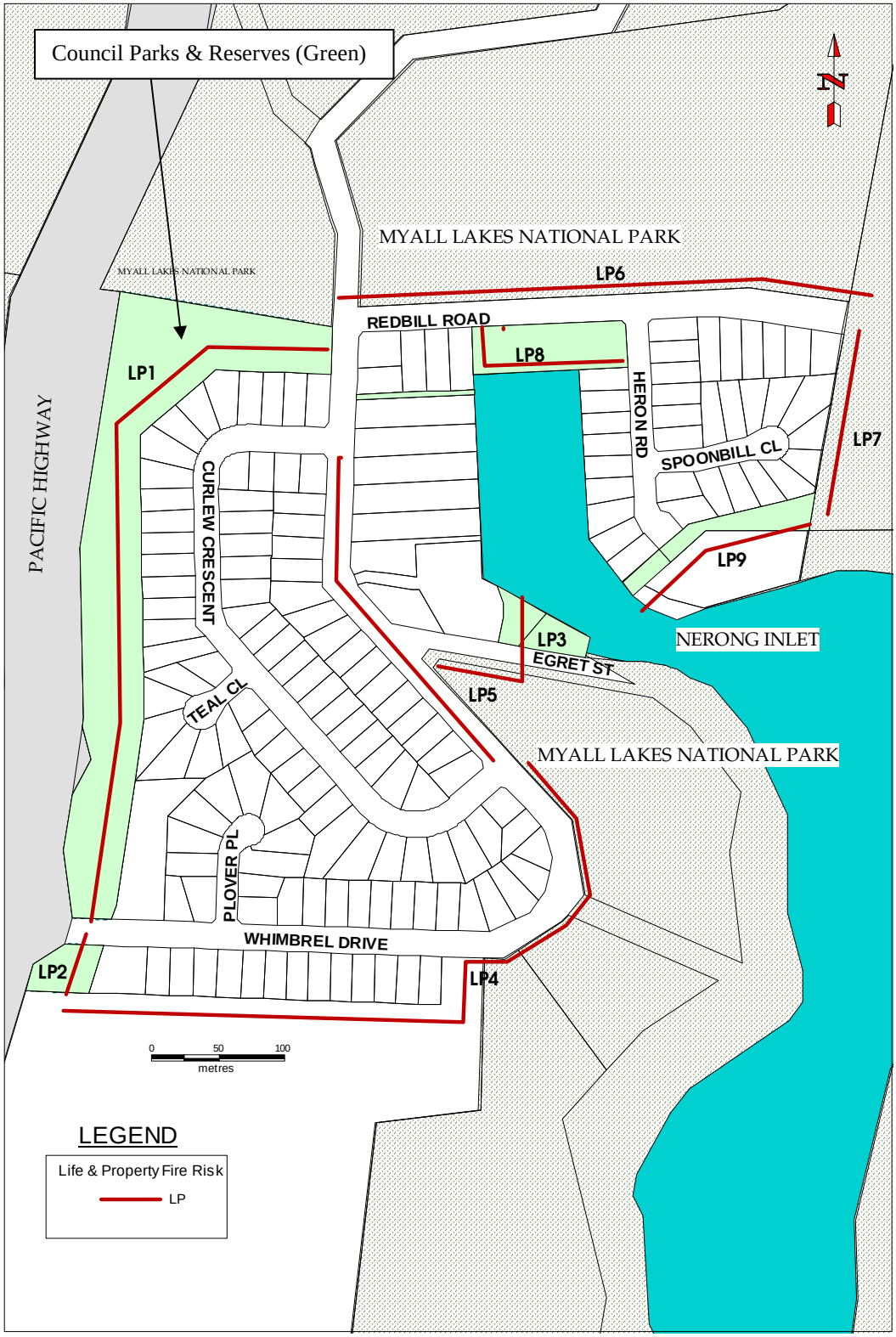


Figure 8: Location of life and property risk to Nerong.

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.

- *Key Fire Issue - Bushfire Prone building standards apply to some structures that occur in Nerong with on-site water supplies available for fire fighting.*

Risk to Natural Heritage

The Lower Hunter Zone Bush Fire Risk Management Plan identifies and classifies Council Reserves as being of both major and minor environmental and ecological risk rating[9] (Figure 7 and Table 7). The risk (major, moderate or minor) indicates the effects of fire on the land identified or the actual level of impact of fire on the environment and the risk to remain sustainable with current conservation values. Those areas of major risk are affected more than areas with minor risks.

Adjacent to Nerong Village is MLNP, which is classified as a major environmental and ecological risk. Inappropriate fire regimes can impact the natural heritage values of the national park and local vegetation formations neighbouring the area, along with disturbances such as clearing or extensive under scrubbing on other lands. Reducing the impact of fire on areas, by planning to reduce fuels or the spread of fire, improves biodiversity and the natural integrity of the area.

Assessment of the fire risk within reserves adjacent 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 MLNP and Myall 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 community, severely depleted and requires further protection. In decreasing priority for local vulnerable status (paperbark) and rare status (mangrove, swamp and rainforest) the conservation of these communities during fire management is important.

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.

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

Table 7: Risk to natural heritage.

Key	Location of Council Public Reserve/Properties	VegetationCommunity Effected by Bushfire Events	Lower Hunter Zone Bush Fire Risk Management Plan Environmental & Ecological Risk Rating (2002)
N1	Whimbrel Park (RES 5050)	2.677 hectares of dry sclerophyll scrub forest	Major
N2	Public Reserve (RES 5051)	0.141 hectares of dry sclerophyll scrub forest	Major
N3	Redbill Park (RES 5205)	0.411 hectares of disturbed dry sclerophyll scrub/grass forest	Minor
N4	Heron Park (RES 5058)	0.189 hectares disturbed dry sclerophyll scrub/grass forest and disturbed swamp sclerophyll forest	Minor
N5	Public Reserve (RES 5058)	0.086 hectares cleared dry sclerophyll scrub forest	Minor
N6	Waterhen Park (RES 5206)	0.102 hectares cleared swamp sclerophyll forest/dry sclerophyll scrub forest	Minor
N7	Public Reserve (RES 5321)	0.496 hectares cleared dry sclerophyll scrub forest	Minor
N8	Drainage Easement	0.000 hectares disturbed dry sclerophyll forest	Minor
N9	Heron Park (R 210002)	0.036hectares disturbed dry sclerophyll forest/ swamp sclerophyll forest	Minor

Risk to Cultural heritage

The Lower Hunter Zone Bush Fire Risk Management Plan does not identify any archaeological or aboriginal heritage sites in or around Nerong. 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. However the Council "*Draft Great Lakes Heritage Study 2004"* has identified proposed items pending final determination in the adjacent Myall Lakes National Park.

Table 8: Risk to cultural heritage.

Key	Location	Historic Site	Lower Hunter Zone Bush Fire Risk Management Plan Risk Rating (2002)
HS1	Myall Lakes National Park	Timber Milling Village	Not identified in the plan

SECTION 9

Management Strategies

Specific fire management strategies for each zone are outlined in Tables 9-15, with corresponding fire management zone locations in Figure 8 to 10. The overview includes DEC (Parks and Wildlife Division) land and other land managers within and around Nerong. To assist with the understanding the code on the figures refer to identification (ID) seen within Table 9 which identifies the relationship with the figures.

Table 9: Terminology and identification used on maps.

ID	Description
LP	Life and property
A-Z	Locality of **town or village** the zone relates[10]
A	Asset Protection Zone reference number (preceded by locality code)
A1	Zone number that relates to the name
S1	Strategic Fire Management Zone reference number (preceded by locality code)
C1	Land Management Zone for conservation reference number (preceded by locality code)
E1	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

Table 11-16 contains relevant fire objectives and the strategy(s) that are applied to a particular zone, which accordingly varies depending on the proposed management techniques. The overviews include zones to protect assets, are strategic or are for conservation, to meet management fire objectives, assist in the prevention of fires, and to reduce the risk of bushfire. Implementation and maintenance by Council is managed as part of the annual work program.

Council has considered adjacent fire management strategies in determining FMZ's on Council land and have in addition reviewed information from the DEC who currently apply fire management strategies adjacent to Council land. It is recognised that the DEC and other authorities have evolving management practices and fire strategies may alter from currently recorded strategies included within this plan. Council acknowledges that these may changes in the future and reference particularly to Parks and Wildlife Division of DEC (and the former NPWS) planning documents is important to ensure contemporary management is continually being undertaken.

Council is responsible for management of these FMZ's, however the Lower Hunter Bushfire Management Committee has a responsibility to manage fuels within the whole of Great Lakes with a coordinated approach. This has led to the inclusion of adjacent mapped fire

[10] Refer to Appendix VII

management zones proposed or identified by other fire fighting authorities within other planning documents.

Asset protection zones

Using the criteria identified by the RFS for determining APZ's, 8 APZ's have been identified within Council Land and 8 within Council Road Reserves (Figure 9 & 10). The DEC (Parks and Wildlife Division) have identified an equivalent APZ as a radiation zone. Consideration to existing APZ's on private properties, enable Council fire management strategies meet fire protection requirements.

The responsibility for maintenance of the existing APZ's on private property within Nerong lie with private landholders (inner and outer fire protection areas when associated with new and existing dwellings). This is monitored by the RFS. These zones have not been mapped but meet legislative requirements and are guided are guided by other planning documents referred to earlier within this plan.

The overall fire mitigation plan objectives have led to the identification of specific objectives and strategies to be implemented. Standard strategy options that can be applied to individual APZ's are detailed below in Table 10. Table 11 contains relevant fire objectives and the strategy(s) that are applied to a particular zone, which accordingly varies depending on the proposed management techniques, To meet management fire objectives, assist in the prevention of fires, and to reduce the risk of bushfire. Implementation and maintenance by Council is managed as part of the annual work program.

Table 10: Options for specific strategies applied to asset protection zones.

Strategy	1	Maintain APZ specifications on Council land for adjacent existing developments to meet specifications of the BFEAC (RFS 2003a)
	2	Provide and maintain fuel reduced areas to help prevent the spread of fires and reduce fire intensity
	3	Monitor Overall Fuel Hazards to ensure they are maintained to meet prescribed levels (NPWS 2003b)
	4	Create and/or maintain existing fire advantage lines to provide access for fire fighters
	5	Promote to the Community, education on importance of hazard reduction & Home Bush Survival Plans
	6	Liaison with adjoining land managers for a coordinated approach to monitoring and management of adjacent zone for bushfire risks and fuel hazards
	7	Provide a refuge area for fire fighters, visitors and residents in the event of a fire
	8	Enhance adjacent asset protection zone or strategic fire advantage zone
	9	Maintain APZ by mechanical hazard reduction within existing DC to meet APZ specification to the BFEAC (RFS 2003a) and/or to the PBFP guidelines (RFS 2002b)[11]
	10	Ensure Buildings and fire standards to comply with Australian Standards AS3959 (Ramsey and Dawkins 1993) and PBFP for new developments
	11	Prescribe burn at a frequency to maintain the prescribed Overall Fuel Hazard within a APZ (NPWS 2003b)

Table 11: Specific fire objectives and strategies applied to asset protection zones for Nerong (N).

APZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
A1	LP1	8	Reserve No 5050 --- Whimbrel Park (North of Whimbrel Drive)	• To protect the western residential edge including 30 residential properties (10 houses) and bushland interface W & N of Nerong linking with MLNP & the Pacific Highway.	1,2,3,4,5,6 within Whimbrel Park	Width – 10m Length – 423m Area – 0.43ha Slashing/Hand removal	Dry sclerophyll shrub - Spotted Gum/Stringybark/ White Mahogany/ Grey Ironbark/Grey Gum- Blackbutt/ Tallow-wood/
A2	LP2	8	Lot 118 DP 247531 --- Whimbrel Park (South- of Whimbrel Drive)	• To protect the western residential edge and rural/urban interface adjacent to the Public Reserve, south of Whimbrel Drive and west towards the Pacific Highway and MLNP.	1,2,3,4,5,6 within Lot 118 DP 247531	Width – 10m Length – 37m Area – 0.04ha Slashing	Dry sclerophyll shrub/grass forest/Semi-mesic grass forest

[11] Council approval required for APZ to coexist on private development and Council Land.

APZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
A3	LP8	8	Redbill Park ---------- (2 parts) North of Nerong Harbour, Redbill Road	• To protect 2 residential properties (2 houses) S & W of park, the public reserve (toilet) & N into MLNP.	1,2,3,4,5,6,7 within Redbill Park	Width - 18m Length - 37m (East – 19 X 47m) Area - 0.151ha Mowing	Coastal Sands Blackbutt/Blood-wood/Banksia Dry Open Forest with part disturbed/ Maintained Park
A4	LP9	8	Heron Park ---------- South-east of Nerong south of Heron St towards Myall Lake	• To protect 6 residential properties (5 houses) N & E within the bushland interface linking with MLNP.	1,2,3,4,5,6,7 within Heron Park and adjacent open space.	Width – 10m Length –127m Area – 0.133ha Mowing	Swamp Mahogany / Maintained Park
A5	LP3	8	Lot 12 DP 851162 ---------- Adjacent to Waterhen Park , North of Egret Street	• To protect 1 residential property W of Waterhen Park, the foreshore of the harbour and south into MLNP.	1,2,3,4,5,6,7 within Waterhen Park and adjacent open space.	Width – 10m Length –37m Area – 0.04ha Mowing/Slashing	Maintained Park/linking with Swamp Mahogany/ Paperbark on foreshore
A6	LP9	8	Lot 143 DP 734840 ---------- Adjacent to Heron Park	• To protect 8 residential properties (1 house) N of the park.	1,2,3,4,5,7,8 within Waterhen Park and adjacent open space.	Width – 12m Length –33m Area – 0.047ha Mowing entire area	Cleared forest/ Maintained Park
A7	LP9	8	RES 210002 (Heron Park)---------- Lot 7007, Adjacent to Heron Park/Waterhen Park	• To protect 6 residential properties (5 houses) N & E within the bushland interface linking with MLNP.	1,2,3,4,5,6,7,8 within Heron Park.	Width – 5m Length –152m Area – 0.078ha Mowing	Swamp Mahogany Swamp Forest/ Maintained Park
A8	LP6	8	Drainage Reserve ---------- Lot 13 DP 851162 Adjacent to harbour	• To protect 6 residential N & S of the drainage reserve.	1,2,3,4,5,6,7,8 within Heron Park.	Width – 4m Length –89m Area – 0.036ha Mowing	Cleared forest/ Maintained reserve

APZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
					TOTAL	**0.955 hectares**	
Asset Protection Zones within Road Reserves							
Rd-A1	LP1, LP2, LP3, LP4, LP5	9	Whimbrel Drive	• To protect adjacent residential properties • To assist in mitigating the spreading of bushfire throughout Nerong or into MLNP.	1,2,3,4,6,7,8 within Whimbrel Drive.	Width – 20m Length –900m Area – 0.018ha Mowing/road maintenance	900m Public-sealed Rd with mow edges
Rd-A2	LP1, LP2, LP4,	9	Plover Place	• To protect adjacent residential properties. • To assist in mitigating the spreading of bushfire throughout.	1,2,3,4,6,7,8 within Plover Place.	Width – 20m Length –89m Area – 0.002ha Mowing/road maintenance	89m Public-sealed Rd with mow edges
Rd-A3	LP1, LP4, LP5	9	Curlew Crescent	• To protect adjacent residential properties. • To assist in mitigating the spreading of bushfire throughout Nerong or into MLNP.	1,2,3,4,6,7,8 within Curlew Crescent.	Width – 20m Length –508m Area – 0.012ha Mowing/road maintenance	508m Public-sealed Rd with mow edges
Rd-A4	LP1	9	Teal Close	• To protect adjacent residential properties. • To assist in mitigating the spreading of bushfire throughout.	1,2,3,4,6,7,8 within Teal Close.	Width – 20m Length –54m Area – 0.11ha Mowing/road maintenance	54m Public-sealed Rd with mow edges
Rd-A5	LP3	9	Egret Street	• To protect adjacent residential properties. • To assist in mitigating the spreading of bushfire throughout Nerong or into MLNP.	1,2,3,4,6,7,8 within Egret Street.	Width – 20m Length –158m Area – 0.003ha Mowing/road maintenance	158m Public-sealed Rd with mow edges
Rd-A6	LP1	9	Redbill Road	• To protect 11 residential properties on the northern residential edge of Nerong and N within Myall Lakes National Park (MLNP). • To assist in mitigating the spreading of bushfire throughout Nerong or into MLNP.	1,2,3,4,6,7,8 within Redbill Road and verges.	Width – 20m Length –367m Area – 0.007ha Mowing/road maintenance	367m Public-sealed Rd with mow edges

APZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
Rd-A7	LP7, LP8, LP9	9	Heron Street	• To protect adjacent residential properties. • To assist in mitigating the spreading of bushfire throughout.	1,2,3,4,6,7,8 within Heron Street.	Width – 20m Length –171m Area – 0.003ha Mowing/road maintenance	171m Public-sealed Rd with mow edges
Rd-A8	LP6, LP7, LP9	9	Spoonbill Close	• To protect adjacent residential properties. • To assist in mitigating the spreading of bushfire throughout.	1,2,3,4,6,7,8 within Spoonbill Close.	Width – 20m Length –103m Area – 0.002ha Mowing/road maintenance	103m Public-sealed Rd with mow edges
Asset Protection Zones maintained by other property owners and DEC (Parks and Wildlife Division) [12]							
PP-A1[13]	LP11	10	Nerong Township – South	• To protect adjacent 14 residential properties on the southern edge of Nerong	1,2,3,4,5,8,9,10 within private property	Private: Mowing – 10m APZ on northern edge of property As above to meet conditions within the BFEAC	Tallowwood/Forest Red Gum/Swamp Forest/ Dry &Wet sclerophyll forest
DEC-A1	LP7 NPWS Radiation Zone	10	NPWS Radiation Zone (Part of MLNP) ---------- Nerong East	• To protect 5 residential properties on the eastern residential edge of Nerong within Myall Lakes National Park (MLNP).	Within the MLNP FMS the NPWS to maintain the Nerong Village Radiation Zone.	DEC: NPWS specification: (Width – 20m Length – 119m) Area – 0.4ha	Coastal Sands Blackbutt/ Bloodwood/Banksia Dry Open Forest

[12] NSW National Parks and Wildlife Service (2003a) - *Fire Management Strategy, Mall Lakes National Park and Island Reserves.*
[13] NB. Mapped by Council as a suggested maintained APZ as per the guidelines by the RFS (hazard reduction works to assist in the protection of the community).

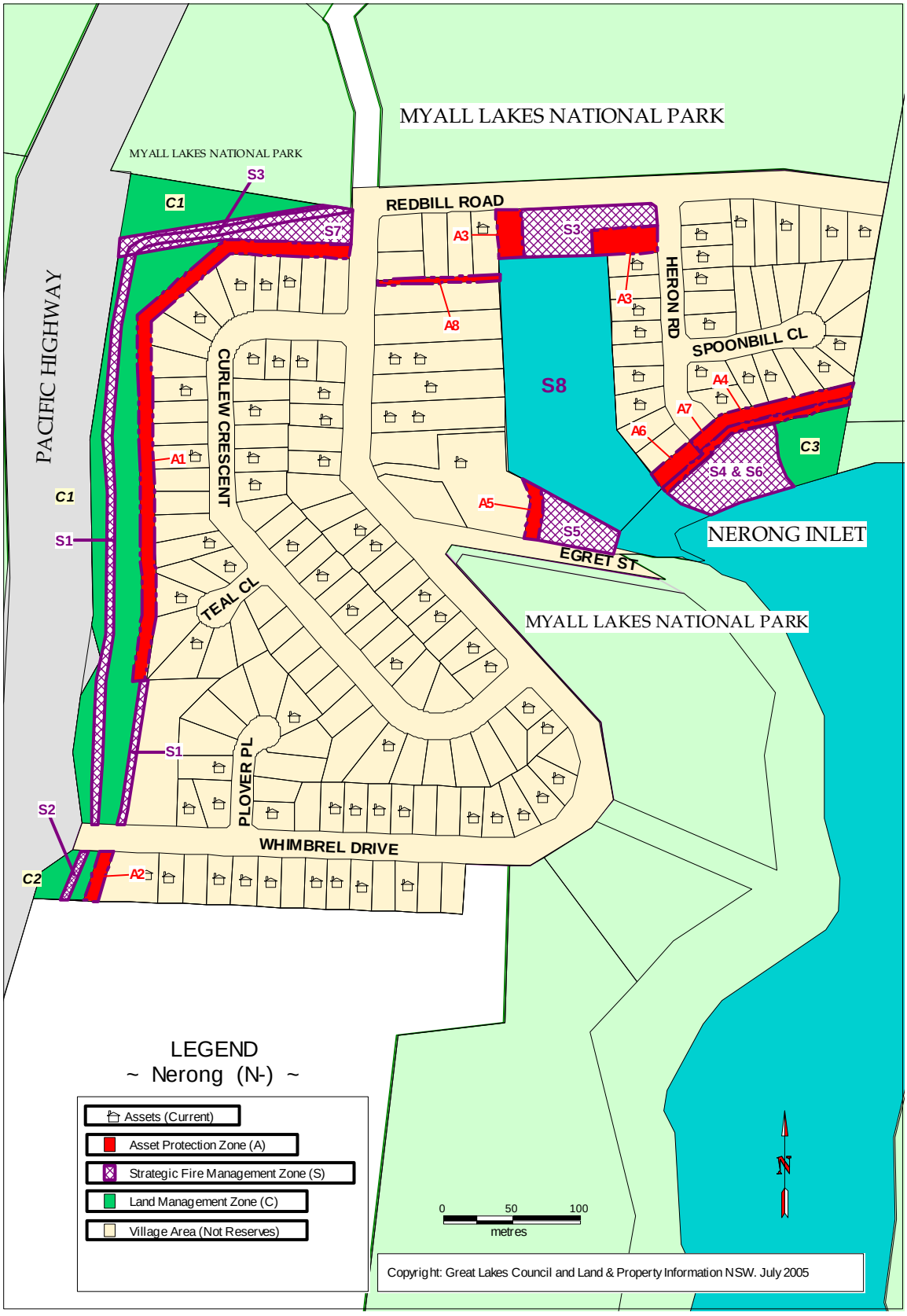


Figure 9: Fire management zones within Council managed land in Nerong.

