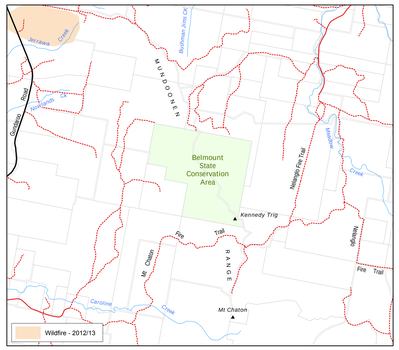
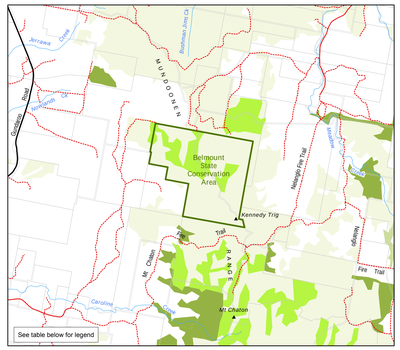
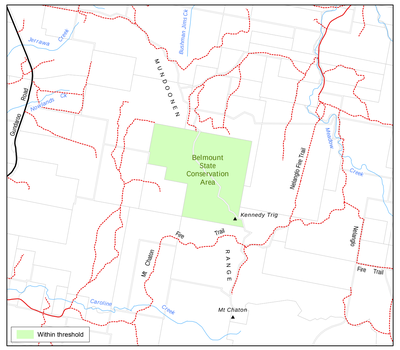
Map 1: Fire History



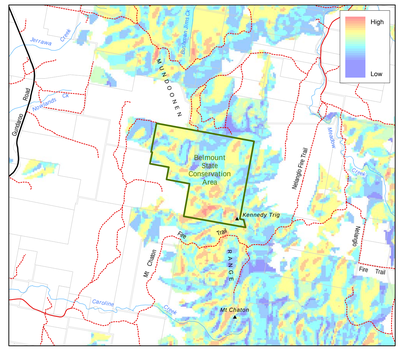
Map 2: Vegetation Communities



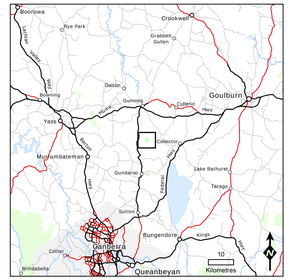
Map 3: Vegetation Threshold Analysis

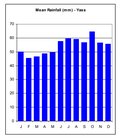


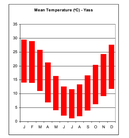
Map 4: Bushfire Behaviour Potential



Location







Southern Ranges Region
Belmount
State Conservation Area
Fire Management Strategy 2016

Scale: Works Program map 1:20000, Location map 1:900000, other maps 1:40000
ISBN: 978-1-76039-500-1, OEH2016/0568, Version: October 2016

This Map should be used in conjunction with air photos and ground reconnaissance during incidents and the development of incident action plans.

Resource Information

Belmount State Conservation Area (referred to in this plan as the reserve) is located approximately 15km north of Gundaroo on the Mundoonen Range. The Mundoonen Range is the main characteristic of the reserve. Kennedy Trig is the highest point in the reserve with an elevation of 854m. There are a number of large gullies that run off to the west from the Mundoonen Range.

This strategy has been prepared in accordance with the policies and procedures detailed in the NPWS Fire Management Manual, and relevant legislation.

National Parks and Wildlife Service	• NSW National Parks and Wildlife Service, Parks and Wildlife Group, Alpine-Queanbeyan Area, Southern Ranges Region	**Government Areas**	• Hume Federal Electorate • Burrinjuck State Electorate • Upper Lachlan Shire Council
Rural Fire Service	• Southern Tablelands Zone	**Other Organisations**	• Onerwal Local Aboriginal Land Council • South East Local Land Services

MAP 1: FIRE HISTORY

Ignitions	The pre-European fire history of the reserve is not well known. Traditional fire practices of Aboriginal people in NSW have not been well researched and are therefore poorly understood. There have been no recorded ignitions for the reserve, in the records held by NPWS, or the Rural Fire Service. However, there are fire scars on trees and charring of fibrous bark species indicating past fires. Lightning strikes during dry electrical storms have been the major cause of fires in the local area. The majority of these storms occur between November and February.
Prescribed Burns	There have been no recorded prescribed burns for the reserve, in the records held by NPWS, or the Rural Fire Service.
Wildfire	There are no records of wildfire within the reserve or the surrounding area.
Fire Frequency	The lack of records shows that the incidence of fire for the reserve, and the surrounding area is low.

