Bushfire Management Plan

Location:

Jindabyne Sport & Recreation Centre Jindabyne, NSW

Prepared For:

Peter Nolan
Sport & Recreation,
Communities NSW

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Reference Number: 100431- I

Prepared By:
Building Code & Bushfire Hazard Solutions Pty Limited

Tel: (02) 9457 6530
Fax: (02) 9457 6532

PO Box 124
Berowra NSW 2081
ABN 19 057 337 774

www.bushfirehazardsolutions.com.au

FPA AUSTRALIA
Certified Business
Bushfire Planning & Design
BPD-BA-02354

Abstract:

The development of a Bushfire Management Plan is essential for large area land holders or trustees of such lands in order to provide an established methodology for the prevention or mitigation of bushfires occurring within those lands. This Bushfire Management Plan provides details of mitigation measures and future planning considerations to better manage vegetation fuel loads and other bushfire mitigation matters and as a consequence increase the bushfire safety to Sport & Recreation clients, staff, contractors and the general public.

A Bushfire Management Plan is designed to serve not only the landholder or trustee but also its land neighbours and fire authorities by providing a tool which incorporates sufficient detail with which to make informed decisions on mitigation and bushfire response issues.

All land owners or managers (both public and private) have a duty to prevent the occurrence of bush fires on their land and to minimise the danger of the spread of bushfire on or from their land to adjoining lands. This responsibility is legislated under section 63 of the *Rural Fires Act, 1997*.

The *Rural Fires Act 1997* also provides for the:

a) prevention, mitigation and suppression of bush fires in local government areas
b) coordination of bush fire fighting and bush fire prevention throughout NSW
c) protection of life, property and the environment from damage arising from bushfires
d) protection of the environment by requiring that activities have regard to the principles of ecologically sustainable development.

While preventative measures will be included to reduce the likelihood of a bushfire occurring, bushfires are a natural part of the environment and essential for some ecological communities to exist. Not to allow hazard reduction by fire at some future time may preclude continuance of some plant communities.

Ordinarily measures are included in a Bushfire Management Plan (BMP) that provide for an appropriate fire maintenance regime in favour of the flora and fauna present however to maintain any existing ecological biodiversity of the Centre and to fulfill the landowner's duty of care to stop or restrict the passage of bushfire (under the *Rural Fires Act 1997*) any mitigation measures undertaken must be a combination of control burning and hand / mechanical means in selected locations as necessary and in consideration of possible environmental constraints.

These measures when combined with managing Centre access, the supply of water and overall bushfire preparedness will present an overall BMP suitable for the safety of the Centre, its occupants and its commercial operations.

There is also a very strong need to restrict arson and other unplanned bushfire events within the Centre which may compromise the safety of the Centre. Unfortunately this matter will always remain a high risk as limited actions only can ever be implemented.

A BMP is a living document and should be reviewed regularly usually every 5 years or as soon as possible following a major bushfire incident by a person competent to do so.

A BMP should where possible, consider any external BMP prepared for the region or local area by fire authorities.

Contents

Abbreviations:

The following abbreviations may have been referred to in this document;

Title / Name	Abbreviation
Asset Protection Zone	APZ
Australian Standard AS3959	AS3959
Building Code of Australia	BCA
Bushfire Management Plan	BMP
Bushfire Prone Land Map	BPLM
Bushfire Protection Measures	BPM's
Catastrophic Fire Danger Rating	CFDR
Defense Zone	DZ
Ecological Sustainable Development	ESD
Fire Danger Index	FDI
Fire Danger Rating	FDR
Inner Protection Area	IPA
Local Environmental Plan	LEP
Metres (measurement of distance)	m
Fire & Rescue NSW	FB
NSW Rural Fire Service	RFS
NSW Sport & Recreation	S&R
Outer Protection Area	OPA
Snowy River Shire Council	Council
Planning for Bushfire Protection - 2006	PBP
Rural Fires act 1997	RF Act
State Environmental Planning Policy	SEPP
Special Fire Protection Purpose	SFPP
Static Water Supply	SWS
Strategic Fire Advantage Zone	SFAZ

Table 1 Abbreviations

1.0 Introduction

The Jindabyne Sport and Recreation Centre located in Jindabyne and is one of eleven (11) NSW Sport and Recreation Centre's located within NSW. The Centre can house up to 530 guests and staff in Lodge or Cottage style accommodation for extended periods. Guests are catered for with various indoor and outdoor sports activities over the 87.0 hectare site (approximate).

The Centre is located at 207 Barry Way in a small east facing valley all within the Snowy River Shire Councils (Councils) Local Government area. The Centre's land abuts private land holdings to the north, east and south.

Almost 60% of the site is remnant woodland or grassland and contains several vehicular and walking trails. The more level portions of the Centre consist of sporting fields, open space, service and accommodation buildings and other facilities. Grass and maintained lawns are intermixed in and around the Centre and its facilities.

The Centre is not subject to constraints which may be applied under the Bushfire Prone Lands Map as prepared by the Snowy River Shire Council.

Notwithstanding this, the whole of the Centre is subject to grassfire impact either from grassfires originating within the Centre itself or bushfires commencing outside the Centre to the north and south. Where bushfire occurs outside the Centre the potential to seriously effect the operation of the Centre is considered high due to high levels of smoke and embers that could impact the Centre prior to and following a bushfire impact.

It is not the role of this plan to manage emergencies within the Centre that is addressed separately in a document known as the 'Emergency Management Plan'.

2.0 Purpose of Plan

The purpose of this Bushfire Management Plan is to provide those vested with the responsibility for the care, control and management of the Centre with an independent bushfire assessment together with appropriate recommendations for bushfire management and safety strategies designed to reduce the possible bushfire impact to occupants, staff, existing built assets and the internal services infrastructure.

In respect to bushfire mitigation matters the Plan will address the prevention or limitation of bushfire spread from the Centre onto adjoining public or private properties so as to provide conformance with the NSW Rural Fires Act of 1997 in particular Section 63 which in part sates:

Duties of public authorities and owners and occupiers of land to prevent bush fires;
(1) It is the duty of a public authority to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of a bush fire on or from:

(a) any land vested in or under its control or management, or
(b) any highway, road, street, land or thoroughfare, the maintenance of which is charged on the authority.

(2) It is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from that land.

The Plan intends to recommend the implementation of mosaic hazard reductions by controlled burning or by mechanical methods within an ecological sustainable framework to assist with overall fuel management for the Centre.

3.0 Scope

The scope of this Plan is limited to providing a Bushfire Management Plan including recommendations for the Jindabyne Sport & Recreation Centre, Jindabyne.

Where reference has been made to the surrounding lands, this plan does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and the possible bushfire impact to the Centre from those lands.

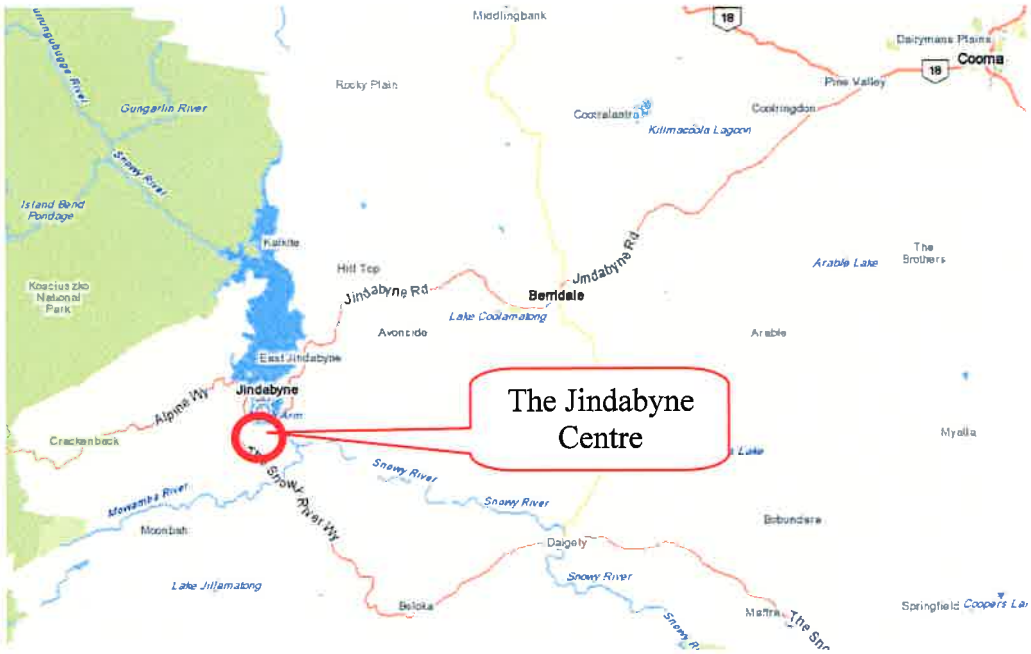
4.0 Legislative Context

Comments provided are based on the requirements of the *NSW Rural Fires Act 1997*, *Rural Fires Regulation 2008*, the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act), the principles of Ecologically Sustainable Development, the *Environment Protection and Biodiversity Conservation Act 1999,* the RFS documents known as the *Bushfire Environmental Assessment Code for NSW* and the Rural Fire Service publication, *Planning for Bushfire Protection – 2006 (as amended)* for the purposes of bushfire hazard determination. AS3959-2009 "*Construction of buildings in bushfire-prone areas*" has been referred to for building compliance as necessary.

One company representative has inspected the Centre and the surrounding area.

5.0 Location

The Centre is located off The Barry Way, Jindabyne in the Snowy River Shire Council's LGA. The Centre is bounded by private pasture lands to the north, east and south.



(Acknowledgements to Whereis.com)

Image 01 – General location of the Jindabyne Sport and Recreation Centre

(acknowledgements to Google Maps)

Image 2 – Aerial view of the local area and only access roads

(acknowledgements to LPMA SixViewer

Image 3 – Aerial view of the Centre and its allotment boundaries (dotted yellow line)

The allotment data is subject to verification by NSW Communities, Sport and Recreation.

The relevance as to land tenure is that where bushfire mitigation is recommended, such works can only occur on that property land. Where mitigation measures are desired on adjoining lands a formal instrument (agreement) must be made possibly under a Section 88b Notice of the NSW Conveyancing Act – 1919 to ensure legal access for perpetuity or for the life of the development.

6.0 Ecology

6.1 Ecological Communities

The ecology around the Centre is generally described as being transitional between *Temperate Montane Grasslands* and *Tableland Clay Grassy Woodlands.* In the main however, given the extent of grasslands in the area the predominate vegetation has been considered to be the Temperate Montane Grasslands. These grasslands have been grazed over the years and slashed in part. Small clumps of Grassy Woodland are scattered about the Centre.

The *Tableland Clay Grassy Woodlands* are characterised short growth up to 15m in less fertile clay soils found around the Monaro region. The understory is sparse with grasses and herb type vegetation taking over. The Woodland species have been degraded over many years due to farming and other development. There are few 'original' tracts left in NSW.

Generally the tress consist of *Eucalyptus pauciffloria* (white sally), *Eucalyptus stellulata* (black sally), Eucalyptus viminalis (ribbon gum) and occasionally *Eucalyptus melliodora* (yellow box). Shrubs layers consist of *Acacia dealbata* (silver wattle), Acacia melanoxylon (blackwood), and *Pimelea linifolia* (slender rice flower). Grasslands consist of dense tussock grasses with perenial herbs in the tussock spaces. (*source: Ocean to Shores to Desert Dunes, Keith, David A; ISBN 0 73136780 4)*

Image 04 – View of north from the eastern gate suggesting remnant woodland giving way to grasslands.

Image 05 – View of ridge below main water tank.
Open grasses, sparse woodland and slashed grasses remain.
This area is used for group BBQ's / cook outs.

The grounds around the Centre are well maintained and generally consist of mowed and slashed grasses. Where regular mowing occurs, many of the areas are provided with in-ground watering systems.

6.2 Significant Flora

The Centre is located on highly disturbed lands and the possibility of significant flora is limited. Where hazard reduction by controlled burning is proposed, further research should be undertaken to ensure endangered species are protected.