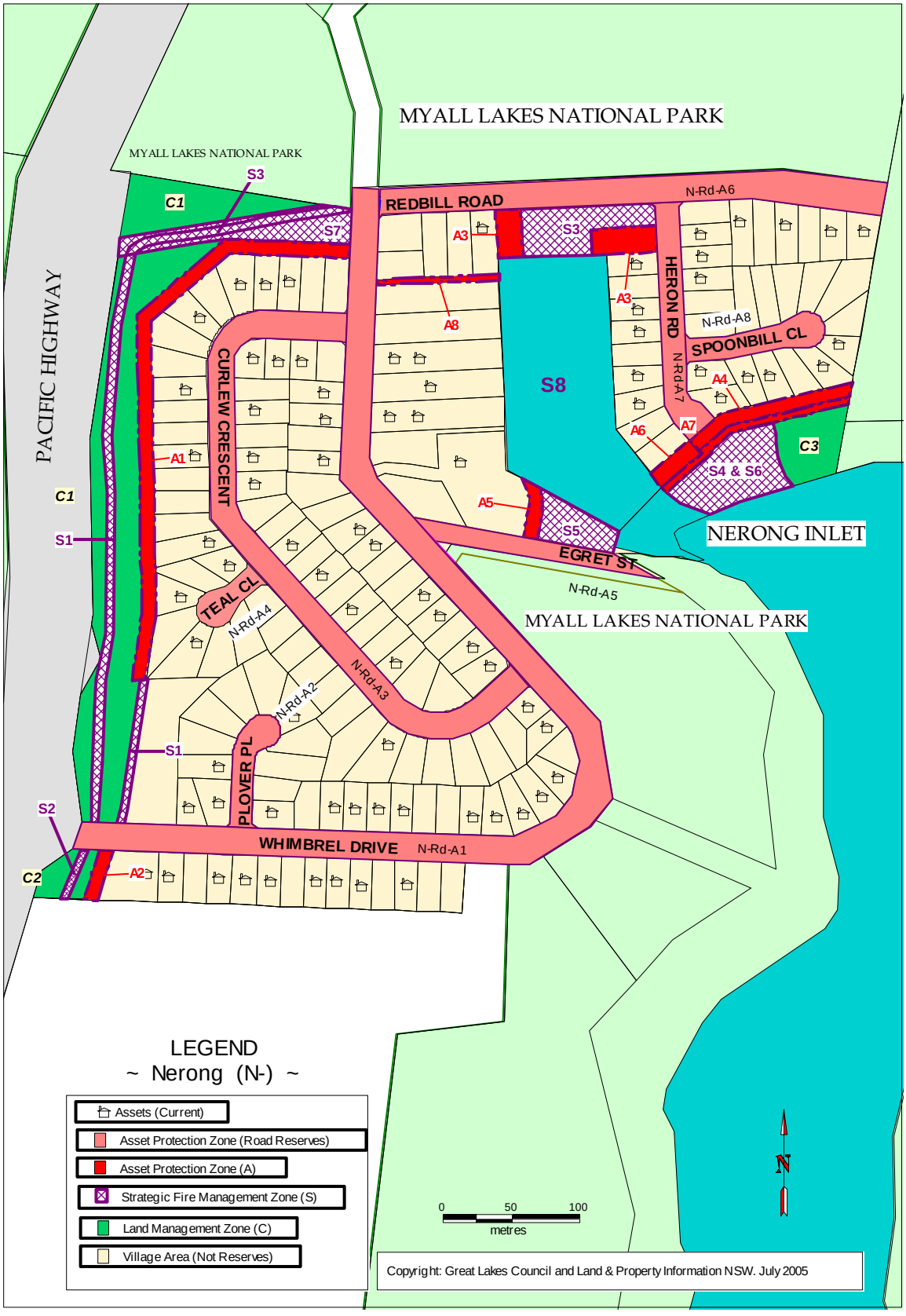


Figure 10: Asset protection zone on road reserves in Nerong.

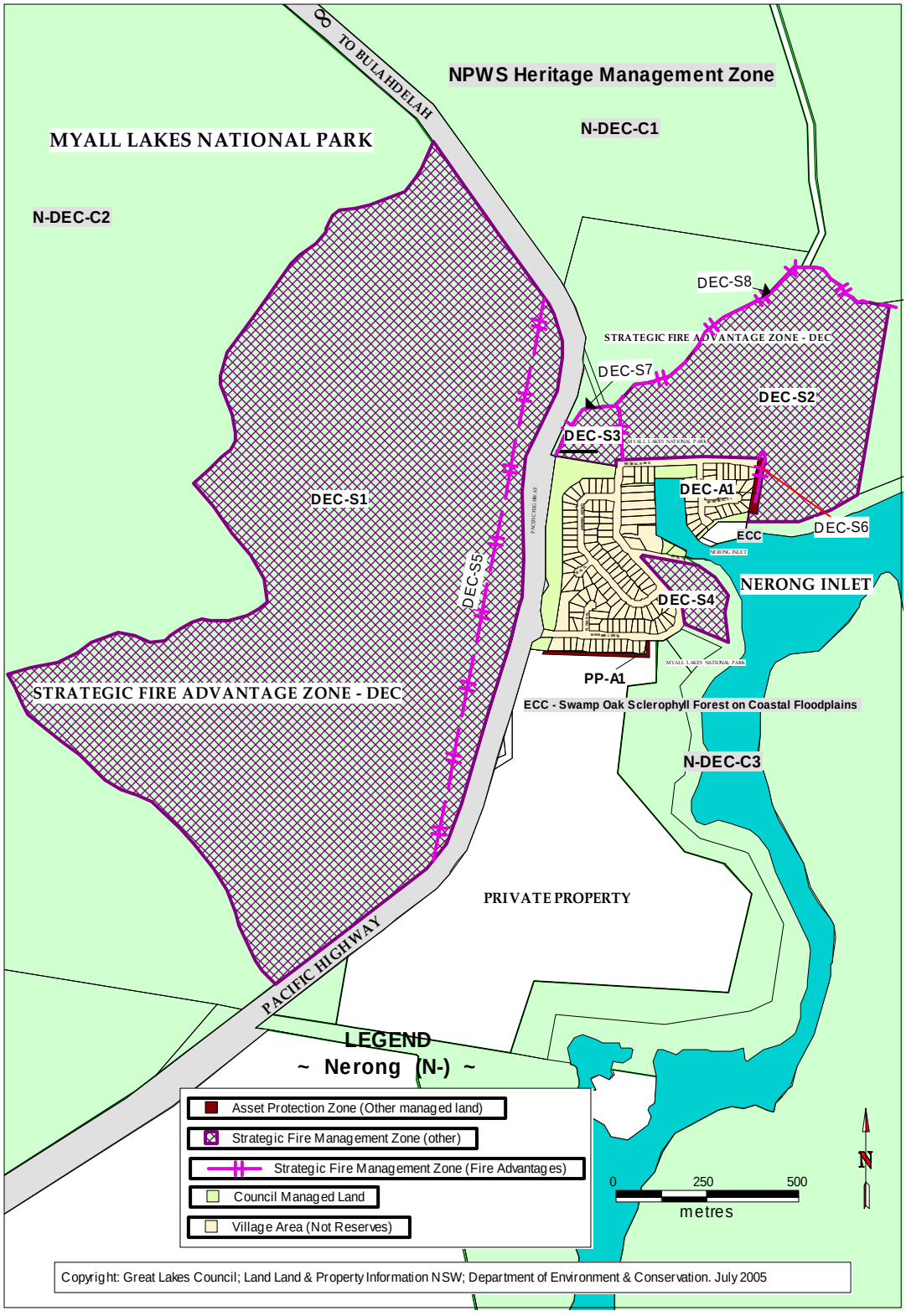


Figure 11: Adjacent fire management zones on other property.[14]

[14] (Refer to Table 13 for descriptions of PP-A1; DEC-S1; etc).

Strategic Fire Advantages

Eleven (11) SFAZ's have been identified within Council Land (Figure 9); Eight (8) on Council road reserves (Figure 10) using mechanical hazard reduction methods and 4 on DEC (Parks and Wildlife Division) managed land (Figure 11) where hazard reduction burning is prescribed within classified NPWS APZ and SFAZ's.

Council has labelled areas identified for hazard reduction burning by DEC including a SFAZ and a APZ (divided into 3 parts) as DEC-S1 to S4 (using Council classification system) and have recognised DEC (formerly NPWS) fire strategy objectives within this plan. These assisted Council in developing compatible fire management strategies complementing those detailed by the NPWS (NPWS 2003a). The NPWS APZ (north and east) and the SFAZ (west) of the village within MLNP strategically provide added protection in the event of a fire threatening Nerong Village. These areas have a mosaic of various fuel loads, which extend a greater distance from the village zone than those provided within Council APZ and SFAZ's neighbouring residents.

In addition Council have located 4 fire advantages to assist fire planners in the event of a fire. These are within DEC ,Council and RTA lands. In order to show adjacent fire management zones (by other agencies) a sequential number has been identified within this chapter. Council's identification Code system has labelled these areas as DEC S5-S8. Council acknowledges that NPWS fire strategies[15] which are summarised within Table 15 refer to localities within both NPWS APZ and SFAZ. Further reference to DEC, plans, documents and fire strategies regarding these areas is important to understand in detail their management objectives.

The overall fire mitigation plan objectives have led to the identification of specific objectives and strategies to be implemented. Standard strategy options that can be applied to individual SFAZ's are detailed in Table 12. Table 13, 14 and 15 contain relevant objectives and the strategy(s) applied to a particular zone, which accordingly varies depending on the proposed management techniques. To meet management objectives, assist in the prevention of fires and to reduce the risk of bushfire, implementation and maintenance by Council is managed as part of annual work program.

[15] DEC objectives and strategies apply to these zones as per the Draft Fire Management Strategy for Myall Lakes National Park.

Council acknowledge that land managers in particular, DEC, have defined strategies for APZ's within the Draft Fire Management Strategy for Myall Lakes National Park (Draft FMS for MLNP) as that Council consider to be equivalent to SFAZ's. To enable within the context of this plan, a consistent approach to strategies for strategic fire advantages (as defined by the RFS), Council have placed NPWS APZ's within the section for SFAZ's.

Table 12: Options for specific strategies applied to strategic fire advantage zones.

Strategies	1	Maintain SFAZ specifications on Council land for adjacent existing developments to meet specifications of the BFEAC (RFS 2003a)
	2	Provide and maintain fuel reduced areas to help prevent the spread of fires and reduce fire intensity
	3	Monitor Overall Fuel Hazards to ensure they are maintained to meet prescribed levels (NPWS 2003b)
	4	Create and/or maintain existing fire advantage lines to provide access for fire fighters
	5	Maintain SFAZ specifications on Council land for adjacent existing developments to meet specifications of the Environmental Impact Assessment (Council 2005a)
	6	Liaison with adjoining land managers for a coordinated approach to monitoring and management of adjacent zone for bushfire risks and fuel hazards
	7	Provide a refuge area for fire fighters, visitors and residents in the event of a fire
	8	Enhance adjacent asset protection zone or strategic fire advantage zone
	9	Maintain SFAZ by mechanical hazard reduction within existing DC to meet APZ specification to the BFEAC (RFS 2003a) and/or to the PBFP guidelines (RFS 2002b)[16] (Boundary fire breaks and existing trails)
	10	Ensure Buildings and fire standards to comply with Australian Standards AS3959 (Ramsey and Dawkins 1993) and PBFP for new developments
	11	Prescribe burn at a frequency to maintain the prescribed Overall Fuel Hazard within SFAZ (NPWS 2003b) Meet biodiversity thresholds for vegetation communities described in Table 18
	12	Meet biodiversity thresholds for vegetation communities described in Table 18

[16] Only for Council Approval of APZ to coexist on private development and Council Land.

Table 13: Specific fire objectives and strategies applied to SFAZ's in Nerong (N).

SFAZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
S1	LP1	8	Reserve No 5050 Pacific Highway ---------- Whimbrel Park (North of Whimbrel Drive)	• To protect the western residential edge including 30 residential properties (10 houses) and bushland interface west & N of Nerong linking with MLNP & the Pacific Highway. Adjacent to N-A1	1,2,3,5,6,8,9,11 within Whimbrel Park	Width – 6m Length – 420m Area – 0.253ha Hand removal/ Slashing	Dry sclerophyll forest - Spotted Gum/Stringybark/ White Mahogany/Grey Ironbark/Grey Gum-Blackbutt/Tallow-wood/
S2	LP2	8	Lot 118 DP 247531 ---------- Telephone line within Whimbrel Park (South-of Whimbrel Drive)	• To protect the western residential edge and rural/urban interface adjacent to the Public Reserve, south of Whimbrel Drive and west towards the Pacific Highway and MLNP. Adjacent to N-A2	1,2,3,5,6,8,9,11 within Lot 118 DP 247531	Width – 6m Length – 37m Area – 0.021ha Slashing	Dry sclerophyll forest/ As above
S3	LP8	8	Redbill Park ---------- North of Nerong Harbour, Redbill Road	• To protect 2 residential properties (2 houses) south and west of park, the public reserve (toilet) & N into MLNP. Adjacent to N-A8	1,2,3,5,6,7,8,9 within Redbill Park	Width -98m Length - 35m Area - 0.258ha Mowing	Disturbed dry sclerophyll forest/ Blackbutt-Bloodwood Apple/ Maintained park.
S4	LP9	8	Heron Park ---------- South-east of Nerong south of Heron St towards Myall Lake	• To protect 6 residential properties (5 houses) N & E within the bushland interface linking with MLNP. Adjacent to N-A4	1,2,3,5,6,7,8,9 within Heron Park and adjacent open space.	Width – 10m Length –127m Area – 0.311ha Mowing	Disturbed dry sclerophyll forest/(Disturbed) Swamp Mahogany Forest/ Maintained park.
S5	LP3	8	Waterhen Park ---------- Waterhen Park, North of Egret Street	• To protect 1 residential property west of Waterhen Park, the foreshore of the harbour and south into MLNP. Adjacent to N-A5	1,2,3,5,6,7,8,9 within Waterhen Park and adjacent open space.	Width – 10m Length –33m Area – 0.115ha Mowing	Cleared/Maintained Park
S6	LP9	8	RES 210002 (Heron Park)---------- Lot 7007, Adjacent to Heron Park/Waterhen Park	• To protect 6 residential properties (5 houses) N & E within the bushland interface linking with MLNP. Adjacent to N-A4	1,2,3,5,6,7,8,9 within Heron Park.	Width – 5m Length –152m Area – 0.015ha Mowing	Disturbed Swamp Forest/ Maintained Park

SFAZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
S7	LP1	8	Nerong Power Line ---- (Country Energy)	• To protect residential properties on the N & western bushland interface linking with MLNP. Adjacent to N-A1	1,2,3,4,5,6,7,8,9 under the powerlines.	Width – 6m Length –152m Area – 0.209ha Slashing	Disturbed Swamp Forest/ Maintained Park
S8	LP3, 8, 9 11, 12	8	Nerong Boat Harbour	• To protect residential properties on the south and eastern bushland interface linking with MLNP.	4 -This is a natural fire advantage.	None	Harbour area
S9	LP1 & 2 (NPWS SFAZ – Part of S6)	8	Nerong – Access track along Transmission line	• To assist in the control and spread of bushfire from MLNP to Nerong.	1,2,3,4,5,6,7,8,9 under the powerlines.	Width – 6 m Length –160 m Area - 0.092ha Slashing	Disturbed Dry sclerophyll forest
S10	LP1,2	8	Boundary – Reserve 5050 (Whimbrel Park)	• To protect residential properties on the western bushland interface linking with MLNP. • To assist in mitigating the spreading of bushfire into Nerong or MLNP.	6	Width – 6 m Length –133m Area – 0.0561ha Slashing	Disturbed Dry sclerophyll forest
S11	LP3	8	Lot 12 DP 851162 ---------- Adjacent to Waterhen Park, North of Egret St	• To protect 1 residential property west of Waterhen Park, the foreshore of the harbour and south into MLNP.	1,2,3,4,5,6,7 within Waterhen Park and adjacent open space.	Width –10m Length –33m Area – 0.033ha Mowing/Slashing	Cleared/ Maintained Park
					TOTAL	**1.363 hectares**	
Strategic Fire Advantage Zones within Road Reserves							
PP-A1 or Rd-S1	LP1, LP2, LP3, LP4, LP5	9	Whimbrel Drive	• To assist in mitigating the spreading of bushfire within Nerong or into MLNP. • To provide access and refuge areas	1,2,3,4,6,7,8 within Whimbrel Drive.	Width – 20m Length –900m Area – 0.018ha Mowing/road maintenance	900m Public-sealed Rd with mowed edges
PP-A2 or Rd-S2	LP1, LP2, LP4,	9	Plover Place	• To protect enhance adjacent APZ. • To provide access and refuge areas • To assist in mitigating the spreading of bushfire throughout. • To provide access and refuge areas	1,2,3,4,6,7,8 within Plover Place.	Width – 20m Length –89m Area – 0.002ha Mowing/road maintenance	89m Public-sealed Rd with mowed edges

SFAZ Code (N)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
PP-A3 or Rd-S3	LP1, LP4, LP5	9	Curlew Crescent	• As above	1,2,3,4,6,7,8 within Curlew Crescent.	Width – 20m Length –508m Area – 0.012ha Mowing/road maintenance	508m Public-sealed Rd with mowed edges
PP-A4 or Rd-S4	LP1	9	Teal Close	• As above	1,2,3,4,6,7,8 within Teal Close.	Width – 20m Length –54m Area – 0.11ha Mowing/road maintenance	54m Public-sealed Rd with mowed edges
N-PP-A5 or N-Rd-S5	LP3	9	Egret Street	• To protect enhance adjacent APZ. • To provide access and refuge areas • To assist in mitigating the spreading of bushfire within Nerong or into MLNP. • To provide access to vehicle water.	1,2,3,4,6,7,8 within Egret Street.	Width – 20m Length –158m Area – 0.003ha Mowing/road maintenance	158m Public-sealed Rd with mowed edges
PP-A6 or Rd-S6	LP1	9	Redbill Road	• To protect enhance adjacent APZ. • To provide access and refuge areas • To assist in mitigating the spreading of bushfire within Nerong or into MLNP. • To provide access and refuge areas	1,2,3,4,6,7,8 within Redbill Road and verges.	Width – 20m Length –367m Area – 0.007ha Mowing/road maintenance	367m Public-sealed Rd with mowed edges
PP-A7 or Rd-S7	LP7, LP8, LP9	9	Heron Street	• As above	1,2,3,4,6,7,8 within Heron Street.	Width – 20m Length –171m Area – 0.003ha Mowing/road maintenance	171m Public-sealed Rd with mowed edges
PP-A8 or Rd-S8	LP6, LP7, LP9	9	Spoonbill Close	• As above	1,2,3,4,6,7,8 within Spoonbill Close.	Width – 20m Length –103m Area – 0.002ha Mowing/road maintenance	103m Public-sealed Rd with mowed edges

Table 14: Specific fire objectives and strategies applied to SFAZ's by DEC (Parks and Wildlife Division) by prescribed burning.

SFAZ Code	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Required Maintenance Size by NPWS	Vegetation Formation
Strategic Fire Advantage Zones maintained and monitored by the Department of Environment and Conservation: (NPWS 2003a) [17]							
DEC-S1	LP1 & 2	10	NPWS SFAZ-S6 (Part of MLNP) ---------- Nerong West	• To protect Nerong from bushfires from the west within MLNP.	As per NPWS Fire management strategy for Myall Lakes NP and Island Nature Reserves.	NPWS specification: (Total Area of Fuel Management Zone – 165.2ha)	Dry sclerophyll forest
DEC-S2	LP6,LP7 NPWS Fuel Management Zone	10	NPWS APZ – A1 (Part of MLNP) ---------- Nerong North/East	• To protect 12 residential properties on the northern residential edge of Nerong and N MLNP E of Fire advantage 1. • To protect 4 residential properties (2 houses) of the eastern residential edge adjacent to MLNP and including houses along Redbill Road, Heron St and Spoonbill Cl.	As per NPWS guidelines. Prescribe burn at a frequency required to maintain the Overall Fuel Hazard <High (estimated frequency once every 3-7 years)	NPWS specification: Total Area of Fuel Management Zone – 21ha	Dry sclerophyll forest/Swamp Sclerophyll Forest/Freshwater wetlands
DEC-S3	LP6,LP7 NPWS Fuel Management Zone	10	NPWS APZ – A1 (Part of MLNP) ---------- Nerong North/East	• To enhance the adjacent slashed SFAZ/APZ of 8 residential properties on the northern residential edge of Nerong W of Fire advantage 1 withinMLNP.	As above	NPWS specification: Total Area of Fuel Management Zone – 21ha	Dry sclerophyll forest
DEC-S4	LP4 NPWS Fuel Management Zone	10	NPWS APZ – A1 (Part of MLNP) ---------- Nerong South East	• To protect 17 residential properties of the south-eastern residential edge opposite Egret Street.	As above	NPWS specification: Total Area of Fuel Management Zone – 2.6ha	Dry sclerophyll forest/Swamp Sclerophyll Forest/Freshwater wetlands

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

[17] (NPWS) National Parks and Wildlife Service, (2003a) *Fire Management Strategy, Mall Lakes National Park and Island Reserves.*

SFAZ's). These are recorded as existing features available for use during fire incidents and are not necessarily maintained as fire trails or require specific maintenance regimes. Change is imminent and reference to these are intended as a guide only, as other management and planning decisions by managers may alter suitability in the future. Liaison with the responsible manager is required to confirm presence/absence of such a fire advantages for fire control lines. Consideration to fire fighter safety is imperative when working under or near power lines.

Table 15: Specific fire objectives and strategies applied to fire advantages.

Code	Life & Property Code	Map Figure	HR Name/ Location	Objective	Strategy	Manager	Vegetation Formation
Fire Advantages [18]							
DEC-S5	LP1 & 2	10	NPWS SFAZ – S6 (Part of MLNP) Nerong – Transmission line (Within NPWS SFAZ – S6)	• Monitor suitability to assist in the control and spread of bushfire. Either out of Nerong or from west of the Highway in MLNP to Nerong during fire incidents.	As per NPWS Fire management strategy for Myall Lakes NP and Island Nature Reserves.	DEC/Maintained by TransGrid within MLNP.	Disturbed Dry sclerophyll forest
DEC-S6	LP1 & 2	10	Nerong – No 1 Fire Advantage19 (Within NPWS APZ – A1, Radiation Zone)	• Monitor suitability to assist in the control and spread of bushfire. Either out of Nerong or from within MLNP to Nerong during fire incidents. •	To provide an E-W fire advantage within the APZ, E of Nerong during fire incidents, linking with No 3 to the north.	DEC	Disturbed Dry sclerophyll forest
DEC-S7	LP1 & 2	10	Nerong – No 2 Fire Advantage * (Within NPWS APZ-A1)	• Monitor suitability to assist in the control and spread of bushfire. Either out of Nerong or from within MLNP to Nerong during fire incidents. •	To provide a link from the transmission line NE to No 3 Fire Trail surrounding the NPWS APZ (A1) N of Nerong.	DEC/RTA/GLC	Disturbed Dry sclerophyll forest

[18] NSW National Parks and Wildlife Service, (2003a) *Fire Management Strategy, Mall Lakes National Park and Island Reserves.*
[19] *Reduced fuel area able to be used as a fire advantage line (not specifically dedicated as a management trail or a fire trail for fire fighting use) (DEC 2005b)

Code	Life & Property Code	Map Figure	HR Name/ Location	Objective	Strategy	Manager	Vegetation Formation
DEC-S8	LP1 & 2	10	Nerong – No 3 Fire Advantage * (Within NPWS APZ-A1)	• Monitor suitability to assist in the control and spread of bushfire. Either out of Nerong or from within MLNP to Nerong during fire incidents. •	To provide a fire advantage surrounding the NPWS APZ (A1) N of Nerong linking with Redbill Road and No 1.	DEC/GLC	Disturbed Dry sclerophyll forest

Land Management Zones/Heritage Management Zones

Three (3) LMZ's (Conservation Zones (C)) have been identified within Council Land (Table 16) and an additional DEC Heritage Management Zone[20] (HMZ) (Table 17) identified within MLNP and adjoining private property adjacent to Nerong Village (Figure 9 and 10) (NPWS 2003a). Council individually coded these zones identified objectives within these zones, along with biodiversity thresholds (Table 18) within Nerong. The implementation of ecological based fire regimes of irregular mosaic burn patterns and minimal intervals between burns is important for managing larger zones containing species that require fire for enhancement of biodiversity of the area.