MAP 2: VEGETATION COMMUNITIES

The vegetation is mainly Silvertop Ash (*E. sieberi*), Red stringybark (*E. macrorhyncha*), Scribbly gum (*E.rossii*) and Brittle gum (*E. mannifera*) with a sparse mid layer of saplings and shrubs. The canopy is between 10-20 metres. The mid layer occasionally has patches of grasstrees (*Xanthorrhoea glauca*) and wattles between 1-1.5 m, but cover is generally only 5-10%. The understorey is predominantly grassy, with some herbaceous species and low shrubs with a height up to 0.5 m and cover up to around 50%.

Argyle apple (*E. cinerea*) occurs in creeklines and flats in lower parts of the reserve along with Brittle gum and Silvertop ash. There was no shrub layer, with a grassy understorey up to 0.2 m high and 80% cover.

Vegetation Class (Keith, 2002)	Vegetation Community Description	Vegetation Group (Gellie, 2005)	Reserve (GIS) Ha's	% Reserve Cover
South East Dry Sclerophyll Forests	Silvertop Ash - Peppermint forest at high altitudes	112	43.32	20.62
Upper Riverina Dry Sclerophyll Forests	Stringybark - Box - Gum Woodland	114	165.92	79.00
Southern Tableland Grassy Woodlands	Blakely's Red Gum - Yellow Box open-woodland of the tablelands	154	N/A	N/A

MAP 3: STATUS OF FIRE THRESHOLDS

Threshold	Vegetation Community	% of Reserve	Interpretation & Management Guidelines
Below Minimum Frequency Threshold	N/A	0	• The inter fire intervals have been too short. • In these areas, species and populations sensitive to short fire intervals may experience a decline in abundance to a point where they risk local extinction. • Protect from fire as far as possible.
Within Frequency Threshold	Silvertop Ash - Peppermint forest at high altitudes, Stringybark - Box - Gum Woodland	100	• Fire history is within the threshold for the vegetation community. • Fire is neither required or to be avoided.
Above Maximum Frequency Threshold	N/A	0	• Where the age of a vegetation community is greater than the maximum fire interval for the community. • If fires continue to be excluded, a decline in biodiversity may result through the senescence of plants and their seed banks. • Long-unburnt areas are, however, ecologically significant, as there may be relatively few areas represented. • Consider implementing an ecological burn or allow the area to burn under suitable conditions.

Note: The threshold analysis is derived from vegetation community thresholds and recorded fire history. In the event of fire, the analysis must be performed again to establish new thresholds. Fire history for the Park is unknown, therefore all vegetation communities are considered within threshold.

MAP 4: BUSHFIRE BEHAVIOUR POTENTIAL

Vegetation Fuel Hazard Rating (under moderate conditions in mature vegetation communities)
The ratings and modelling are specific to the reserve. The information is not for comparison of the broader landscape managed by the NPWS Southern Ranges Region.

Rating	Vegetation Description	% of Reserve
Low	Nil	N/A
Moderate	Nil	N/A
High	Silvertop Ash - Peppermint forest at high altitudes	20.62
Very High	Stringybark - Box - Gum Woodland	79.00

Aspect Bushfire Behaviour		Slope Bushfire Behaviour	
Rating	**Aspect in degrees**	**Rating**	**Slope in degrees**
Low	80 - 200	Low	0 - 10°
Moderate	30 – 80 & 200 - 240	Moderate	10 - 20°
High	10 - 30 & 240 -260	High	20 -30°
Very High	260 - 10	Very High	>30°

ANALYSIS OF BUSHFIRE BEHAVIOUR POTENTIAL

Bushfire behaviour at any position on the landscape reflects

- Site attributes such as vegetation type, slope, aspect and elevation (can affect fuel levels, structure and moisture content).
- Fire weather attributes such as temperature, relative humidity, wind direction and wind speed. While these characteristics are difficult to predict, bad fire weather days are generally associated with winds from the north-west to west.