6.3 Significant Fauna

The Centre is not known for its importance as a corridor for migratory birds or other animals.
Where hazard reduction by controlled burning is proposed, further research should be undertaken to ensure endangered species are protected.

6.4 Riparian Zones

The Centre has one (1) mapped creek known as 'Lees Creek' passing through its grounds. Vegetation along the creek appears to be consistent with *Tableland Clay Grassy Woodlands* combined with weed and scrubby undergrowth.

Where a creek appears as a blue line on a 1:25000 scale topographical map whether named or not, it generally requires that a riparian zone must be determined being of sufficient width so as to comply with the requirements of the NSW Water Management Act 2000.

The width of the riparian zone will depend on the "order of the water course" that is to say the size of the watercourse. The Water Management Act 2000 stipulates that watercourses are to be referred to as *'first', 'second' or 'third order'* watercourses under the "Strahler system" which is explained as follows;

- Starting at the top of a catchment, any watercourse that has no other watercourses flowing into it is classed as a 1st order watercourse,
- Where two 1st order watercourses join, the watercourse becomes a 2nd order watercourse,
- If a 2nd order watercourse is joined by a 1st order watercourse - it remains a 2nd order watercourse,
- When two or more 2nd order watercourses join they form a 3rd order watercourse,
- A 3rd order watercourse does not become a 4th order watercourse until it is joined by another 3rd order watercourse and so on.

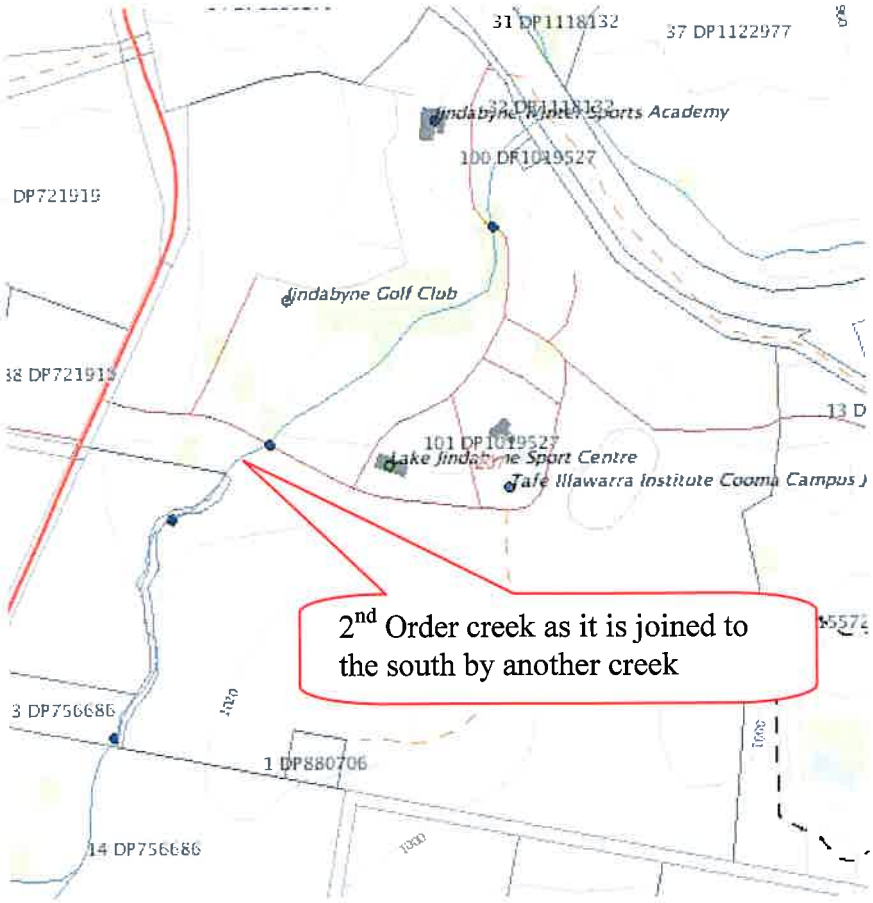


Image 06 – Extract from LPMA's "SixViewer" showing Lees Creek as a blue line.

Where creeks have been piped underground, compliance with WMA 2000 is not required.

The following extract from the *Water Management Act 2000* details typical approved Riparian Zone areas from which APZ's and SFAZ's can commence. Where this requirement is applied hazard reduction by prescribed burning or mechanical means will need careful consideration and in most cases cannot be undertaken inside riparian zones.

Figure 1. Riparian corridor zones.

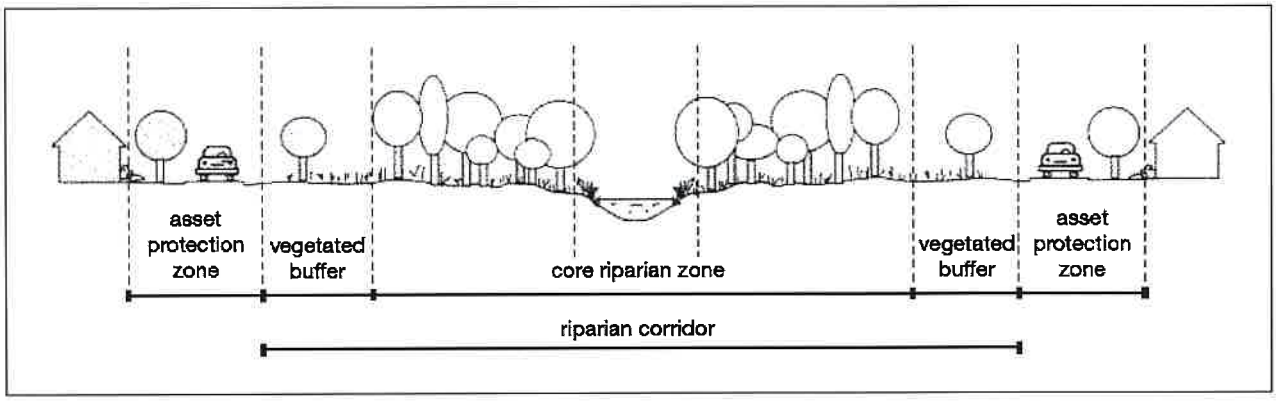


Image 07 – Extract from WMA 2000 Ripairian requirements

The Department of Water and Energy recommends that a vegetated Core Riparian Zone (CRZ) width based on a watercourse order be considered in the design of any controlled activity (see table below). However, the final CRZ will be determined after a merit assessment of the Centre and consideration of any impacts of the proposed activity is undertaken. CRZ widths should be measured from the top of the highest bank and on both sides of the water course.

Types of Watercourses	CRZ Widths
Any **first order** watercourse and where there is a defined channel where water flows intermittently	10 metres
Any permanently flowing **first order** watercourse or any **second order** watercourse and where there is a defined channel where water flows intermittently or permanently	20 metres
Any **third order or greater** watercourse and where there is a defined channel where water flows intermittently or permanently. Includes estuaries, wetlands, and any parts of rivers influenced by tidal waters.	20-40 metres

Table 6.4.1 – Types of water courses

In this instance and to further accord with the *Bushfire Environmental Assessment Code for NSW* the following CRZ, and Vegetated Buffers must remain intact along the length of the creeks where possible. All APZ's must commence after the total width of the riparian corridor has been determined.

Lees Creek is intermittent in flow therefore despite a second creek flowing into it from the south it remains equivalent to a first order creek.

Watercourse Order number	Required CRZ (m)	Required Buffer (m)	Total Riparian Zone Required (m)
One	10	5	15
Two	20	5	25
Third	20-40	5	25 - 45

Table 6.4.2 – Required riparian corridor for Lees Creek is 15m

A minimum of 15.0 m should be maintained on either side of the "top of bank" to ensure soil stability and environmental principals are complied with. Dedicated riparian zones are exempt from programmed bushfire hazard reduction or ecological burns or mechanical clearing.

In summary, an APZ cannot commence until after the CRZ and the Vegetation Buffer have been identified and established.

In the case of the Jindabyne Centre, it is unlikely that prescribed hazard reductions by fire or hazard reductions by mechanical means would be undertaken along Lees Creek. However discussions with relevant authorities may lessen the riparian zone width and allow such works to be undertaken.

6.5 Ecological Burns

A fire regime is essentially the combination of fire frequency (usually measured by the number of years between fires – both wild and prescribed), fire intensity, and the season of fire occurrence.

To identify the fire regime of an area requires assessment of the fire attributes over a long period of time (normally decades but in some cases centuries). In many areas an 'adaptive management' approach is used by land managers such that the fire regimes applied are determined from a combination of the best fire history and fire ecology information available.

An inappropriate fire regime is considered to be one where (usually through the decisions or actions of humans) one or more of the fire attributes is occurring outside its historic range of variation for the area. Where such a change is allowed to continue, changes to the environment are likely to result. Examples of this include areas where prescribed fire is applied too frequently, areas where fire occurrence is reduced (through wildfire suppression and cessation of prescribed burning) such that fires are less frequent but however are more intense, or areas where the season of burning is changed.

In summary controlled hazard reduction burning is possible on a mosaic approach with proper planning.

7.0 Climate

The specific climatic conditions for the Centre are not available. Data from NSW Bureau of Meteorology (BoM) via Cooma Airport weather station has been used to provide indicative climatic indications. It is considered that other than wind direction the following climatic data can be considered reasonably accurate for the region and provides a reasonable indication of general climatic conditions which could be expected for the Centre for varying months of the year including the bushfire season being nominally the 1st October to 31st March each year.

This information may assist in the preparation of bushfire hazard reduction burn plans and times. Note that "*Daylight Saving*" has not been included in ant graphical representation.

Key: Units are degrees Celsius. *12.3* = Not quality controlled.

Highlight data in table: Highest | Period for calculating statistics: All years | 1961-1990

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Graph													
1991												21.5	
1992	21.9	21.4	22.7	17.3	13.7	10.3	10.7	10.6	12.1	16.6	16.7	20.8	16.2
1993	26.6	24.0	20.2	19.2	15.3	10.7	11.7	13.8	14.5	17.2	20.8	23.4	18.1
1994	26.0	25.6	20.0	18.1	13.3	10.4	11.5	11.9	15.0	19.0	22.7	28.6	18.5
1995	24.3	24.0	20.3	16.9	13.3	9.9	9.3	15.4	14.7	16.9	19.8	21.8	17.2
1996	24.0	22.6	21.7	16.0	14.1	11.3	9.9	10.8	14.1	18.7	18.1	23.1	17.0
1997	24.8	28.4	21.5	20.2	14.7	10.8	8.9	12.0	13.2	18.9	24.3	26.3	18.7
1998	28.5	28.9	25.8	20.1	14.7	10.7	8.7	11.8	15.7	16.4	18.1	25.1	18.7
1999	26.8	24.8	22.1	16.8	16.1	11.2	10.8	12.8	16.4	18.0	19.4	22.8	18.2
2000	22.3	28.6	22.7	17.7	14.0	10.4	10.1	11.5	16.3	17.8	20.6	25.5	18.1
2001	29.1	27.0	21.8	19.4	13.0	13.2	10.0	11.5	16.6	16.8	20.0	23.4	18.5
2002	25.0	21.3	23.0	19.2	13.7	11.8	11.9	12.6	16.1	19.0	25.0	25.8	18.7
2003	29.1	26.5	21.9	16.7	13.8	11.3	10.3	11.1	14.3	15.6	21.6	24.9	18.1
2004	26.5	27.3	25.2	19.4	14.0	11.8	9.7	11.9	14.9	17.8	20.7	22.5	18.5
2005	25.9	23.1	20.8	21.5	15.6	12.2	11.0	12.7	14.2	18.5	20.5	25.6	18.5
2006	28.7	28.0	25.5	16.9	13.0	9.6	9.8	12.6	16.2	20.8	22.5	25.1	19.1
2007	28.1	25.4	21.6	18.5	15.6	8.3	9.0	12.7	14.7	19.8	21.9	22.8	18.2
2008	27.3	21.9	23.7	16.5	14.5	11.7	9.5	10.1	15.8	20.8	21.4	22.2	17.9
2009	29.3	25.6	24.2	16.7	13.4	10.5	10.3	13.1	15.8	16.0	26.6	26.3	19.0
2010	28.9	23.4	21.8	19.0	13.9	10.1	10.1	10.2	14.9	17.9	20.5	22.2	17.7
2011	26.9												

(Acknowledgements to Australian Bureau of Meteorology)

Image 08 – Mean Maximum Temperatures at Cooma Airport

Average maximum temperature ranges during the months of November through to March may preclude controlled hazard reduction operations during this period unless rainfall has preceded a proposed burn day.