Table 16: Specific fire objectives applied to Council land management zones in Nerong.

LMZ Code (N)	Life & Property Code	Figure	Location	Zone Objective	Vegetation Formation
C1	LP1	10	Reserve No 5050 Pacific Highway ---------- Whimbrel Park (North of Whimbrel Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bushfires. • Implement hazard reduction burns to maintain biodiversity.	Dry sclerophyll forest
C2	LP2	10	Reserve No 5051 ---------- Whimbrel Park (South-of Whimbrel Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bushfires. • Implement hazard reduction burns to maintain biodiversity.	Dry sclerophyll forest
C3	LP9	10	R 210002 ---------- Lot 7007, Adjacent to Heron Park/Waterhen Park	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bushfires. • Conserve and protect the integrity of the adjacent MLNP. • Implement Catchment management objectives adjacent to enhance Myall Lakes.	Dry sclerophyll forest/Swamp Sclerophyll Forest/ Maintained Park

[20] The DEC Heritage Management Zone is equivalent to the RFS Land Management Zone

Table 17: Specific fire objectives and strategies applied to heritage zones by DEC (Parks and Wildlife Division).

LMZ Cod e (N)	Life & Property Code	HR Name/ Location	Zone Objective	Strategy	Vegetation Formation
Heritage Management Zones strategies defined by the DEC (Parks and Wildlife Division) : (NPWS 2003a) [21]					
C1-DEC	LP7 NPWS Heritage zone	NPWS HZ – H9 (Part of MLNP) ---------- Nerong North	• Prevent extinction of all species and other culturally significant features from fires, except where noted otherwise.	• Suppressing bushfires, where necessary conduct prescribed burns to maintain fire regimes within the biodiversity threshold table within the report. • Implementing the threatened species and cultural heritage management guidelines specified within the report where they are likely to occur.	Dry sclerophyll forest/Swamp Sclerophyll Forest/ Freshwater wetlands
C2-DEC	LP6 NPWS Heritage zone	NPWS HZ – H7, H7a (Part of MLNP) ---------- Nerong East	As above	As above	Dry sclerophyll forest/Swamp Sclerophyll Forest/ Freshwater wetlands
C3-DEC	LP10 & 3 NPWS Heritage zone	NPWS HZ – H8 (Part of MLNP) --- Nerong South East	As above	As above	Dry sclerophyll forest

Ecological Considerations

Within Nerong study area there are communities that appear to satisfy the criteria for listing as endangered ecological communities (EEC) (Figure 11). The conservation and enhancement of these areas is guided by the TSC Act. 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 and LMZ's by identifying fire regimes for each zone by incorporating past fire history with current management. The Wallis Lake Foreshore area is within the riparian zone and requires protection when the fire regime has either been exceeded (within areas of high conservation values) or the vegetation type does not support burning for biodiversity (Table 18, Appendix VIII).

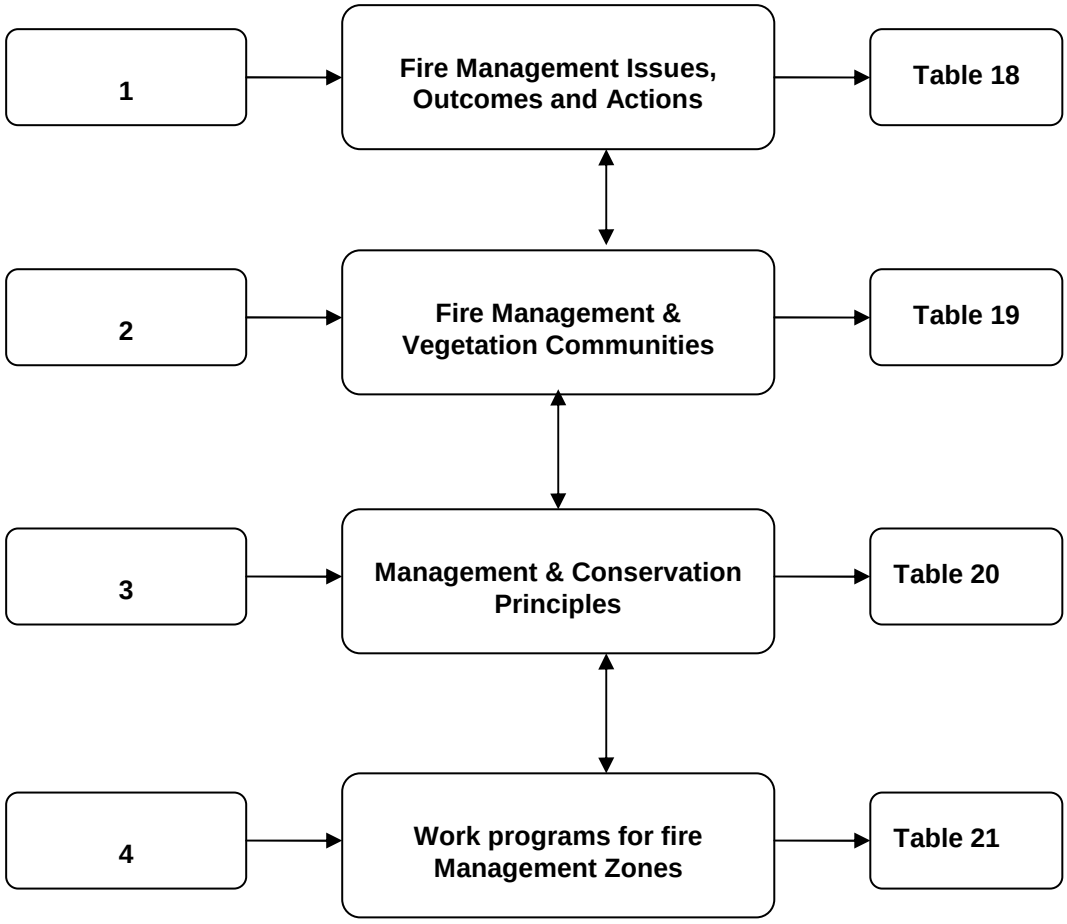
[21] NSW National Parks and Wildlife Service, (2003a) *Fire Management Strategy, Mall Lakes National Park and Island Reserves.*

SECTION 10

Operational Guidelines

Hazard Reduction Works

The plan has reviewed and provided strategic guidelines for planners to implement. The fire management outcomes reflect Council management requirements through the identification of specified on-ground works (discussed previously through various sections within the plan). 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.



1. *Fire Management issues are the identified key fire issues distributed in the plan. In response Councils provides resultant actions to the respective outcomes. These have been identified from collating and collaborating with on-ground assessment fire management legislation, polices and guidelines.*

2. *The biodiversity thresholds and fire regimes to be applied to vegetation within the Coomba study area have been summarised within this table. The associated vegetation formation (as described by the RFS) for burning in SFAZ guides managers in the frequency for hazard reduction and ecological burning.*

3. *The implementation of fire mitigation activities by Council ensures guidelines within the plan are met. The table particularly identified guidelines for conservation principles, the implementation and monitoring of fire management zones. Ongoing programs that link with other management objectives ensure targeted outcomes are adhered too.*

4. *Specified work programs within APZ and SFAZ's within the study area, has operational emphasis particularly guiding work schedules.*

These tables should be referred to for detailed management of each fire management zone. 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 gives 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.

Monitoring of fire hazards will guide slashing and mowing regimes within fire management zones which will be 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 frequency) s.

Disturbances in natural areas often encourage the invasion of weeds. These weeds are classified as being noxious or an environmental weed. Management of pest plants within

these areas is guided by legislation to suppress, control or eradicate these species. The approved methods of application of registered herbicides on weed species are detailed within the NSW Agricultural, *'Noxious Environmental weed control handbook 2004-2005'.* Managers are able to integrate manual weed control, herbicide control and to specify weed management practices with fire mitigation works to ensure minimal impact of pest plant introductions to manage fire management zones.

Management Issues

Through the preparation of this plan key fire issues have been identified with subsequent outcomes required to mitigate these issues (see below). 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 guidelines.

Table 18: Management issues.

Key fire issues within Nerong	Outcomes	Actions
❖ A large number of assets occur within Nerong often with absentee owners.	Promotion of fuel management to owners is important to promote mechanical works within Nerong.	Ensure Bushfire Hazard assessment on private land is implemented by RFS.
❖ Nerong is surrounded by contiguous vegetation, rated as a major fire risk by the NSW Rural Fire Service.	In the event of a fire Nerong potentially could be surrounded on three sides.	Provide fire management zones to reduce fuels.
❖ In extreme fire weather conditions the fire path is aligned with the ridgeline.	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.
❖ Parks and reserves contain recreational facilities that need protection.	Assets require protection from fire threat.	Reduce ground fuels within reserves.
❖ Adjacent Myall Lakes National Park and private landholders have asset protection zones, strategic fire advantage zones, fire trails and fire advantage to assist in fire operations.	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.

Key fire issues within Nerong	Outcomes	Actions
❖ Hazard reduction burning occurs in Myall Lakes National Park.	Strategic hazard reduction works reduces the fire risk to Nerong. Maintain biodiversity and protect sensitive areas such as riparian areas.	Review hazard reduction techniques and implement burning in strategic fire management zones when required. Implement fire regimes for biodiversity.
❖ There is a need for landholders to be prepared as fire fighting resources are sought from outside Nerong	Landholders to implement hazard reduction programs and prepare fire protection plans.	Promote to the community the importance of preparation for fires.
❖ Area is serviced by fire fighting vehicles from nearby towns and locations	Resources are available to protect Nerong are adequate.	Continued liaison with RFS to ensure operational resources are adequate.
o Potential fire ignitions adjacent to Pacific Highway or from lightning strikes during the spring and summer months.	Heightened awareness and diligence to fire preparedness knowing the increased threat in these periods.	Education of the community to assist in the preparation of homes in bushfire areas.
❖ The majority of Nerong is mapped as Bushfire Prone Land.	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 19: Biodiversity thresholds[22] and fire regimes to be applied to vegetation.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones (NPWS 2001)	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	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
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	E1. Dry sclerophyll shrub/grass forest	5
		Dry Blackbutt	37	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark/ Smooth-barked Apple/ Stringybark	84/106	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum – Ironbark/ Grey Gum	74	1	E1. Dry sclerophyll shrub/grass forest	5
		White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	1	E1. Dry sclerophyll shrub/grass forest	5
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	Paperbark/ Blackbutt	31/37	1	C. Swamp sclerophyll forests	7
		Paperbark/ Swamp Oak	31/32	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany	30	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Paperbark	30/31	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Swamp Oak	30/32	1	C. Swamp sclerophyll forests	7
		Swamp Oak	32	1	C. Swamp sclerophyll forests	7
		Tallowwood #1	45	1	B2. Semi mesic grassy forests	10
		Tallowwood/ Grey Gum	45/60	1	B2. Semi mesic grassy forests	10

[22] 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 20: 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, 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.
Exclusion Zone	APZ and SFAZ hazard reduction burning excluded.	Conservation area.	Record fires.

Table 21: Specific works program applied to fire management zones.