The reserve generally consists of a short section of the Mundoonen Range, which runs NW to SE through the reserve. The western slopes within the reserve have the highest fire behaviour potential, due to their steepness and exposure to both afternoon sun and drying north westerly to westerly winds through summer.

Lower fire behaviour is found on the more sheltered north easterly aspects, with more gently undulating slopes. The fuel moisture levels are generally higher, thus mitigating fire behaviour under moderate conditions. However, during extended drought periods or severe fire weather conditions all vegetation communities have the potential to support extreme fire behaviour.

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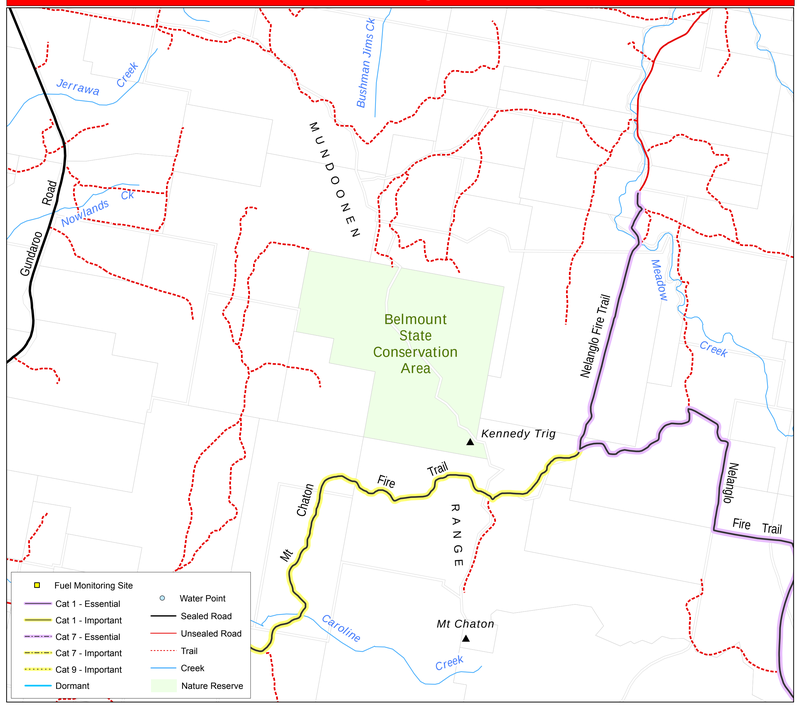
Works Program



WORKS PROGRAM

Asset	Priority	Name, Area or Detail	Management Strategy	Proposed Works
Trails	Low	Dormant Trails	• Could be used during emergencies once upgraded to Cat 9 standard. • May be re-opened as a control line option.	• Survey unmapped trails and document condition and suitability for fire suppression activities and reserve access, as required.
Land Management Zones	High	As identified in Map 7	• Prescribed burns will be implemented where deemed necessary for asset protection. • Any proposed prescribed burn must be in line with OEH policy and managed in accordance with the Southern Tablelands Bushfire Management Committee.	• Assess cooperative fire management programs with adjacent landholders and implement where appropriate, in consultation with BFMC. • Conduct fuel hazard assessment as per fuel monitoring schedule.
Information & Research	High	Fuel monitoring	• Conduct fuel monitoring program. Establish further fuel monitoring.	• Conduct fuel hazard assessment as required.
		Mapping fire	• Map all bushfires and prescribed burns to enable data collection on fire frequency, intensity, rate of spread and area burnt.	• Map the extent, patchiness and intensity, where possible, of all bushfires and prescribed burns. • Incorporate data into fire management and incident databases.
	Low	Research	• Liaise with academic and research institutions to encourage research in the Park relevant to fire management. • Establish monitoring program to identify areas where vegetation community is senescing due to lack of fire.	• Ongoing
Cooperative Fire Management	High	Liaise with NSW RFS, and Neighbours	• Attend meetings of the Southern Tablelands Bushfire Management Committee, and local RFS volunteer brigades. • Undertake joint training exercises.	• Ongoing