Key: Units are millimetres. 12.3 = Not quality controlled.

Highlight data in table: No highlight | Period for calculating statistics: All years | 1961-1990

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Graph													
2004	63.0	31.0	4.0	12.0	23.0	29.0	11.0	26.0	27.6	46.6	66.0	99.0	438.2
2005	26.0	74.0	20.6	26.0	7.0	65.0	35.6	35.0	62.0	97.6	71.6	16.6	537.0
2006	127.6	13.0	4.0	14.0	16.0	43.0	55.6	23.6	46.6	7.6	27.0	38.0	416.0
2007	11.6	116.0	19.2	27.8	29.6	100.0	35.0	18.6		37.4	122.8	84.8	
2008	42.8	85.2	36.4	5.9	7.4	21.8	28.4	20.6	47.6	11.8	90.4	42.0	440.3
2009	21.7	22.2	12.6	57.6	6.0		35.8	61.0	46.5	85.6	18.2	45.0	
2010	24.4	159.0	68.2	4.4	67.9	21.4	22.6	*58.0*	*26.6*	*83.2*	*100.0*	100.6	*738.3*
2011	*41.0*	*114.2*											

top

Summary statistics for all years

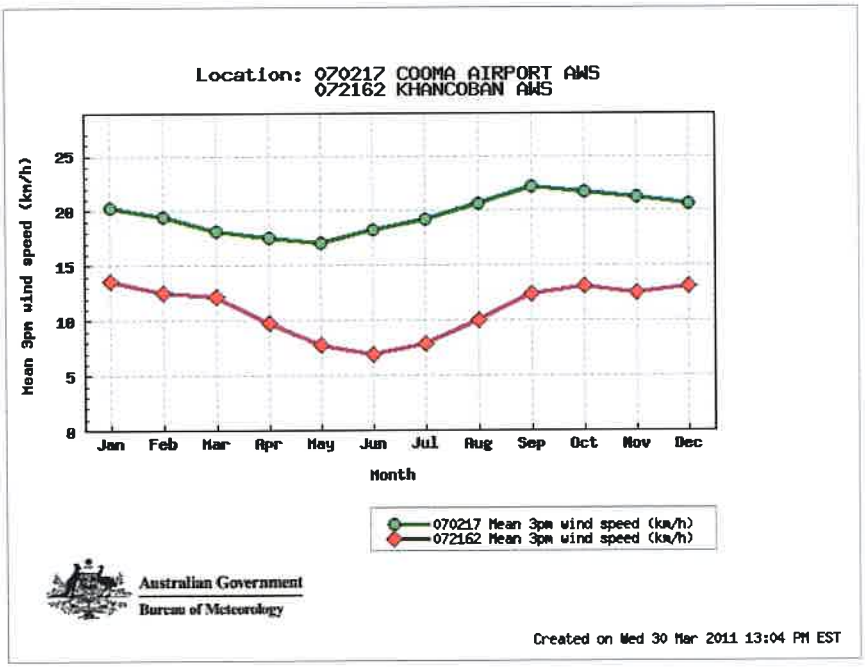
Information about climate statistics

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Lowest	11.6	13.0	4.0	4.4	6.0	21.4	11.0	18.6	27.6	7.6	18.2	16.6	416.0
Highest	127.6	159.0	68.2	57.6	67.9	100.0	55.6	61.0	62.0	97.6	122.8	100.6	738.3

(Acknowledgements to Australian Bureau of Meteorology)

Image 09 – Mean Rainfall at Cooma Airport

The table above suggests that the highest mean rain fall occurs in the months from November to March. Controlled hazard reductions undertaken outside these months will be preferable.



(Acknowledgements to Australian Bureau of Meteorology)

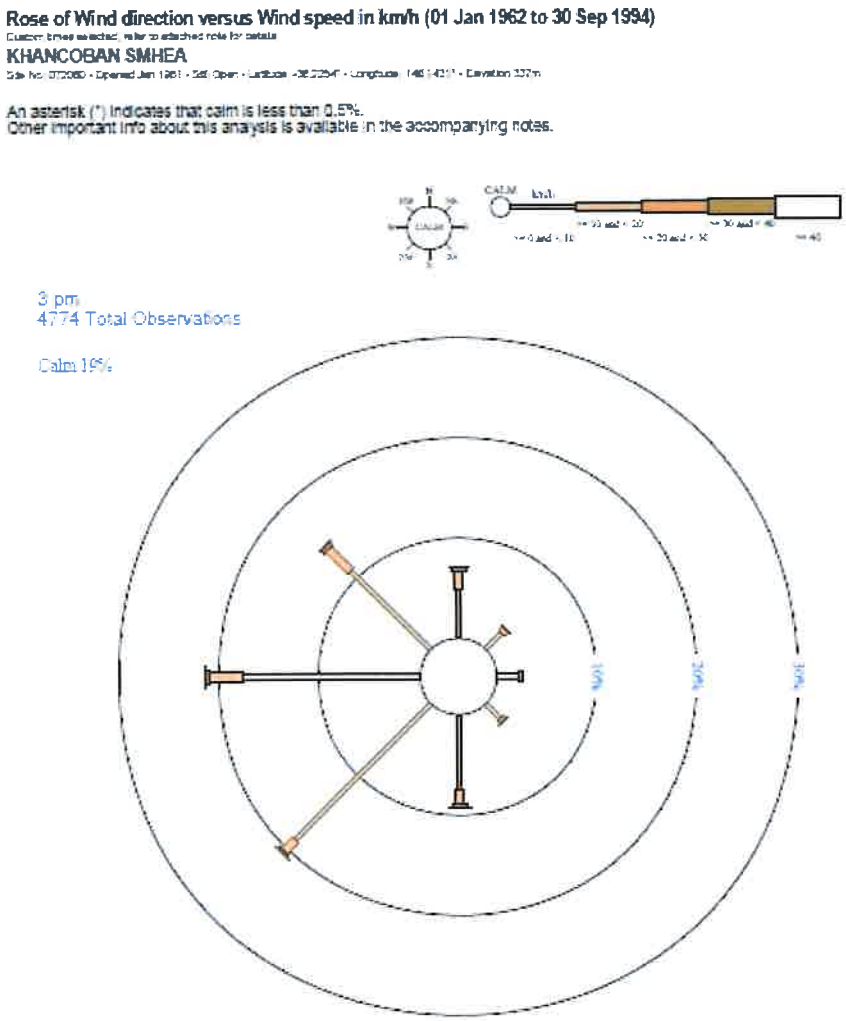
Image 10 – Mean 3.00pm Wind Speeds for Cooma Airport & Khancoban

Winds typically increase in mid to late afternoon and can be influenced by warmer temperatures therefore 3.00 pm has been taken as the preferred time period.

A significant difference is noted in the wind speeds, this is due in part to open plains around Cooma Airport as compared to the wind deflecting hills and mountains at Khancoban. The Jindabyne Centre's average winds would be expected to lie closer to the those of Khancoban's averages graphed above and would have a marked influence on allowing bushfire hazard reduction to take place.

The climate overall is considered relatively warm and dry with predominantly summer rainfall.

The following image indicates mean Wind Rose data for Khancoban taken at 3:00 pm. The rose suggests strong winds >30 km/h and gusting to >40 km/h emanating from the west / southwest are common for >20% of the year. This data suggests that the winds impacting from the north, east and south will be preferable as far as hazard reduction burning is concerned as smoke generated is not likely to impact onto the Centre's facilities or drift into Jindabyne township. The actual wind speed on the day may preclude burning. This would be determined by the RFS on the day.



(Acknowledgements to Bureau of Meteorology)

Image 11 – Mean 3:00pm Wind direction vs Wind speed for Khancoban

Where bushfire mitigation is proposed by carrying out prescribed burning, the NSW Rural Fire Service should be asked to undertake such work for the Centre. It is likely that such burning will be mosaic that is, carried out in relatively small pockets of land would be burnt off at various times throughout a year or over several years. These types of burning operations would also consider the Centre and its occupants in that if planned correctly these actions may not have serious effect of the Centre's overall operations.

It could be that private lands surrounding the Centre may be hazard reduced in part as well adding to the overall significance of the burn in better protecting the Centre and the southern aspect of Jindabyne.

8.0 Ignition sources

Bushfires can be ignited by many causes including accidental escapes from adjoining properties, camp fires, arson or lightning strikes. Bushfires are capable of propagating from or spotting into the Centre and causing localised ignitions. The Centre management cannot control the bushfire mitigation measures undertaken on any adjoining lands and therefore must ensure that reasonable measures are instigated and maintained within its own leased lands in order to reduce possible bushfire impact to the Centre's occupants and facilities.

Local ignition sources including camp fires, open flame cutting or welding, electric welding, machinery / friction failure can also cause ignitions particularly where bush and grassland are close to these work sites or recreation areas.

8.0.1 History of bush fire frequency and ignition cause

The Beridale Office of the NSW Rural Fire Services has advised that a number of small bushfires have occurred in the vicinity of the Jindabyne Centre over the years. Fortunately to date these have had little impact on the Park or its assets. Formal records are not available.

In the case of the Jindabyne Centre, the most probable ignition sources will be from the camp fires located in the bushland above the Centre or from slashing equipment whilst maintaining the large grassland areas.

Grassfire progression would be expected to be rapid on Very High and above fire danger rated days where the fire originates in the grasslands to the south, east and north of the Centre. Dependent upon wind direction, grassfire would be expected to impact the Staff Residences to the east and possibly the accommodation cabins to the north. The accommodation lodges to the south are downslope and unlikely to be impacted directly from grassfire however ember attack and smoke impact are to be expected. Smoke entry into buildings may activate local internal smoke detectors generating building fire alarm conditions.

General smoke and ember impact is also considered to be a very high risk should a grassfire occur and would generate concern to all clients and staff alike. A bushfire's direction will be governed by the direction of the prevailing wind and the influences of the open hillside slopes bounding Jindabyne.

The location of the Centre suggests that in summer months westerly winds will be the most likely The 3:00 pm wind data on page 14 refers. These 'prevailing' winds of course will be further influenced by the slopes in the region of the Centre and the 'typical' direction may be altered. These 'typical' wind shifts need to be acknowledged by staff in order to plan a safe relocation or evacuation of all occupants and for possible 'first aid' fire-fighting should an incident develop. The Barry Way could be impacted by smoke and should not be used for escape unless formal advice is received from the NSW Police or the Rural Fire Service that it is clear and safe to travel on.

Spotting from small bush and grass fires can be expected where strong winds are present. Therefore staff should immediately take action to relocate / evacuate all occupants from surrounding access trails and walking paths to safe refuge buildings within the Centre as soon as possible.

Camp fires, open fires or open flame maintenance must be very well controlled and indeed banned on days of declared "Severe, Catastrophic" and "Total Fire Bans".