(Refer to Table 11—16 for related objectives and strategies)

APZ/ SFAZ Code (N)	HR Name/ Location	Required Maintenance Size by GLC	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**
ASSET PROTECTION ZONES			
A1	Reserve No 5050 Pacific Highway ---------- Whimbrel Park (North of Whimbrel Drive)	Width –10m Length – 423m Area – 0.43ha	1 Slashing/Hand removal
A2	Lot 118 DP 247531 ---------- Whimbrel Park (South- of Whimbrel Drive)	Width –10m Length – 37m Area – 0.04ha Slashing	1
A3	Redbill Park ---------- North of Nerong Harbour, Redbill Road	Width - 18m Length - 37m Area - 0.1510ha	2 Mowing
A4,	Heron Park ---------- South-east of Nerong south of Heron St towards Myall Lake	Width –10m Length –127m Area – 0.133ha	2 Mowing
A5	Lot 12 DP 851162, adjacent to Waterhen Park ---------- Waterhen Park, North of Egret Street	Width –10m Length –42m Area – 0.042ha	2 Mowing/Slashing
A6	Lot 143 DP 734840 ---------- Adjacent to Heron Park	Width –12m Length –33m Area – 0.047ha	2 Mowing entire area
A7	RES 210002 (Heron Park) ---------- Lot 7007, Adjacent to Heron Park/Waterhen Park	Width – 5m Length –152m Area – 0.078ha	2 Mowing
A8	Drainage Reserve ---------- Lot 13 DP 851162 Adjacent to harbour	Width – 4m Length –89m Area – 0.036ha	2 Mowing
	TOTAL	**0.955 hectares**	

APZ/ SFAZ Code (N)	HR Name/ Location	Required Maintenance Size by GLC	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**
STRATEGIC FIRE ADVANTAGES			
S1	Reserve No 5050 Pacific Highway ---------- Whimbrel Park (North of Whimbrel Drive)	Width –10m Length – 456m Area - 0.253ha	1 Hand removal/slashing
S2	Lot 118 DP 247531 ---------- Telephone line within Whimbrel Park (South- of Whimbrel Drive)	Width – 6m Length – 37m Area – 0.021ha	1 Slashing
S3	Redbill Park ---------- North of Nerong Harbour, Redbill Road	Width - 10m Length - 37m Area – 0.258ha	2 Mowing
S4	Heron Park ---------- South-east of Nerong south of Heron St towards Myall Lake	Width –10m Length –127m Area – 0.311ha	2 Mowing
S5	Waterhen Park ---------- Waterhen Park, North of Egret Street	Width –10m Length –33m Area – 0.115ha	2 Mowing
S6	RES 210002 (Heron Park) ---------- Lot 7007, Adjacent to Heron Park/Waterhen Park	Width – 5m Length –152m Area – 0.148ha	2 Mowing
S7	Nerong Power Line ---------- (Country Energy)	Width – 6m Length –152m Area – 0.209ha	2 Slashing under the powerlines.
S8	Nerong Boat Harbour	None	N/A This is a natural fire advantage.
S9	Nerong – Access track along Transmission line	Width – 6 m Length –160 m Area – 0.092ha	1 Slashing under the power line
S10	Nerong – Reserve 5050 (Whimbrel Park)	Width – 6 m Length –133m Area – 0.0561ha	1 Slashing
S11 (Adjacent to S5)	Lot 12 DP 851162 ---------- Adjacent to Waterhen Park, North of Egret St	Width –10m Length –33m Area – 0.033ha	1 Mowing/Slashing
Rd-S1	Whimbrel Drive	Width – 20m Length –900m Area – 0.018ha	3 Mowing/road maintenance
	TOTAL	**1.363 hectares**	

APZ/ SFAZ Code (N)	HR Name/ Location	Required Maintenance Size by GLC	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**
Rd-S2	Plover Place	Width – 20m Length –89m Area – 0.002ha	3 Road side slashing/road maintenance
Rd-S3	Curlew Crescent	Width – 20m Length –508m Area – 0.012ha	3 Road side slashing/road maintenance
Rd-S4	Teal Close	Width – 20m Length –54m Area – 0.11ha	3 Road side slashing/road maintenance
Rd-S5	Egret Street	Width – 20m Length –158m Area – 0.003ha	3 Road side slashing/road maintenance
Rd-S6	Redbill Road	Width – 20m Length –367m Area – 0.007ha	3 Road side slashing/road maintenance
Rd-S7	Heron Street	Width – 20m Length –171m Area – 0.003ha	3 Road side slashing/road maintenance
Rd-S8	Spoonbill Close	Width – 20m Length –103m Area – 0.002ha	3 Road side slashing/road maintenance

APPENDICES

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*.

bush fire 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 bush fire hazard reduction work means bushfire hazard reduction work that is carried out in accordance with a Bush Fire 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.*

Displan *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 Plan, 2004-2007*, 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).*

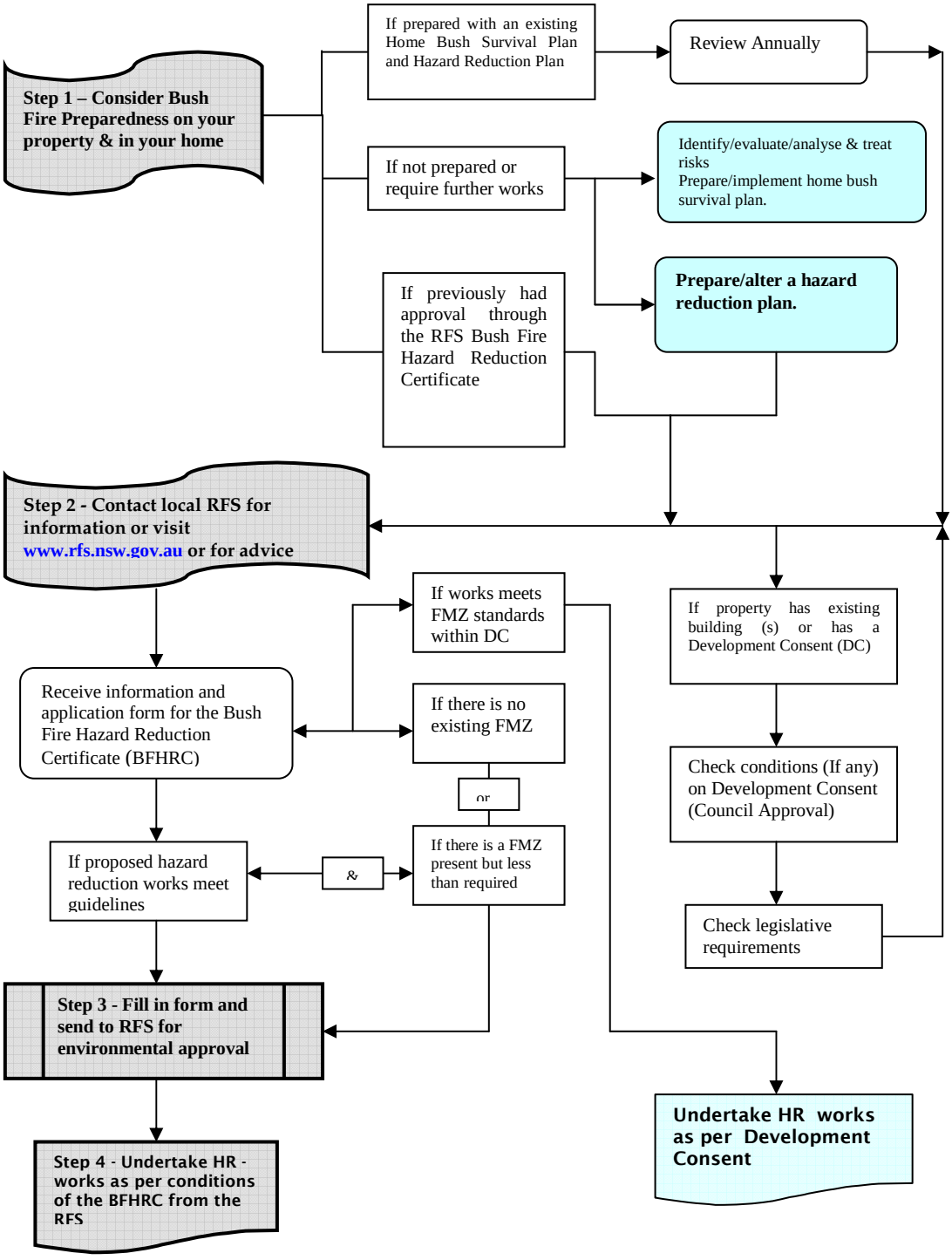
Objectives:

- ✓ *'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 accordance with the New South Wales State Emergency Service Annual Report for 2003/2004 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.'*

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

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

APPENDIX IV – Fire Mitigation

The Local Environmental Plan (LEP) permis 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 bushfires 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 (eg. road, sporting field, 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 Building	*Building - Shed*
Upslope		
<18	20 metres	10 metres
Downslope		
>0 – 5°	25 metres	10 metres
>5 – 10°	30 metres	10 metres
>10 – 15°	40 metres	10 metres
>15 – 18°	50 metres	10 metres

(RFS 2003a)

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 (200b1)* 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 comprises of two components, being the Outer Protection Area (OPA) and the Inner Protection Area (IPA).

Within Bushfire 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 †[23])
	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

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.

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 is 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 — ie **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 preferance to retain smooth bark species over rough barked species. The more fibrous bark increases

* 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 bush fire 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.

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

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.

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 Bushfire 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, shrubland 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 – Bushfire Prone Land Mapping, NSW Rural Fire Service, 2004* defines the criteria for **Bushfire Vegetation Categories**[24] **using the above mapped** Vegetation Groups and is as follows: –

(i) Vegetation Group 1 and 2, greater than 1 hectare **– Bushfire Vegetation Category 1**
(ii) A 100 metre external buffer to Bushfire Vegetation Category 1 vegetation polygon—**Buffer zone Category 1**
(iii) Vegetation Group 3, greater than 1 hectare – **Bushfire 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 — **Bushfire Vegetation Category 2.** or
(vi) 30m lateral separations from a bushfire vegetation category 2 are **—Bushfire 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)*

[24] The NSW Rural Fire Service owns bush fire prone mapping and is held in custody by Council

APPENDIX VI – Bushfire 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:

Bushfire Risk Description

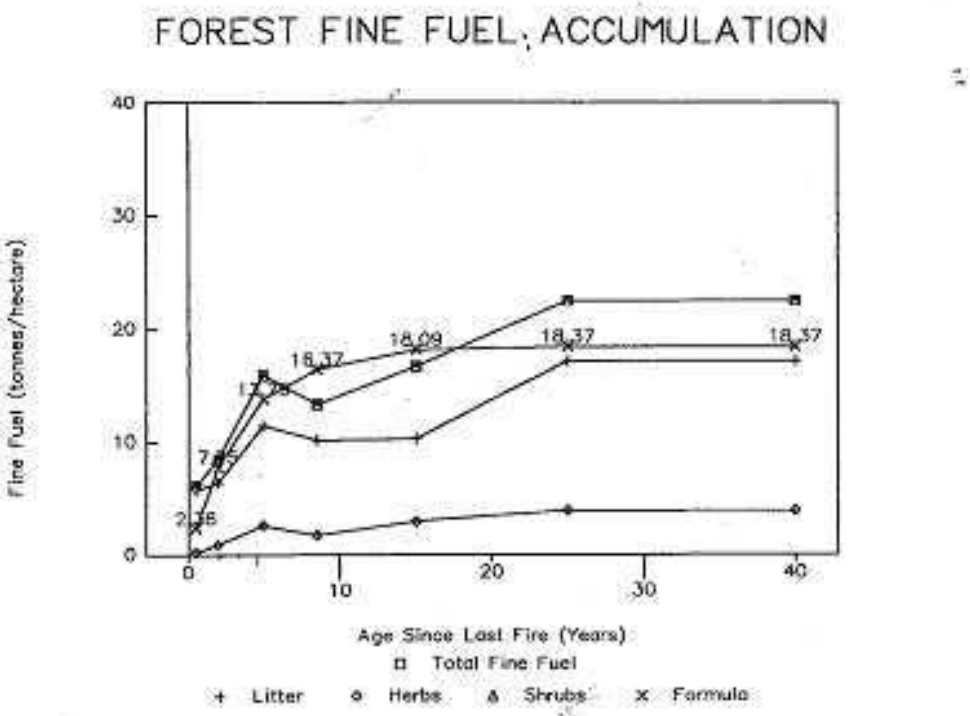
Development Type *X — absent, ✔— present)*	*Bushfire Threat*[25]	*Bushfire Risk*[26]	*Consideration to Asset Protection/ Building Design*[27]
Urban/bushland interface/ Multiple Occupancies	Within 100m	Extreme	✗
Urban/bushland interface/ Multiple Occupancies	Within 100m	Major	✔
Urban/bushland interface	100m – 2.5km	Major	✗ and ✔
Environmental/Ecological Assets	Any	Major	✔
Remote Rural Residential Development	Any	Major	✗ and ✔
Agricultural areas	Any	Moderate	✗