Belmount NR - PLANNING @ June 2016

THREATENED FAUNA MANAGEMENT

Common Name	Scientific Name	TSC Schedule	Vulnerable Period J	F	M	A	M	J	J	A	S	O	N	D
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	✓	✓	✓						✓	✓	✓	✓
Scarlet Robin	*Petroica boodang*	V	✓								✓	✓	✓	✓
Powerful Owl	*Ninox strenua*	V	✓				✓	✓	✓	✓	✓	✓		

Threatened Fauna Guidelines

- Minimise size and intensity of wildfires, and manage to produce mosaic burn patterns. Fire patchiness is likely to be an important factor in providing a mosaic of structurally diverse vegetation.
- If prescribed burns are necessary, avoid implementation during spring. When planning prescribed burns, refer to the periods of vulnerability of species likely to be located within the burn area, and develop appropriate mitigation measures for their protection.
- Avoid prescribed fire during times of prolonged drought.
- Minimise introduction of high intensity fires during prescribed burning and backburning operations.
- Avoid damaging/felling hollow-bearing and known nest/feed trees when establishing control lines, mopping up and during prescribed burning. If habitat trees are located on control lines remove fuel from base of tree, prior to prescribed burning or backburning. During mop up activities try to extinguish fire rather then falling tree.

Belmount- PLANNING @ June 2016

MAPS 2 and 5: SIGNIFICANT COMMUNITIES

Vegetation Communities	Significant Flora Management Guidelines & Considerations
	• No significant communities recorded within the reserve. • The reserve contains some of the only substantial vegetated areas remaining in the region, protecting a number of key vegetation communities and species that are under represented within the reserve system.

Threatened Flora Management

Group	Common Name	Scientific Name	Status	Guidelines
No threatened flora species have been recorded within the reserve.				
The following flora species are listed on the TSC Act and potentially occur in the habitats described for BelmountSCA:				
Buttercup Doubletail (*Diuris aequalis*)				
Any species listed under TSC Act and potentially occurring in the reserve will be managed in accordance with the biodiversity fire thresholds for the vegetation community in which they occur.				

Regionally Significant Plant Species

There are no Regionally Significant Plant Species recorded in or nearby Belmount SCA.

MAP 3: VEGETATION COMMUNITY THRESHOLDS

Vegetation Class (Keith 2002)	Vegetation Community Description	Minimum Fire Interval	Maximum Fire Interval	Fire History Evaluation	Guidelines
South East Dry Sclerophyll Forests	Silvertop Ash - Peppermint forest at high altitudes	5	50	100% within threshold	• A decline in biodiversity is predicted if 3 or more consecutive fires occur with inter – fire intervals of < 7yrs. • Given the lack of knowledge of ecosystem function without fire, the upper limits of these thresholds are untested. Fire should only be introduced into the reserve for the protection of assets, and ecological purposes if there is a demonstrated biodiversity decline. • Long-unburnt areas are ecologically significant, as there may be relatively few areas represented. • Too frequent fires may promote fire tolerant shrubs.
Upper Riverina Dry Sclerophyll Forests	Stringybark - Box - Gum Woodland	5	50	100% within threshold	• As above • Minimum interval of 10 years should apply in the Southern Tablelands region

Note: These are indicative biodiversity thresholds based on broad state wide guidelines. The broad thresholds are based on an analysis of known flora response to fire using plant vital attributes, and including compatibility of known fauna requirements, for identified broad vegetation formations (Kenny et al. 2004). Vegetation communities as outlined in Map 2 have been classified into formations to determine the appropriate biodiversity threshold guidelines. These thresholds, while accounting for some key flora and fauna variables, do not account for the whole variability in the landscape. Therefore such thresholds must be used with caution (Kenny et al. 2004). Interpretation of the thresholds should be done in association with local knowledge,detailed survey and planning associated with prescribed burn proposals and utilising the results of local monitoring programs (Kenny et al. 2004). It is noted that there is very little data available on the response of fauna species to fire regimes and therefore more attention should be paid to fauna species at the local level when considering applying the thresholds.