9.0 Assessment of Centre

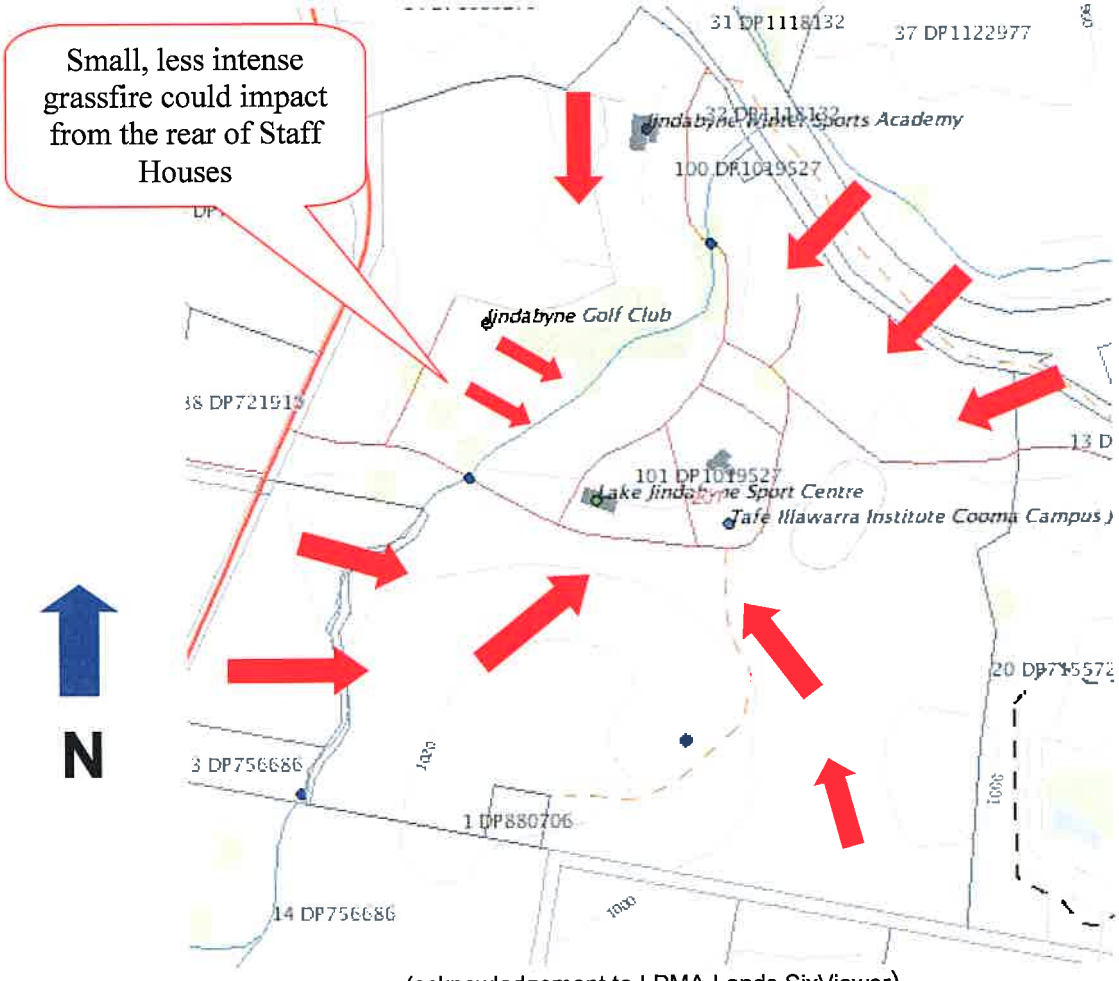
9.1 Soils

The soils within the Centre are transitional and are predominately fertile clay loamy soils down to and along Lees Creek and down to the bounding unsealed road. On steeper rocky grounds whilst still fertile clays they are less predominate giving way to textured rocky outcrops and gravels. This is then consistent with the Woodland vegetation.

The effect of fire on soils can include altering nutrient availability, damaging soil fauna and micro organisms, reducing soil moisture levels and may induce water repellent properties in some soil types. The loss of organic matter can reduce soil structure and increase the risk of erosion or the retardation of vegetation growth. Careful planning of small mosaic burn patterns within defined APZ areas will assist in retaining soil stability.

9.2 Slope & Topography

The topography of the Centre is undulating rising above the unsealed road to the east and extending to Barry Way. Land contours extend from an elevation of approximately 940m to 1020m on the southern hill above the Lodges.



(acknowledgement to LPMA Lands SixViewer)

Image 12 – Topographical data for the Centre & possible bushfire direction paths

The Centre's facilities are generally located on along Lees Creek and the gentle hillsides forming the valley ending down at the sealed Kosciuszko Road. These gently slopes will have influence on bush / grass fire behavior and will accelerate the progression fires burning below these facilities.

Rapid progression of bushfire is also expected along Lees Creek to the northeast of the Centre due to woodland growth along the creek. Where traditional wind directions remain the bushfire is likely to move away from the Centre in a south easterly direction. Bushfires within Lees Creek below the staff cottages is not expected to be on an intensity to cause major damage to the Centre's buildings and is therefore considered to be of a lessor consideration.

9.3 Available Fuels

The available fuels are consistent with being transitional between *Temperate Montane Grasslands* and *Tableland Clay Grassy Woodlands* discussed previously in Section 6.1.

Image 13 – View from eastern boundary, north toward Barry Way. Grassland gives way to open woodland.

Image 14 – View north from above southern lodges noting extensive grassland and large LPG storage cylinder at top left.

9.4 Centre Access and Fire Trails

The Centre is accessed from the Barry Way being the only sealed access road passing by the Centre. Barry Way is a two lane, sealed all weather road capable of accommodating heavy vehicles. Local access within the Centre is via well maintained and sealed access roads and trails.

All roads are capable of accepting Category 1 fire fighting vehicles however caution should always be employed where vehicles attempt to go off sealed roads.

Image 15 – View of main entry point into the Centre off Barry Way.

Where a trail is going to be used as a fire access trail or a fire control line or fire break, work should be undertaken to ensure clear access is provided to accord with PBP-2006. That is, a 4.0m wide access trail with a 4.0m vertical clearance for overhanging tree clearance must be complied with.

All trails should be numbered or identified with signage provided at the commencement of each trail likely to be used by a fire fighting vehicle. Signage can consist of posts with numbers or letters affixed at an appropriate height.

The trail leading up to the camp fire location and the main water tank can be used as fire break trails as well as access trails.

The following aerial image depicts possible fire trails and there locations. These trails can be used as firefighting access trails and were necessary fire brake boundaries.

The concept being that the available grassland can be sectored in order to reduce possible impact size and to simplify possible grassland management areas.

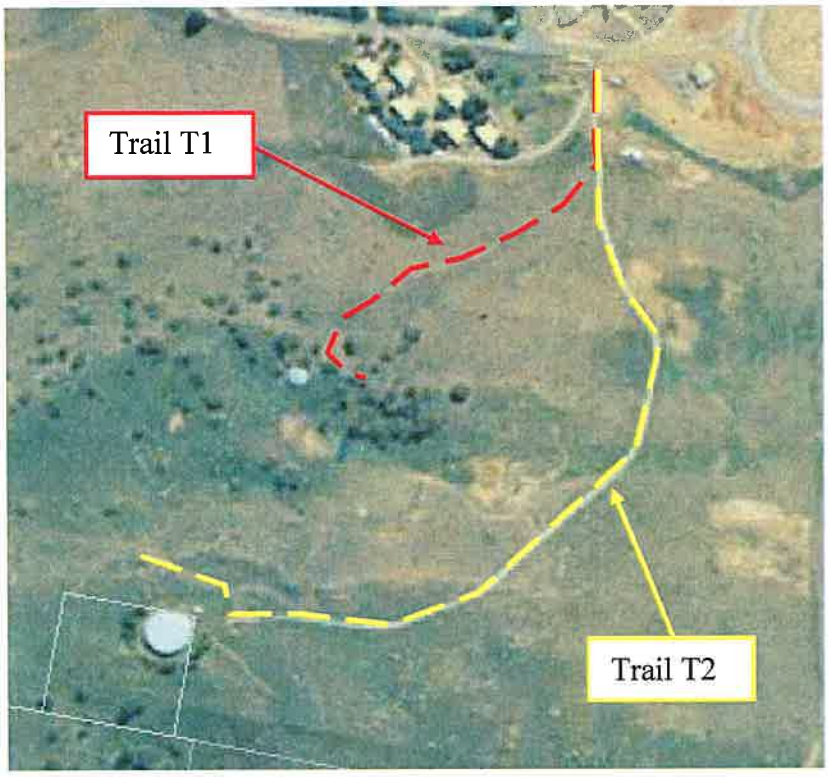


Image 16 – Approximate locations of possible fire trails and their identification codes

9.5 Services and Water Supplies

a) Electrical Supply

The Centre is serviced by an aerial 11.0kV electrical supply emanating from the unnamed unformed road to the north of the Centre. An internal pole mounted step down transformer serves the Centre's reticulated power needs.

Image 17 – View of external aerial power supply pole. Centre's power pole is to RHS of image.

A small proportion of the aerial electrical services are subject to bushfire impact, in particular flame contact along the unnamed and unformed road to the north of the Centre which could result in a loss of supply to the Centre. The electrical easement is outside the Centre's northern boundary and should be managed by the electrical supply authority.

A second supply appears to entry the Centre for the purposes of providing power to the main water tank pumps and control system.

Image 18 – View of external aerial power supply pole for main water tank

The secondary poles travel over grassland and are not likely to suffer extensive damage fro grassfires.

b) Communications

Communications for the Centre consists of underground telephone cables emanating from the local Telstra Network serving Jindabyne. Mobile telephones are also in use however these may be susceptible to loss of signal due to high concentrations of smoke. Two way VHF radios are also used. Current communications with staff is considered to be satisfactory. General two way communication to the whole of the Centre is not provided.

The general broadcasting of an emergency alert is not possible and consideration should be given to the provision of an emergency warning hooter (or similar) system to enable all clients and staff to be made aware of an emergency at all times.

c) Water Supplies

The Centre is supplied from two large water tanks located on the hill south of the Centre. We are advised that a new 100mm water main is going to be installed shortly.

The overall water pressure has not been formally tested however given service contracts are in place for the fire hydrants and hose reels which need to be signed off on annually by the serving contractor, it is presumed acceptable and sufficient for first aid firefighting and the replenishment of fire vehicles.

d) Gas Storage

One above ground bulk LPG storage tank is located within a fenced compound near the staff vehicle parking area. The Centre uses 9.0kg LPG gas bottles for its needs, these bottles are refilled from the large on-site bulk cylinder. Leaf litter within the compound must be removed regularly. Ladders and other equipment should not be stored in the compound as these will restrict fire service access to isolation valves.

Image 19 View of eastern end of 'cigar' type LPG storage installation located above the southern Lodges.

Warning: It is noted that the above installation should it develop a gas leak the gas being heavier than air will drop down and circulate around the Lodges and drift further down to the facilities located below at the northern end of the Centre. The risk of explosion is considered high.

Image 20 View of the Kitchen 'cigar' type LPG storage installation

Warning: It is noted that the above installation should it develop a gas leak the gas being heavier than air will drop down and circulate around the Amenities, Office buildings and drift further down to the facilities located below at the northern end of the Centre. The risk of explosion is considered moderate as the gas tank is a reasonable distance from a building and that the gas cloud will tend to disperse in air.

Image 21 – View of lower 'cigar' type LPG cylinder.

Should a gas leak occur the gas cloud from this cylinder would tend to drift down into Lees Creek and disperse in air. There are no buildings lower than this cylinder therefore ignition sources are few.

e) Fuel / Diesel Storage

Bulk ULP (Petrol) and diesel fuel is dispensed within the Workshops compound however it is to be removed in the future. The general areas continue to be well maintained.

Image 22 - View of existing original petrol pump.

f) Fire Fighting Resources

The fire-fighting resources observed for the Centre consist of pillar type fire hydrants, fire hose reels, portable fire extinguishers, portable water tanks and a small firefighting pump.

It is presumed that all are in good condition as no formal inspection was made at the time.

Images 23, 24 and 25 – Views of fire hose reel & fire hydrant, small portable fire pump and petrol bowser portable fire extinguishers.

g) Centre Access

General access within the Centre's grounds is acceptable. The access / fire trails are in a reasonable state of repair and would accommodate a heavy fire appliance. Maintenance of fire trails to PBP-2006 having regard to curve radius, width and vertical clearances should be on-going.

All roads and trails can accommodate Category 1 heavy fire tankers of the Rural Fire Service.

Image 26 – View of sealed, gravel and slashed access roads and trails

Fire Service locations:

The NSW Fire Brigades have fire 24 hour staffed Station located at:

Jindabyne, Perisher Valley, Thredbo and Cooma.

The NSW Rural Fire Service has volunteer Stations located at:

Jindabyne and Ingebyra.