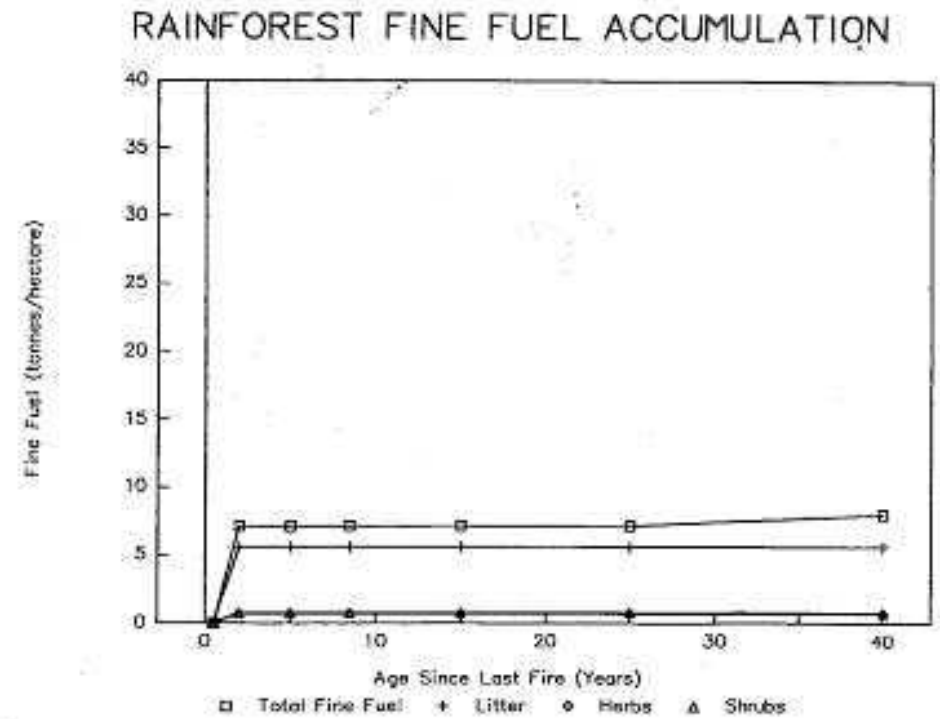
[25] How close assets are located to the hazard

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

[27] 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[28] and fire regime to be applied to vegetation communities in Great lakes LGA.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones (NPWS 2001)	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	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
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	E1. Dry sclerophyll shrub/grass forest	5
		Blackbutt/ Scribbly Gum	40	1	E1. Dry sclerophyll shrub/grass forest	5
		Blackbutt/ Sydney Peppermint/ Smooth-barked Apple	42	1	D. Sclerophyll grassy woodlands	5
		Dry Blackbutt	37	1	E1. Dry sclerophyll shrub/grass forest	5
		Forest Red Gum - #1	92	1	D. Sclerophyll grassy woodlands	5
		Grey Gum/ Grey Ironbark/ White Mahogany	62	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark	84	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark/ Smooth-barked Apple/ Stringybark	84/106	1	E1. Dry sclerophyll shrub/grass forest	5
		Mahogany/ Ironbark/ Grey Gum/ Blackbutt	60/37	1	E1. Dry sclerophyll shrub/grass forest	5
		Red Bloodwood	126	2	D. Sclerophyll grassy woodlands	5
		Scribbly Gum	117	1	E1. Dry sclerophyll shrub/grass forest	5
		Smooth-barked Apple	105	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum	70	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum – Ironbark/ Grey Gum	74	1	E1. Dry sclerophyll shrub/grass forest	5
		Sydney Peppermint	128	1	E1. Dry sclerophyll shrub/grass forest	5
		Sydney Peppermint/ Stringybark	115	1	E1. Dry sclerophyll shrub/grass forest	5
		White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	1	E1. Dry sclerophyll shrub/grass forest	5

[28] 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.*

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones (NPWS 2001)	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	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
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	G. Heathlands	7
		Disturbed Heath	219/223	2	G. Heathlands	7
		Forest Red Gum - #2	92	1	B2. Semi mesic grassy forests	10
		Heath	223	2	G. Heathlands	7
		Heath Paperbark	31/223	2	G. Heathlands	7
		Paperbark	31	1	C. Swamp sclerophyll forests	7
		Paperbark/ Blackbutt	31/37	1	C. Swamp sclerophyll forests	7
		Paperbark/ Smooth-barked Apple/ Sydney Peppermint	31/106	1	C. Swamp sclerophyll forests	7
		Paperbark/ Swamp Oak	31/32	1	C. Swamp sclerophyll forests	7
		Red Mahogany	68	1	E2. Dry sclerophyll shrub/grass forest	7
		Red Mahogany/ Smooth-barked Apple	68/105	1	E2. Dry sclerophyll shrub/grass forest	7
		Rough-barked Apple	129	1	C. Swamp sclerophyll forests	7
		Scrub	224	2	G. Heathlands	7
		Swamp - #1	231	3	J. Freshwater wetlands	6
		Swamp Mahogany	30	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Forest Red Gum	30/92	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Grey Gum	30/60	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Paperbark	30/31	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Swamp Oak	30/32	1	C. Swamp sclerophyll forests	7
		Swamp Oak	32	1	C. Swamp sclerophyll forests	7
		Tallowwood - #1	45	1	B2. Semi mesic grassy forests	10
		Tallowwood/ Grey Gum	45/60	1	B2. Semi mesic grassy forests	10

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones (NPWS 2001)	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	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
c	❖ Avoid more than 1 fire every 30 years ❖ Avoid inter-fire periods > 200 years	Flooded Gum	48	1	B1. Wet sclerophyll forests	25
		Flooded Gum/ Paperbark	48/31	1	B1. Wet sclerophyll forests	25
		Inland Brush Box	53	1	B1. Wet sclerophyll forests	25
		Ironbark/ Grey Gum/ Flooded Gum	60/48	1	B1. Wet sclerophyll forests	25
		Moist Blackbutt	36	1	B1. Wet sclerophyll forests	25
		Sydney Blue Gum	46	1	B1. Wet sclerophyll forests	25
		Sydney Blue Gum/ Paperbark	46/31	1	B1. Wet sclerophyll forests	25
		Tallowwood - #2	45	1	B1. Wet sclerophyll forests	25
		Tallowwood/ Sydney Blue Gum	47	1	B1. Wet sclerophyll forests	25
		Tallowwood/ Sydney Blue Gum/ Brushbox	47/53	1	B1. Wet sclerophyll forests	25
d	❖ Any fire occurrence (a limited recovery ability exists)	Fig/ Giant Stinger	6	3	A. Rainforest	na
		Fig/ Myrtle	6/23	3	A. Rainforest	na
		Headland Brushbox	25	3	A. Rainforest	na
		Mangrove	33	3	K. Estuarine & saline wetlands	na
		Myrtle	23	3	A. Rainforest	na
		Palm	7	3	A. Rainforest	na
		Palm/ Myrtle	7/23	3	A. Rainforest	na
		Swamp - #2	231	3	K. Estuarine & saline wetlands	na
		Tuckeroo	24	3	A. Rainforest	na
		Yellow Tulipwood	22	3	A. Rainforest	na
NA	❖ Not Applicable	Natural Grassland	230	3	No prescribed fire on headlands[29]	na
		Pine	-	1 or 2	Other	na
		Rock/Sand	-	na	Other	na
w	❖ **Use a, b, c, d** options for biodiversity thresholds	Introduced Scrub	221	1,2,3	W. Appropriate management practice[30]	na
		Mixed Forest Regrowth Mixed Pine Mixed Woodland Vine		1,2,3	W. Appropriate management practice	na

[29] Not described in BFEAC schedule
[30] W. Variable within each vegetation formation

APPENDIX IX – Vegetation formations for NSW

Vegetation formations for NSW to be applied to the Bushfire and Environmental assessment Code for asset protection zones and strategic fire advantage zones.

A. Rainforests	Forests dominated by trees with soft broad leaves (non eucalypts), with vines, ferns and palms in the understorey. Coast and tablelands in mesic sites on fertile soils.
B1. Wet sclerophyll forests	Tall forests of dominated by straight-trunked eucalypts with dense understories of shrubs with broad soft leaves, ferns and herbs. Relatively fertile soils in high rainfall parts of coast and tablelands.
B2. Semi-mesic grassy forests	Tall forests dominated by straight-trunked eucalypts, with mixed grassy understories and sparse occurrences of shrubs with broad soft leaves. Coast and tablelands in high rainfall regions and along major inland watercourses on relatively fertile soils.
C. Swamp sclerophyll forests	Forests of hard-leaved trees (eucalypts, paperbarks, casuarinas) with scattered shrubs and continuous groundcover of water-loving sedges and herbs. Floodprone flats and plains and riparian zones principally along the coast and inland rivers.
D. Sclerophyll grassy woodlands	Woodlands of eucalypt trees, with dry understories of grasses, herbs and sometimes scattered shrubs. Rolling terrain with fertile soils and moderate rainfall on the coast, tablelands and western slopes.
E1. Dry sclerophyll shrub/grass forests	Eucalypt forests with mixed understories of hard-leaved shrubs and grasses. Moderately fertile soils in moderate rainfall areas of the coast, tablelands and western slopes.
E2. Dry sclerophyll shrub forests	Low forests and woodlands dominated by eucalypts, with understories of hard-leaved shrubs and sparse groundcover (few grasses or sedges). Regions receiving high to moderate rainfall on the coast, tablelands and western slopes, often in steep areas.
F. Semi-arid woodlands	Open woodlands dominated by eucalypts, acacias and casuarinas, with open understories of hard-leaved shrubs, grasses and forbs, including many ephemeral species. Low-moderate rainfall regions of the near western plains, including infrequently flood-prone sites.
G. Heathlands	Dense to open shrublands dominated by shrubs with small, hard leaves and sedges. High rainfall regions of the coast and tablelands on infertile soils, often in exposed topographic positions.
H. Alpine complex	Mosaics of low herbfields, grasslands and shrublands. High, snow-prone parts of the southern ranges.
I. Grasslands	Closed tussock grasslands with a variable compliment of herbs and few if any woody shrubs or trees. Fertile soils of the tablelands and western floodplains.
J. Freshwater wetlands	Swamp forests, wet shrublands or sedgelands, usually with a dense groundcover of sedges. Throughout NSW on peaty or gleyed soils with impeded drainage.
K. Estuarine and saline wetlands	Low forests, shrublands and herbfields of mangroves, succulent shrubs (saltmarsh) or marine herbs (sea grasses). Coastal estuaries and saline sites of the western plains.
M. Arid and semi-arid shrublands	Open shrublands of hard-leaved shrubs, hummock or tussock grasses and ephemeral herbs. Low rainfall regions of the far western plains.