SUMMARY GUIDELINES FOR THE PROTECTION OF NATURAL HERITAGE

- Fire will be introduced in accordance with the biodiversity fire regime thresholds.
- Minimise the size and intensity of all fires , and manage to produce mosaic burn patterns.
- Avoid implementation of prescribed burns during spring, and during times of prolonged drought. Minimise introduction of high intensity fires during prescribed burning operations.
- Avoid damaging/felling hollow-bearing and nest/feed trees when establishing control lines, mopping up and during prescribed burning. During mop up activities try to extinguish fire rather then falling tree. If habitat trees are located on control lines remove fuel from base of tree, prior to prescribed burning or backburning.
- Minimise the use of earth moving equipment.
- Avoid the use of fire suppression chemicals within 100m of streams and riparian environments.

MAP 5: CULTURAL HERITAGE

Key Guidelines

- NPWS cultural heritage databases must be accessed during incidents and in planning for hazard reduction burning or other works to ensure new records are considered. Aboriginal site information is sensitive and subject to a Memorandum of Understanding. Site data must be used appropriately.
- Identified sites will be protected. Protection measures will be addressed in impact assessments and operational plans for prescribed burns.
- Where possible, trained officers will provide advice on site protection methods.

Aboriginal Cultural Heritage Site Management	A thorough survey of Aboriginal cultural heritage has not been conducted within the reserve. It is therefore not known with any certainty whether there are sites that can be damaged by fire. Unidentified sites may occur across the landscape, especially in riparian areas, along ridges and rock outcrops. • During wildfire operations, efforts will be made to survey for Aboriginal sites ahead of earthmoving equipment. • Encourage survey for Aboriginal sites after fires when site visibility is increased.
Historic Heritage Management	The only site identified within the reserve is the Kennedy Trig site (rock cairn with set post established in 1886). Other sites may exist that have not been recorded on OEH databases. Any new sites should be identified, entered into the OEH historic heritage database and protected during fire suppression and prescribed burning programs. • During wildfire operations, prevent the use of earthmoving equipment and or ground disturbance within 20 metres of the cairn site (Trig). • Inspect sites after wildfire, assess and plan works where necessary. • All personnel involved in control line construction and vehicle based fire suppression operations are to be briefed on site locations and the required management strategies for site protection. Specific site protection strategies are to be included in Incident Action Plans. • Prescribed burning or back burning activities should minimise the potential for site disturbance.

MAP 6: RISK ASSESSMENT – LIFE & PROPERTY

Asset	Vulnerability	Risk Mitigation
Private properties/ farm buildings	Vulnerable to fire coming from the reserve, particularly under the influence of westerly winds	• Participate in the development and where appropriate implementation of fire management proposals regarding asset protection, through the Southern Tablelands Bushfire Management Committee. • Respond to unplanned fire events as soon as possible. • Implement annual fire management work schedule. • All fires reported or known to occur within the reserve will be reported to the RFS. • Provide media briefing/releases to communicate strategies and updates of fire activity to those potentially affected.
Visitors to the reserve.	Vulnerable to impact from fire within the reserve.	• As above • If a fire breaks out, check for visitors (preferably by air) and give directions if required. • Reserve closure may be implemented during periods of very high fire danger, when the reserve is threatened by fire, or when a fire is actually burning in the reserve. • Partial Reserve Fire Bans, such as a ban on solid fuel, can be considered.
Reserve assets	There are currently no management trails or assets identified within reserve.	• Not applicable.