Fire response from volunteer stations will vary with crew availability and with any current incidents being dealt with at the time. It should be assumed that immediate response may not occur possibly due to other incidents and distance from the Centre therefore the pre-planning of initial incident response scenarios should be established and undertaken by Centre Staff.

All calls must go through the "000" emergency phone system.

9.6 Declared Bushfire Prone Lands

The Snowy River Shire Council has provided an extract from its bushfire prone land map. The Centre is highlighted by a green circle on the Map.

As can be clearly seen the Centre does not lie within a declared bushfire danger area and no formal bushfire restrictions apply to new buildings under PBP – 2006.

All facilities will however remain susceptible to smoke and ember attack from bushfires.

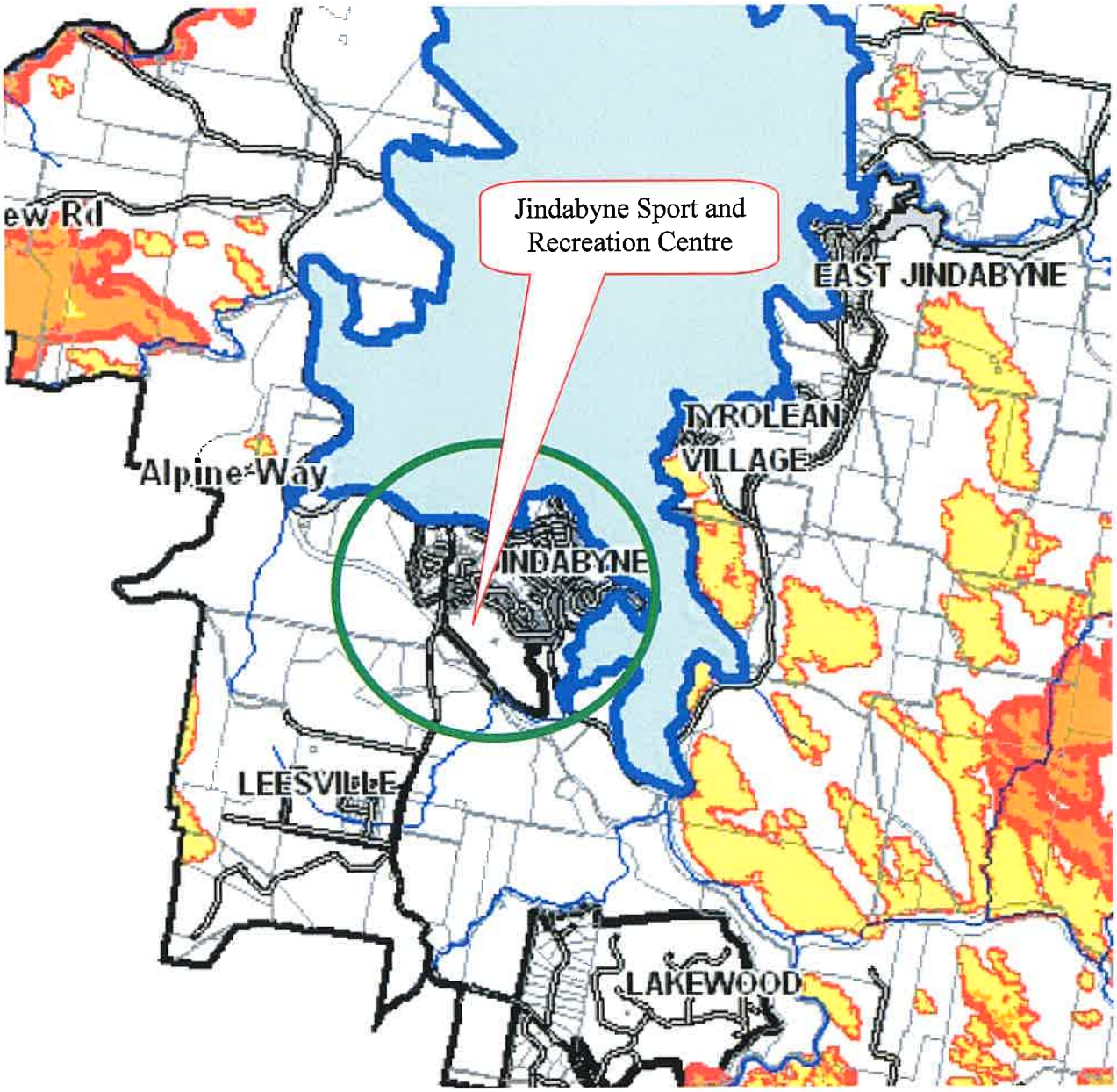


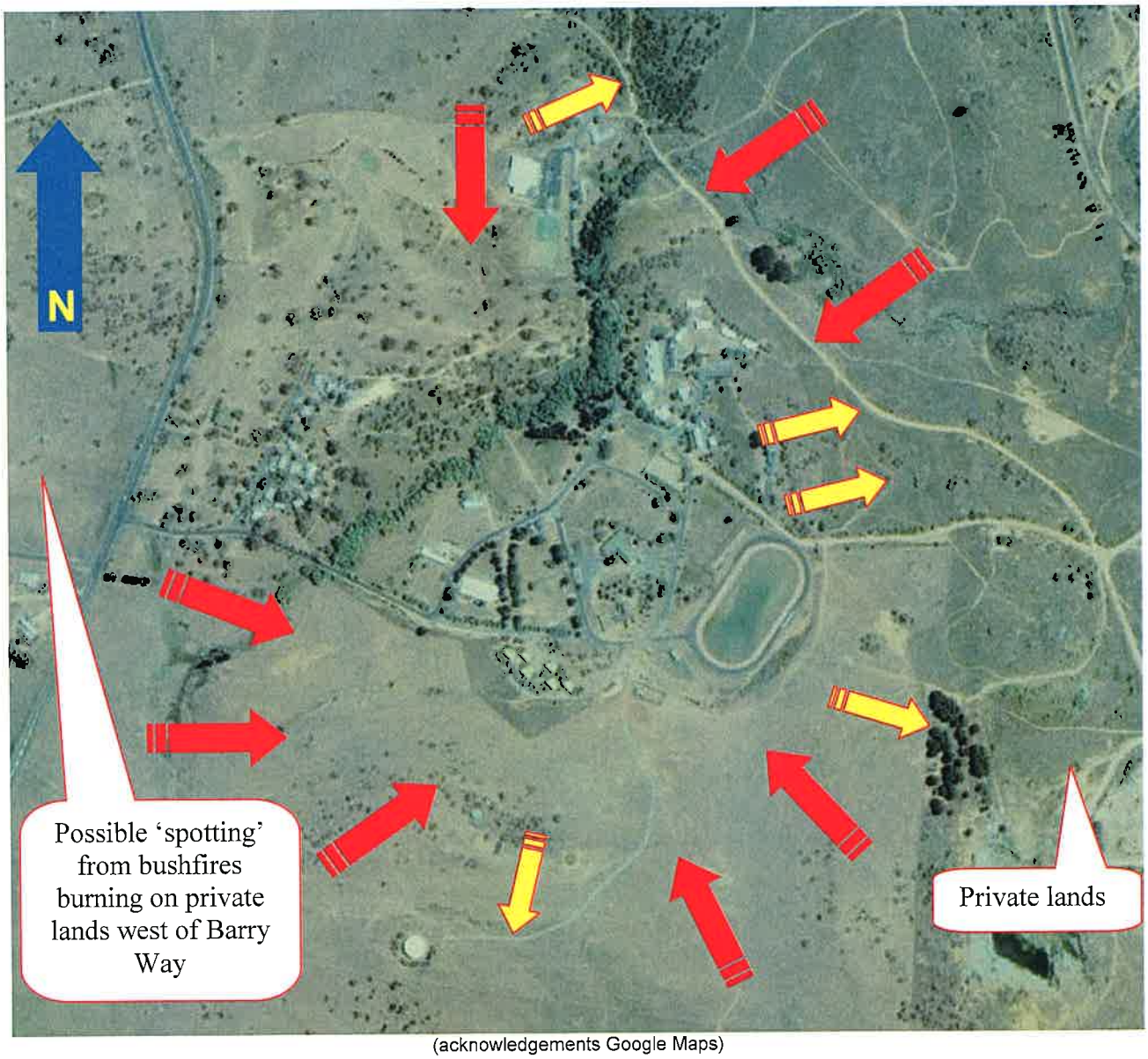
Image 27 - Extract from Snowy River Councils Mapping System

Generally speaking the Centre is not subject to bushfire impact. However grassfire can still occur and may impact from the south and north with possible impact by spotting from the north east.

9.7 Bushfire Risk

In assessing the bushfire threat to the Centre and its facilities it is important to have a holistic approach and assess the risk of a grassfire occurring and impacting the Centre primarily from the south, north and east. Spotting could occur from any direction including the west. It is also important to consider the risk the Centre's vegetation poses to neighbouring properties in this case the adjoining private properties to the south, north and east.

The appropriate bushfire mitigation measures required for implementation by the Centre's management in order for it to uphold its duty of care to its neighbours (*Sect 63, Rural Fires Act*) has been carried out by the provision and maintenance of trails and the regular slashing of grasslands.



(acknowledgements Google Maps)

Image 24 – The Centre's possible grassfire impact risk shown with red arrows toward the Centre and yellow arrows away from the Centre where bushfire initiates inside the grounds and threatens to travel onto adjoining properties

Possible Grassfire Impact

Grassfires originating from the south could produce sufficient embers and smoke to disrupt the activities of the Centre. Severe ember attack may generate spot fires within the Centre itself. Generally unless major reforestation occurs or continued grassland management is stopped the impact risk is considered to be low.

Bushfires originating from the north via the wooded Lees Creek area could generate direct flame impact and certainly heavy smoke and ember impacts to all the Centre's buildings under the right wind patterns. The location of roads and other natural fire breaks are likely to reduce impact levels. Of high risk will be the aerial electrical wires and poles and some disruption to the Centre's power supply may occur.

To a lesser extent grassfire impact or spotting from the east is possible through the private grazing lands alongside the Jindabyne garbage tip site. Grassfire progression through and into the Centre's grounds would be expected due to the upslopes of the surrounding hills enhancing growth and movement.

Whilst relatively remote, grassfire impact from the south can impact the lodges and LPG cylinder to the south of the facilities. A grassfire could develop from the camp fire area of from private property further south and travel around the hill side to impact the lodges.

In all cases smoke and ember impact will occur before, during and following any direct impact on the Centre's facilities. This will necessitate the rapid closure of the Centre and fire service intervention. Conducting emergency relocations or evacuations under these particular conditions could be hazardous due to smoke impact on Barry Way and the possible emergency traffic trying to enter the Centre's grounds.

The following "Likelihood and Consequence" matrix tables are for three (3) impact scenarios and indicate risk levels only, they are not designed to suggest mitigation measures.

Risk to Centre

1) Northern Aspect:

It is assumed that the **likelihood** of a bushfire developing outside the Centre and travelling south toward the Centre along Lees Creek is Possible. The **consequences** of a major impact to the Centre and its facilities is therefore considered to be Moderate. Smoke and ember impact will occur which will mean that staff and clients need to undertake emergency safety measures as early as possible.

		CONSEQUENCE			
		Minor	Moderate	Major	Catastrophic
LIKELIHOOD	Almost Certain	Moderate	High	Very High	Very High
	Likely	Low	Moderate	High	Very High
	Possible	Insignificant	Low	Moderate	High
	Unlikely	Insignificant	Insignificant	Low	Moderate

Table 9.7a - Risk Ranking Matrix for the Northern aspect of the Centre

The risk ranking score generated is based on the bushfire likelihood descriptions table shown in Table 9.7.2 following. Whilst the ranking system provides a more theoretically determination for the Centre, Fire Agencies may decide otherwise particularly where a "Catastrophic" bushfire day has been declared for the region. This matter is discussed later in this document.