(RFS 2005)

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
41?	Dry Heathy Blackbutt-Bloodwood	2,889	58.5%	-	Yes
53	Open Coastal Brushbox	64,878	62.8%	-	Yes

Forest Type	CRA Name	Current area Lower North East CRA (ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
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)

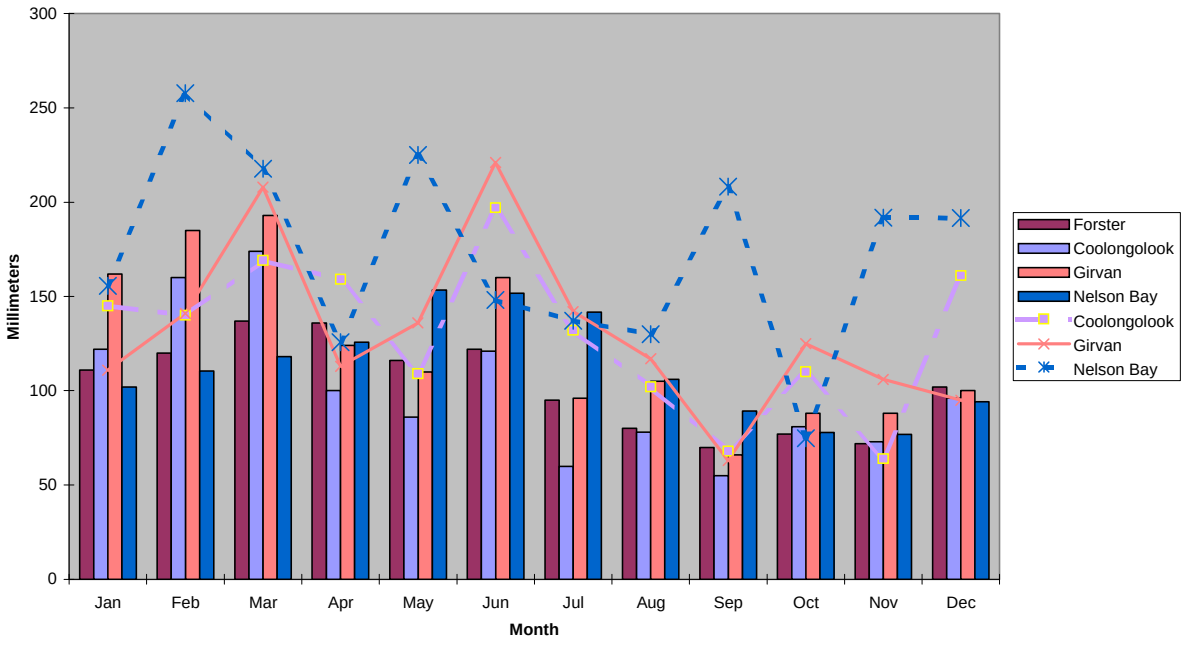
APPENDIX XI – Climate

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

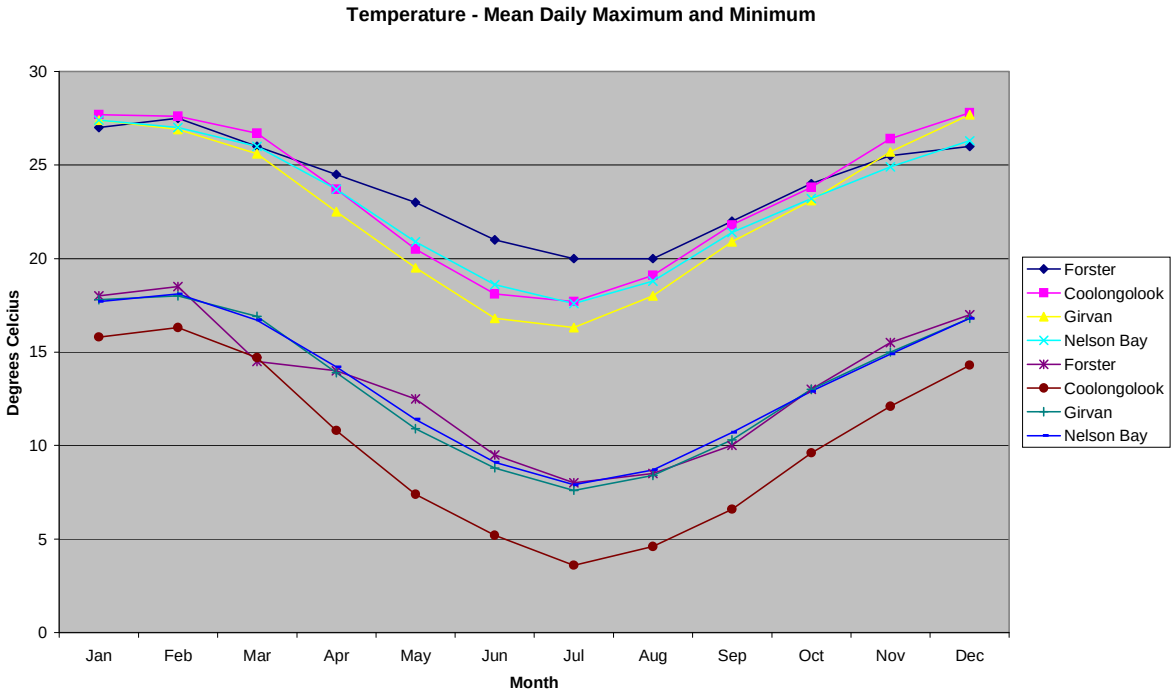
Climate Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANN
Mean Daily Max. Temp (°C)													
Forster	27.0	27.5	26.0	24.5	23.0	21.0	20.0	20.0	22.0	24.0	25.5	26.0	23.9
Coolongolook	27.7	27.6	26.7	23.7	20.5	18.1	17.7	19.1	21.8	23.8	26.4	27.8	23.5
Girvan	27.4	26.9	25.6	22.5	19.5	16.8	16.3	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

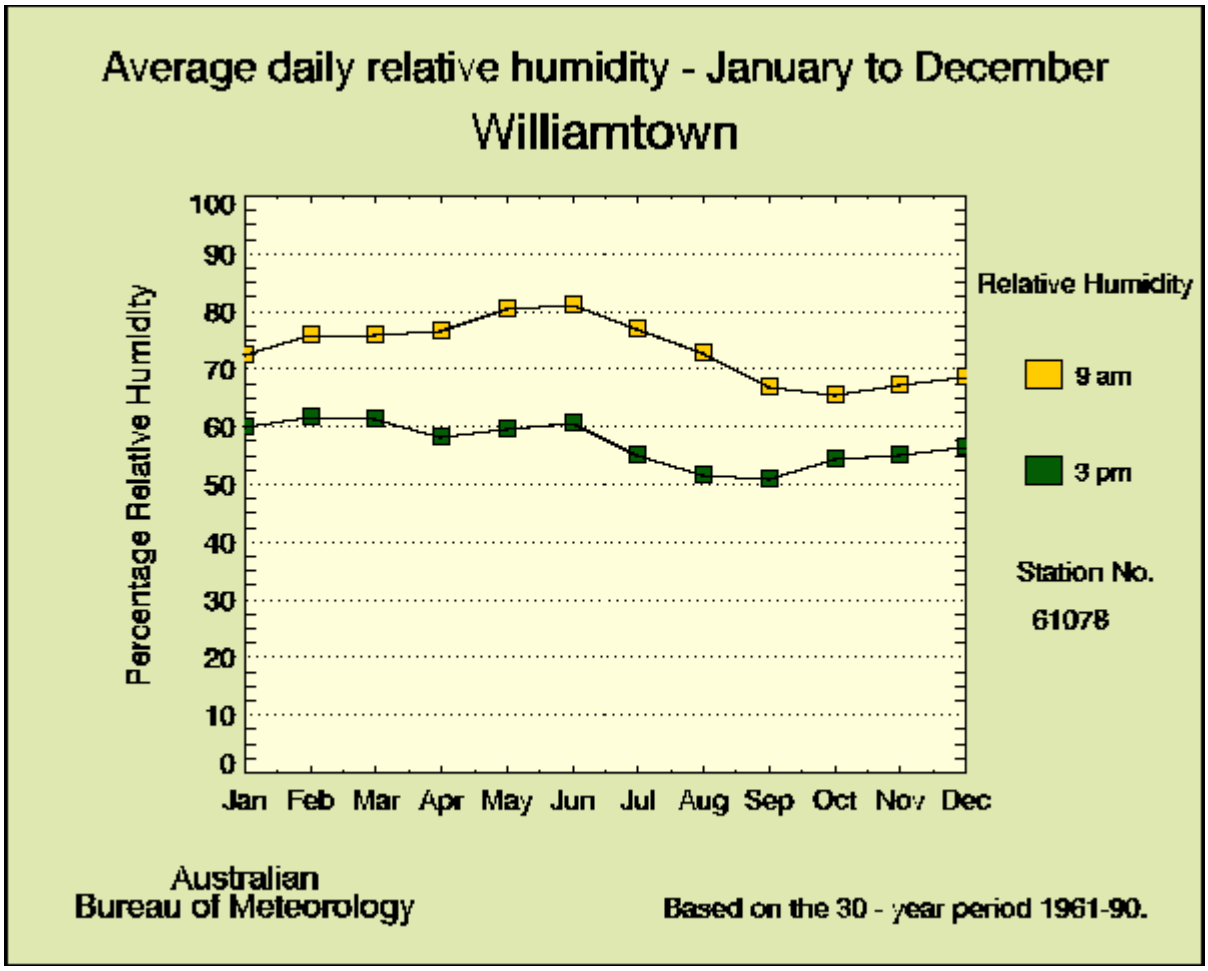
(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)

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 – Fire Fighting Appliance Definitions

The following category identification of all NSW Rural Fire Service appliances apply:

CATEGORY	MAIN IDENTIFICATION	SUB IDENTIFICATION		
Category 1	Heavy Fire Appliance	AWD	3,001L – 4,000L	B – V – F – G / D – S
Category 2	Medium Fire Appliance	AWD	1,601L – 3,000L	B – V – F – G / D – S
Category 3	Heavy Fire Appliance		3,001L – 4,000L	B – V – F – G / D – S
Category 4	Medium Fire Appliance		1,601L – 3,000L	B – V – F – G / D – S
Category 5	Heavy Fire Appliance	AWD	4,001L+	B – V – F – G / D – S
Category 6	Heavy Fire Appliance		4,001L +	B – V – F – G / D – S
Category 7	Light Fire Appliance	AWD	801L – 1,600L	F – G / D – S
Category 8	Light Fire Appliance		801L – 1,600L	F – G / D – S
Category 9	Mop Up Appliance	AWD	350L – 800L D –	S
Category 10	Urban Fire Appliance		1,601L +	B
Category 11	Urban Fire Appliance	AWD	1,601L +	B
Category 12	Personnel Transport			
Category 13	Bulk Water Carriers			
Category 14	Tanker Trailers			
Category 15	Boats			
Category 16	Command Vehicles			
Category 17	General Cargo Vehicles			
Category 18	Catering Vehicles			
Category 19	Communication Vehicles			
Category 20	Other Appliances/Vehicles			

Key:

AWD = All Wheel Drive, **B** = Breathing Apparatus (BA) Equipped,
V = Village (No BA),
F = Forest, **G** = Grassland only
D = Dual/Crew Cabin, **S** = Single Cabin

APPENDIX XIII - Terminology Identification for Localities

Terminology used to identify locations within fire management zones

Identification Key	Village/Town
BL	Blueys Beach
BB	Boomerang Beach
BU	Bulahdelah
BD	Bundabah
BW	Bungwahl
CP	Coomba Park
EB	Elizabeth Beach
F	Forster
HN	Hawks Nest
NB	Nabiac
N	Nerong
NA	North Arm Cove
PD	Pindimar
SR	Seal Rocks
SW	Shearwater
SL	Smiths Lake
TB	Tarbuck Bay
TG	Tea Gardens
T	Tuncurry

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