Likelihood Rating	Description & Probable occurrence
Almost certain	Expected to occur, many recorded incidents, strong anecdotal evidence, high opportunity, reason or means to occur, may occur or exceed once in every **5 years.**
Likely	Will probably occur, consistent record of incidents and good anecdotal evidence, considerable opportunity, reason or means to occur, may occur or be exceeded once in every **10 years.**
Possible	Might occur, a few recorded incidents in each locality and some anecdotal evidence, some opportunity, reason or means to occur, may occur or be exceeded once in every **20 years.**
Unlikely	Is not expected to occur, isolated recorded incidents in this country, anecdotal evidence in other communities, little opportunity, reason or means to occur, may occur or be exceeded once in every **30 or more years.**

Table 9.7.2 Likelihood of bushfire occurrence

2) Eastern Aspect:

It is assumed that the **likelihood** of a grassfire developing on the eastern side of the Centre and travelling west toward the Centre is Possible. The risk of major **consequences** from grassfire impact onto the Centre and its facilities is considered to be Moderate. Smoke and ember impact will occur which will mean that staff and clients need to undertake emergency safety measures as early as possible.

		CONSEQUENCE			
		Minor	Moderate	Major	Catastrophic
LIKELIHOOD	Almost Certain	Moderate	High	Very High	Very High
	Likely	Low	Moderate	High	Very High
	Possible	Insignificant	Low	Moderate	High
	Unlikely	Insignificant	Insignificant	Low	Moderate

Table 9.7b: Risk Ranking Matrix for the Eastern aspect of the Centre

The risk ranking score generated is based on the bushfire likelihood descriptions table shown in Table 9.7.2. Whilst the ranking system provides a more theoretically determination for the Centre, Fire Agencies may decide otherwise particularly where a "Catastrophic" bushfire day has been declared for the region. This matter is discussed later in this document.

3) Southern Aspect:

It is assumed that the **likelihood** of a bushfire developing on the grassland land to the south side of the Centre and travelling north toward the Centre is Likely. This is based on the possibility that road side ignitions may occur along Barry Way, fire escape from a camp fire is possible and impact from grassfires burning in private lands to the south and south east is also possible.

Prevailing wind data suggests that at 3:00pm (the warmest part of the day) southwest winds will dominate and could reach greater than 30km/h. These winds will enhance and develop any ignition and direct smoke and embers toward the Centre's buildings.

The **consequence** associated with a Major impact to the Centre's and its facilities is considered to be High. Smoke and ember impact will occur which will mean that staff and clients need to undertake emergency safety measures as early as possible.

LIKELIHOOD	CONSEQUENCE			
	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	High	Very High	Very High
Likely	Low	Moderate	High	Very High
Possible	Insignificant	Low	Moderate	High
Unlikely	Insignificant	Insignificant	Low	Moderate

Table 9.7c: Risk Ranking Matrix for the Western aspect of the Centre

The risk ranking score generated is based on the bushfire likelihood descriptions table shown in Table 9.7.2. Whilst the ranking system provides a more theoretically determination for the Centre, Fire Agencies may decide otherwise particularly where a "Catastrophic" bushfire day has been declared for the region. This matter is discussed later in this document.

The risk levels from grass and bushfire commencing within the Centre along it boundaries is considered to be unlikely given the lack of substantial ground fuels and full forested areas.

Having considered the possible risks from bushfire commencing within the general area of the Centre, the consequences from grass and bushfire impact to the staff, clients, equipment, facilities and buildings the ***overall risk*** is considered to be **Moderate** and as such the continued operation of the Centre may require suspension for a period whilst a grass or bushfire is brought under control, assessments are made and any necessary facility repairs are carried out.

Risk to adjoining Properties:

The risk the Centre poses to adjoining lands to the north, east and south is considered Low given staff managed activities involving camp fires are very strict and little if any activities are conducted near any Centre boundaries. Grassfires attributed to slashing work remains a possibility but unlikely.

Typical prevailing summer winds are from the west and south west which may tend to drive a grassfire toward the Jindabyne garbage site or new development to the north east of the Centre.

Overall given the location of the Centre in high country and the relatively lower temperatures prevailing during summer the risk to adjoining property owners is low. Notwithstanding this, the Centre management should undertake the regular slashing or mowing of it Centre boundaries in order to restrict grassfire movement either into or from the Centre into private lands.

9.8 Catastrophic bushfire risk

The Federal Government in conjunction with all State Governments has recently determined that a new bushfire warning system must be adopted in all States. This action follows the disastrous bushfires which occurred in Victoria in January 2009. In NSW, the State Government via the NSW Rural Fire Service and the NSW Fire Brigades have now adopted an early warning system for persons residing in bushfire prone areas. The warning system is based on the principal of "Prepare, Act and Survive". Within this structure is the need to "Leave Early or Stay and Defend".

In order to determine if and when a person/s should leave an area two new criteria have been added to the Bushfire Danger Rating system, "Catastrophic" and "Extreme". When advised of a Catastrophic day by commercial radio or the telephone system this does not mean that a large bushfire is actually burning toward your location, rather it means that should an outbreak occur, the likely results would be a possible loss of life and property therefore early evacuation is required.

The term Severe remains but is downgraded slightly.

The terms related to notifying fire danger are derived from an assessment of the potential fire behavior, the difficulty of suppressing a fire and the potential impact on the community. This result of this assessment process is the "Fire Danger Rating" and is expressed in numerical figures and terms.

LOW /MODERATE	HIGH	VERY HIGH	SEVERE	EXTREME	CATASTROPHIC
0-11	12-24	25-49	50-74	75-99	100 and above

Table 9.8

It is important to remember that the safety levels are broad brush and mainly designed for semi rural and rural areas or urban development abutting bushland. A determination of the hazard within a particular area should always be carried out in the first instance.

It is imperative the staff maintain a commercial radio listening watch during warmer days to see if days are going to be declared 'Extreme' or 'Catastrophic' so that necessary actions can be undertaken.

NSW Sport Recreation Centres 2012 FCC Data

Monaro Team	Berridale	Fire Control Officer	Monaro Rural Fire Team Geebung Street Cooma NSW 2630 Ph 6455 0455

9.8.1 Stay or Go Policy

The final determination to **stay or go** on a declared **Catastrophic** bushfire day must be made by local Centre Management based on several very important criteria which is not necessarily considered in current Government advice. Grass or bushfires may not be burning locally but environmental conditions will dramatically enhance the growth of a grass or bushfire should it occur.

Possible management considerations where a grass or bushfire is burning;

a) The limited public access roads (Barry Way) for arranging the timely and safe evacuation or relocation of all Centre occupants.

b) The time needed to arrange and carry out the urgent relocation or evacuation of Centre occupants. Buses may be required at short notice therefore timing becomes a critical factor.

c) Rapid climatic changes may occur subjecting the Centre to direct grass or bushfire impact from surrounding vegetation. This will generate unsafe driving conditions for all vehicles particularly along local public roads. Therefore emergency evacuation may not be achievable utilising the limited public road system due to visibility and ember attack issues.

d) Consideration must also be given to Emergency Services attempting to use Barry Way and the Centre's internal road network as some traffic congestion may also occur due to passing vehicles or pedestrian traffic or operational requirements (fire fighting) along any part of Barry Way or the Centre's own internal road system.

e) Where timing precludes safe evacuation, staff and clients may seek refuge in buildings rather than to GO early. At least one Centre building should be upgraded to be used as a *Safe Refuge Building*. It is likely that the new Recreation Hall and / or Dining Room could accommodate all the Centre's occupants and would make a satisfactory staging areas for further relocation or evacuation to safer locations when conditions permit.

f) The ability of the Centre to be self-sufficient in terms of electricity for lighting, general power and air conditioning, maintaining both a potable and fire fighting water supplies, maintaining an adequate food supply for 6-12 hours and ensuring continued communications coverage both inside and outside the Centre.

g) Staff familiarity with the possible Safe Refuge buildings, access to food supplies and drinking water in times of emergency.

All of these issues need to be canvassed before any formal *Evacuation* is ordered or arranged.

Special Note:

These matters will have little effect where ***Relocation*** is undertaken at least 12 – 24 hours prior to any bushfire impact.

10.0 Bushfire Planning

10.1 Bushfire Planning

It is essential that the Centre develops and maintains this Bushfire Management Plan (BMP) and an Emergency Management Plan (EMP) for all types of emergency events not just bushfire.

An EMP must contain a section that deals with bushfires. A Bushfire Emergency Plan (BEP) will form that section. A copy of the BEP should be provided to Snowy River Shire Council and the Beridale District Office of the RFS. An EMP must be reviewed every 5 years or where local issues require a change or amendments to the contents.

BMP's are by their very nature subject to changes within their own operational areas. These changes may involve the consideration of new APZ's, & SFAZ's, new built assets, road and fire trail construction and ecological constraints all of which need to be reviewed on a regular basis to ensure bushfire mitigation planning methodologies are up to date.

In this instance a review should occur between 3 & 5 years and immediately following a grass or bushfire event either inside the Centre or on lands adjoining the Centre or where major hazard reduction work is undertaken.

These two Plans will form the backbone for bushfire preplanning and emergency actions to be undertaken by staff where a grass or bushfire may impact the Centre.

10.2 Bushfire Mitigation Treatments

The Centre can manage its own lands to the extent that the existing fire / access trails and open grasslands should be well maintained. Boundary management should be investigated further are where possible undertaken on the same regular basis and grassland management.

The management of the lands surrounding the Centre is the responsibility of those land owners and the Centre's management has no control over such lands other than to (where the lands are considered by management to be a high fire risk) seek a formal inspection from the Rural Fire Service under their bushfire hazards complaints system.

Bushfire mitigation treatments can vary considerably from the grazing of livestock to the formal construction and maintenance of APZ's by hazard reduction burning, grading, slashing or by the use of hand tools. The treatment of buildings and structures against bushfire impact forms a part of a compliance regime incorporating the Australian Standard AS3959 'Construction of buildings in bushfire prone areas' - 2009 and 'Planning for Bushfire Protection – 2006' plus any special constraints determined by the RFS or local Councils.

In this case the primary treatment recommended will be the provision and on-going maintenance of Strategic Fire Advantage Zones and Asset Protection Zones. These are to be located around the Centre's built area to the north, east and south.

Aerial photographs have been prepared to suggest where SFAZ's & APZ's should be provided and how theses areas should be managed. These are indications only and actual locations will require ground surveys and possibly ecological assessment reports to verify / confirm locations.

In this instance the creation and maintenance of the APZ's should be undertaken by mosaic burning or hand clearing methods due to their relatively small areas.

An application to undertake the construction of SFAZ's and APZ's must be made to the NSW Rural Fire Service utilising the requirements of the Bush Fire Environmental Assessment Code of NSW – 2006. This is to ensure legally binding Certificates are issued to undertake such work.

10.3 Services and Infrastructure

Reference should be made with Section 9.5 of this document.

a) Electrical Supply

The existing electrical supply cannot be guaranteed during major bushfire incidents.

The bushland beside and under aerial conductors within the Centre should be cut back to conform with the Supply Authorities basic requirements. The Industry Safety Steering Committee (ISSC) specifies a 1.0m clearance from wires where a low voltage line is present plus a further 0.5m in bushfire prone areas.

Where appropriate, clearances should be increased on upslopes to reduce possible tree branch impact from above or the side during high winds.

The supply lines outside the Centre cannot be addressed by Centre management however where branches are noted to be close to power lines, Centre management should advise the electrical supply authority.

Consideration should be given to the provision of a diesel generator for the provision of power to at least nominated *essential services* within the Centre.

b) Communications

Communications between management and staff must be ensured to the best of the Centre's ability. Direct communications will be invaluable during major bushfire (and other) emergency incidents.

The general broadcasting of an emergency alert is not possible and consideration should be given to the provision of an emergency warning hooter (or similar) system to enable all clients and staff to be made aware of an emergency at all times. Where installed this system must be regularly tested and all Centre occupants must be made aware of the significance of the hooter and what they are to do in an emergency.

c) Water Supplies

The domestic water supply is reliant upon the main water tanks and a new, reticulated 100mm underground water supply to be provided soon.

Testing of the new water main should be undertaken as soon as possible.

d) Gas Storage

Any gas connection points, or above ground pipework must be kept clear of vegetation such that should the vegetation become involved in fire the gas pipes will not be subjected to excessive heat or flame.

The storage of ladders and other equipment within the LPG compound should be discouraged to ensure the safe movement of fire fighters around the compound.

e) Fuel / Diesel Storage

All fuel dispensing areas should be well maintained in that combustible materials are to be kept well clear and leaf litter is not allowed to accumulate to excessive levels.

f) Fire Fighting Recourses

The Centre's fire-fighting resources must be maintained to ensure operational readiness at all times. This may be managed under appropriate Service Contracts. Staff must also be regularly familiarised with the operation of various types of firefighting equipment.

Consideration should be given to inviting not only local NSW Fire Brigades but also the Brigades from the NSW Rural Fire Service to inspect the Centre and its assets at least once a year to allow their familiarization with the Centre.

g) Centre Access

During bushfire emergencies, the entry gate area should not be closed or barricaded off.

Consideration to opening the east boundary gate should be given during grass or bushfire impact to allow the rapid deployment of fire services should it become necessary.

All fire trails should comply with PBP -2006 and be individually sign posted so that attending Fire Services and staff can rapidly direct responses to and through those fire trails.

(Refer to Image 16 page 21)

10.4 Preparedness

Preparedness in the context of grass or bushfires will involve ensuring that the Centre's commercial assets are well prepared to restrict the impacts of bushfire and thus afford staff and clients at least one safe refuge building should the need arise. These impacts are smoke, wind driven ember attack (the highest cause of structural loss), radiant heat and direct flame contact.

Whilst the Centre is not legally bound to retrofit its buildings (as the Centre is not in a bushfire prone area as depicted on Councils Bushfire Prone Lands Map (page 27), to better prepare against possible impacts, basic compliance with Australian Standard AS3959 – "Construction of buildings in bushfire prone areas" 2009 should be used on a voluntary basis.

The provision of items such as metal mesh screens to external doors, windows and air vents will greatly assist in reducing possible burning ember entry to buildings. The installation of "gutter guards" will also assist in reducing the development of roof top fires.

Building preparedness is supplemented by fire fighting resources and trained staff who can confidently use them. Local Centre training could consist of the RFS's "Basic Fire Fighter" training package. This is a recognised course throughout Australia and could form the basis of future Staff employment.

Asset Protection Zones are designed to slow the passage of most bushfires and must be regularly maintained together with any associated fire trails or access roads. A regular maintenance program must be developed to ensure maximum efficiency is obtained in this case, from all APZ's within the Centre's grounds. (refer to Image 25 - APZ Plan page 42)

Sound communication is essential in the management of any emergency event. The Centre's management must ensure efficient use is made of portable two way radios, mobile telephone and possibly a new Centre hooter system.

The role of the local NSW RFS and NSW Fire Brigades in providing protection to the Centre can be enhanced by regular (once a year) invitations to inspect the Centre and its assets. It remains however a fact that direct reliance on fire services immediately attending a bushfire cannot be guaranteed and the Centre management must take all necessary and practicable steps to firstly ensure the safety of its staff and clients and secondly its built assets and infrastructure.

A bushfire BEP should be prepared or updated to provide general information for access, fire fighting equipment, provision of contact names and numbers and the preferred procedures for occupant relocation or evacuation during times of bushfire emergency. The BEP must form the "Bushfire Section" of the *Emergency Management Plan*.

10.5 Recovery from bushfire

Recovery from grass or bushfire events will vary depending upon the location of the fire, the fire intensity and damage caused to a building or infrastructure. Early suppression intervention from Staff and / or the Fire Services may result in minimal damage to the Centre and its commercial operations.

Grass or bushfires burning some distance away may only impact with smoke and embers, a careful watch must however be made to ensure spot ignitions do not occur in or about the Centre even several hours after the original event.

Conversely, serious impact to build assets may require asset closure. Dependent upon what type of asset is damaged, the Centre may need to be closed whilst repairs are undertaken. This will be particularly relevant where electrical, gas, water and communication services are cut.

Generally the methodology used in a recovery process will be:

- Assess the damage to essential services then built assets
- Assess the risk to staff during the recovery operation
- Assess the risk to clients and the general public during the recovery operation
- Isolate the damage from staff, clients and public with barriers / fencing
- Advise Government Insurers
- Review alternatives to maintain the Centre's business continuity
- Consider temporary buildings / services
- Review the nature of the impact - where a building is damaged, its location & design to determine if a more suitable location can be found or if other bushfire impact preventative measures can be undertaken. This could involve a qualified bushfire design practitioner.
- Review the effectiveness of the APZ's and bushfire mitigation levels relevant to the loss. For example, was mosaic burning undertaken according to preplanning regimes and did it work?

Where serious damage or injury has occurred, it is unlikely that any services or reconstruction will occur until such times the NSW Coroner or his / her deputy have investigated the incident. Following release of the area the general methodology above can be implemented.

10.6 Monitoring and Review

The monitoring and review of this BMP should be undertaken periodically and be formally reviewed in full every 5 years or as soon as possible following a bushfire impact event.

Centre management should conduct its review in the first instance and where items of concern are evident or physical aspects within the Centre change, management should consider further professional advice from accredited bushfire persons.

11.0 Mitigation Measures Proposed

11.1 Bushfire Preparedness / Upgrading Recommendations

The following table sets out the bushfire safety and maintenance measures recommended in order to increase the overall level of bushfire preparedness.

Item	Priority	Bushfire Safety Measure	Time Frame for Completion	Maintenance Periods
A	1	APZ's - Confirm existing and any proposed locations. Provide / construct as noted on Centre APZ Map. Slash or mow as required. Burning may not be required. SFAZ's – Large area south and east of Centre	2 months 2 months 2 months	40m from buildings: Fortnightly in summer. >40m from buildings: 6 weeks or as growth requires
B	1	Ensure all fire trails can accommodate Category 1 fire vehicles at all times	2 months	Annually
C	1	Verify that the Dining Room and /or Recreation Hall can accommodate all clients and staff in the event of a bushfire emergency.	1 month	Annually
D	1	Inspect the 'Safe Refuge Buildings' - the Recreation Hall and /or the Dining Room to ensure compliance with AS3959 – 2009 for 'Construction in bushfire prone areas' in relation to at least the ember protection of openings	6 months	Bi-annually
E	2	Centre aerial electrical wire & pole clearances to be checked as necessary for vegetation clearances	3 months	Annually
F	2	Ensure all accommodation and administration buildings are metal mesh screened over windows, door and air vents to AS3959 where possible	12 months	Annually
G	3	Ensure that no leaf litter or vegetation is within any bulk LPG compound.	1 Month	Monthly during summer
H	3	Ensure that no leaf litter or vegetation is within the fuel dispensing compound.	1 Month	Monthly during summer
I	3	Ensure staff are trained in EMP bushfire procedures	6 months	Bi-annually

Table 11.1 Bushfire Maintenance Summary

Comments:

a) Several mitigation items can be coordinated to commence at approximately the same period of time.

b) A review of the items completed and their effectiveness should be undertaken by suitably qualified bushfire person in order to ensure compliance with this Plans recommendations and possibly the "Bushfire Section" of the EMP.

11.2 Proposed Strategic Fire Advantage Zones and Asset Protection Zones

SFAZ's and APZ's should be provided in the following areas to better ensure that the direct bushfire impact to the Centre's buildings is reduced. The following plan sets out the general areas for the SFAZ's and APZ's however formal ground truthing should be undertaken in conjunction with a qualified bushfire consultant to ensure practicability.

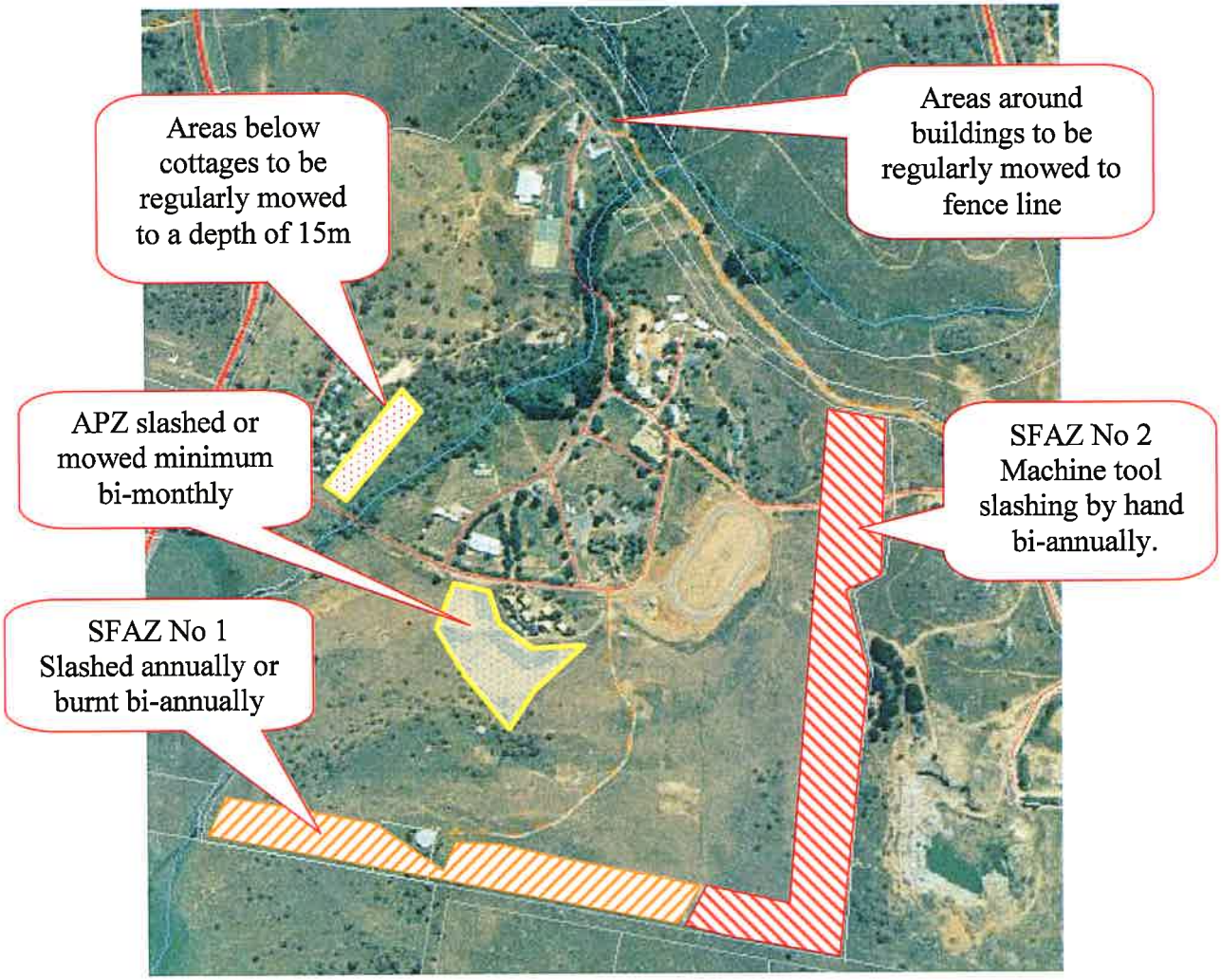


Image 25 – Proposed SFAz's and APZ locations.

Location	Time Frame	Time Frame
APZ	September / October	April / May
SFAZ 1	Bi-annually	
SFAZ 2	Bi-annually	

Table 11.02 – Proposed SFAZ and APZ maintenance schedule

The continuation of the existing general ground maintenance works will ensure that other areas around the Centre are kept free of shrub and leaf litter thus reducing and controlling available fuel loads and reducing available fuels for grass or bushfire consumption.

11.3 Building Upgrade

1. Buildings identified as Safe Refuge Buildings should be provided with good smoke seals to all doors and windows to prevent the entry of embers and smoke into the buildings.
2. Consideration should be given to providing all habitable buildings and the Workshop with metal mesh screening over external openings to prevent ember penetration into the buildings.
3. All buildings should be inspected bi-annually to ensure compliance with AS3959-2009.

11.4 Site Communications Upgrade

1. The Centre currently has a limited ability to provide a general warning to all areas of the Centre. It is recommend that consideration be given to the provision of a manually operated warning hooter system which would enable a site waning to be given and indeed coded messages utilising a number of 'single hoots'.

   The number of hoots emitted could be referenced to the type of emergency.

12.0 Conclusion

Grass or bushfire risk is defined as the chance of a fire igniting, spreading and causing damage to assets of value to the community. In assessing the impacts to the Jindabyne Sport and Recreation Centre, the site has been inspected and discussions held with Staff and the NSW Rural Fire Service the results of which have been incorporated into this Bushfire Management Plan.

The purpose of treating bushfire risks is to reduce their likelihood and harmful consequences to the Centre's clients, assets and its infrastructure. This is achieved through a process of selecting and implementing risk treatment options that modify the characteristics of the land surrounding the Centre (provision of Strategic Fire Advantage Zones and Asset Protection Zones), the provision of generic building requirements (screening and good house-keeping) and the preparedness of staff, fire fighting equipment, communications, water supplies and other services. The recommended treatments are of course no absolute guarantee of bushfire safety or the continuity of business in all bushfire impact cases.

The deficiencies in bushfire preparedness nominated within this document are not insurmountable and can be rectified over a period of time. The matters of immediate concern are the provision of the SFAZ's and the APZ. The ongoing maintenance of these Zones will remain a function of the Centre's management.

The bushfire risk assessment has considered the responsibilities of Centre management including the provision of adequate safe refuge buildings for the short term protection of clients and staff against bushfire impact.

It must be reiterated that direct reliance on the attendance of emergency services for the actual control and extinguishment of a grass or bushfire will remain, however this immediate attendance cannot be guaranteed during major (Catastrophic) fire events therefore local Centre staff may have to carry out first aid firefighting and also direct clients to areas of safe refuge until the arrival of Fire Services.

Whilst there is formal legislation that requires land owners to undertake reasonable actions to prevent the spread of bushfire onto adjoining properties the reality is that ember travel distances of 10-20km have been recorded therefore some actions may never be successfully achieved to prevent ember impact onto grounds.

The provision and maintenance of fire breaks or fire trails around the Centre's eastern and southern boundaries is considered essential and should be maintained at all times.

During days of declared "Extreme" or 'Catastrophic' bushfire potential a listening watch on commercial radio and or television must be maintained in order to derive the most up to date information about any approaching bushfires. The final decision to "Stay or Go" will be a matter for the local Centre's management at that time as there are many unique variables which may influence the decision process.

A declared "Extreme or Catastrophic" day of bushfire does not mean a bushfire is actually burning, rather it suggests that should a bushfire occur the likely impacts will be severe to life and property.

Approaching grass or bushfires will, by their very nature of generating vast amounts of smoke and embers tend to generate panic. Good communications will go part way to reducing this phenomenon by allowing better control of client movement either in relocation, evacuation or in seeking intermediate shelter within the Centre.

The recommendations contained herein are by no means absolute and bushfire mitigation measures can always be upgraded however the value of the upgrading must be considered against the determined level if risk impact to the Centre.

Compliance with the recommendations contained within this BMP will at least ensure that most if not all reasonable steps have been undertaken to better ensure the safety of the Centre's clients, staff, assets and infrastructure.

Prepared by
Building Code & Bushfire Hazard Solutions P/L

Dave McMonnies

David McMonnies, AFSM / M I Fire E
Mst Const Mgt / G D Design in Bushfire Prone Areas
Managing Director
(02) 9457 6530 tele
(02) 9457 6531 fax

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Disclaimer:

Quote from Planning for Bushfire Protection 2006, '*Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above..*'

Similarly the interpretations and opinions provided by Building Code and Bushfire Hazard Solutions in regard to bushfire protection are also given in the same good faith.

13.0 Appendices

13.1 - Definitions

The following definitions may have been used in this document;

Term	Explanation
Asset Protection Zone	A relatively clear area between a structure and the bushland. An APZ consists of an Inner Protection Area of a calculated depth and an Outer Protection Area nominally 15 metres (m)
Asset	Any constructed item of value and any area of land having a cultural or heritage or other significance.
Australian Standard AS3959	A standard designed for "construction of buildings in bushfire prone areas".
Building Code of Australia	A National document setting out the requirements for the construction of buildings and other structures.
Bushfire Management Plan	A purpose plan designed to provide parameters and guidance for the protection of life and structures in the event of bushfire impact.
Bushfire Prone Land Map	A certified map produced by a Local Government Council possibly in conjunction with the NSW Rural Fire Service which outlines the bushfire impact zones as determined by vegetation categories.
Bushfire Protection Measures	A suite of measures available or developed for minimizing the risk of bushfire attack and the subsequent threat to life and property.
Catastrophic Fire Danger Rating	A predetermined rating at or above an FDI index of 100 where the control of fire will be unlikely given predicted high winds and elevated temperatures. Very high levels of wind driven embers are likely to ignite unprotected structures and produce spot fires several kilometers ahead of the main fire front.
Campaign Fire	A fire event which extends significantly over time, requiring extensive coordinated resources from out of the local area and which is usually declared under s44 of the *Rural Fires Act 1997*.
Consequence	Outcome or impact of an event (source AS/NZS 4380:2004)
Ecologically Sustainable Development	Requires the effective integration of economic and environmental considerations in decision-making processes (Section 6 *Protection of the Environment Administration Act 1991)*
Environmental Asset	Any natural feature, e.g. landscape or catchment area, or native flora and fauna species and their associated communities, which is valued by the community.
Defendable space	An area around a building or structure and within an APZ where fire fighters or occupants can undertake property protection after the passage of a bushfire with some level of safety. Generally, 10 m around a building or structure is a minimum distance.
Evacuation	The emergency mass movement of people from a place of danger to a place of safety due to an immanent local disaster.

Term	Explanation
Fire Danger Index	A new fire danger index ranging from 0 – 100 plus with 0 being the lowest and 100 plus the highest hazard index. The index consists of modified values derived from the old Forest Fire Danger Index this being a combination of fuel moisture content (drought), air temperatures, wind speed and relative humidity determinations.
Fire Danger Rating	A graphical representation of an assessment of the potential fire behaviour, the difficulty of suppressing a fire, and the potential impact on the community should a bushfire occur on a given day. The FDR ranges from Low-Moderate, High, Very High, Severe, Extreme and the highest being Catastrophic.
Forest Fire Danger Index	A derivative of calculations based on temperature, relative humidity, wind speed and drought parameters summarised in an index from 0-100. It provides an indication of the likely intensity, spotting and rates of spread of a bushfire and, as a consequence the suppression difficulty. The results are expressed as an indexed score from 0-100 only. 100 being the highest bushfire hazard level. The index is represented graphically by Fire Danger Rating signage. The index for an area can be viewed by following the links to the Total Fire Ban Map at www.rfs.nsw.gov.au.
Hazard Reduction	The controlled application of appropriate fire regimes or other methods for the reduction or modification of available fuels within a predetermined area to mitigate or slow the spread of a bush fire.
Hazard Reduction Burning Season	The time of year, generally autumn and spring, but in some areas it may include winter or early summer, when the weather conditions are conducive to undertaking Hazard Reduction burns that are both safe and effective.
Inner Protection Area	The closest part of an APZ to a building or structure the distance of which is determined by calculation using PBP-2006. The IPA consists of extensively modified vegetation in order to reduce bushfire impact.
NSW Rural Fire Service	A fire fighting service operating under the *Rural Fires Act of 1997* which consists of salaried staff and volunteer Brigades.
Fire & Rescue NSW	A fire fighting service operating under the *NSW Fire Brigades Act of 1989* and incorporating salaried fire fighters on a 24 hours basis.
Outer Protection Area	The outer edge of an APZ nominally 15 m in depth containing slightly modified vegetation designed to slow the progression of bushfire before entering an IPA.
Planning for Bushfire Protection - 2006	A document produced by the RFS and Department of Planning. The document forms the regulatory basis of bushfire risk and protection determinations within NSW.
Relocation	In this context it is the coordinated mass movement of people from one area or building possibly under threat to another safer area or building where time is not critical to the process or their well being.
Residual risk	The risk remaining after implementation of risk treatment *(source AS/NZS 4380:2004).*

Term	Explanation
Risk acceptance	An informed decision to accept the consequences and the likelihood of a particular risk (source *NSW SEMC Implementation Guide for Emergency Risk Management, Applications Guide, Manual 5 of 2004*)
Risk analysis	A systematic process to understand the nature of and to reduce the level of risk. (*source AS/NZS 4380:2004*).
Risk assessment	The overall process of risk identification, risk analysis and risk evaluation. *(source AS/NZS 4380:2004*).
Risk identification	The process of determining what, where, when, why, and how something could happen. (*source AS/NZS 4380:2004*).
Risk treatment	The process of selection and implementation of measures to modify a risk (*source AS/NZS 4380:2004*).
Static Water Supply	A stand alone water source for the use of attending fire services. A SWS can include dams, rivers, lakes, permanent creeks, swimming pools, dedicated water tanks & other permanent water sources.
Strategic Fire Advantage Zone	An SFAZ is located between the bushland hazard and some distance from an IPA. The SFAZ can be large areas of bushland designed to be hazard reduced by fire.
Special Fire Protection Purposes	A particular requirement under the *Rural Fires Act 1997* and PBP 2006 that sets out a need for greater bushfire protection generally for seniors living, schools, group homes, child care facilities, hotels, motels & housing for people with a disability.
Total Fire Ban	In this context, the cessation and prevention of any external fire within the Metropolitan Colliery, Helensburgh and adjoining lands.
Visitor	In this context, a member of the public other than staff, who enters the Centre for personal reasons.
Vulnerability	The susceptibility and resilience of the human community and environment to hazards (source *NSW SEMC Implementation Guide for Emergency Risk Management, Applications Guide, Manual 5 of 2004*)

13.2 – Referenced Documents & Information Sources

Environmental Planning and Assessment Act 1979

NSW Rural Fires Act 1997 as amended

NSW Rural Fires Regulations 2002

"Planning for Bushfire Protection"- 2006 - NSW Rural Fire Services & Planning NSW

"Construction of buildings in bushfire prone areas" - AS 3959 (as amended) – Standards Australia.

"Ocean Shores to Desert Dunes" Keith, David ISBN 07313 67804

Guidelines for Asset Protection Zones - NSW Rural Fire Services

NSW RFS publication "Bushfire Environmental Assessment Code"

The NSW Rural Fire Service Bushfire Risk Management Package – Facilitators Guidelines

Standards for Asset Protection Zones - NSW Rural Fire Services

NSW Department of Lands, Spatial Information Exchange (SIXViewer) - http://maps.nsw.gov.au/

NSW Department of Environment, Climate Change and Water - DECCW

The Snowy River District Office of the NSW Rural Fire Service

Snowy River Shire Council

Australian Bureau of Meteorology

Google Maps

NearMaps.com.au

14.0 – ATTACHMENTS

14.1 Extract from the NSW Rural Fires Act 1997.

RURAL FIRES ACT 1997 - SECT 63

63 Duties of public authorities and owners and occupiers of land to prevent bush fires

(1) It is the duty of a public authority to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of a bush fire on or from:

(a) any land vested in or under its control or management, or

(b) any highway, road, street, land or thoroughfare, the maintenance of which is charged on the authority.

(2) It is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land.

(3) A public authority or owner or occupier is liable for the costs incurred by it in performing the duty imposed by this section.

(4) The Bush Fire Co-ordinating Committee may advise a person on whom a duty is imposed by this section of any steps (whether or not included in a bush fire risk management plan) that are necessary for the proper performance of the duty.

(5) In this section:

"notified steps" means:

(a) any steps that the Bush Fire Co-ordinating Committee advises a person to take under subsection (4), or

(b) any steps that are included in a **bush fire risk management plan** applying to the land

This section of the Act is also called up by the NSW Rural Fire Services document "Planning for Bushfire Protection – 2006" which states that:

*"Section 63 of the Rural Firs Act places a '**duty of care**' on all land managers/owners to prevent a fire spreading on or from their land."*

Other avenues to ensure legally binding bushfire safety measures are provided by land owners or managers are derived from local Council Development Consent Conditions, Development Control Plans and Local Environmental Control Plans.