MAP 7: BUSH FIRE MANAGEMENT ZONES - DEFINITIONS

Asset Protection Zone (APZ)	The purpose of APZ is to protect human life, property and highly valued public assets and values. Provide fuel reduced areas around assets.
Strategic fire Advantage Zone (SFAZ)	To provide strategic areas of fire protection advantage which will reduce the speed and intensity of bushfires, reduce the potential for spot fire development, and aid containment of bushfires to existing management boundaries.
Land Management Zone (LMZ)	The objective of land management strategies within this zone are for the protection of natural and cultural heritage, and to reduce the likelihood of spread of fires.

PARK BUSH FIRE MANAGEMENT ZONES

Zone	Guidelines	Actions
LMZ	• Minimise size and intensity of wildfires, and manage to produce a mosaic burn pattern, where weather conditions permit. • Attempts can be made to increase burn patchiness by use of incendiaries, retardant, water bombing etc. • Fire suppression chemicals may be used to suppress fire, however, minimise use within 100m of drainage lines. • Protect mature trees and minimise felling large and hollow bearing trees during mop up activities. • Minimise use of earth moving equipment throughout the reserve and exclude within a 20m buffer from Kennedy Trig.	• Prescribed fire will be used where deemed necessary for asset protection or ecological purposes. • Assess cooperative fire management programs with adjacent landholders and implement where appropriate, in consultation with BFMC. • Establish monitoring program to identify areas where vegetation community is senescing due to lack of fire.

MAP 8: FUELS AND FIRE BEHAVIOUR

Fuel Landscape Analysis

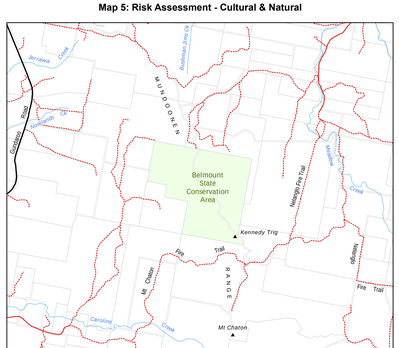
Fuels are variable across the reserve reflecting complex interactions between vegetation type, aspect and topography.

Limited visual fuel sampling was conducted in Spring 2010. The assessment approach applied was to determine the Overall Fuel Hazard (OFH) Rating (McCarthy et al., 1999). Rather then only considering surface fine fuel loads (t/ha), this assessment shifts the emphasis to considering the whole fuel complex, and particularly the bark and elevated fuels – bark and elevated fuels being the fuel elements principally responsible for both first attack failure and also for general suppression difficulty. The major findings of the fuel sampling program were:

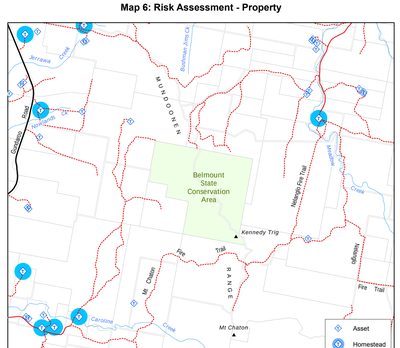
- Sites that were classified as having high overall fuel hazard rating were either located in gully communities, or were dominated by long unburnt fibrous bark species.
- Sheltered gully communities carry high levels of biomass due to the higher moisture availability, which generally equates to high fuel loads. They are also usually located in low fire prone areas due to their topographic position and aspect. Therefore fuel loads in gully communities may not necessarily be reduced, even in some wildfire incidents.
- These sites had variable surface and elevated fuel hazard ratings. To reduce the bark hazard a high intensity prescribed burn would be required. This may have the negative outcome of replacing a grassy understorey with a regenerating shrub layer, therefore increasing the elevated fuel rating. High elevated fuels can impede access for earth moving equipment and fire fighters.

If an area is within biodiversity threshold, identified to have high fuel loads, and there is a risk to life and property, temporary fuel monitoring sites will be located within that area for determination of whether a prescribed burn is required. Management options would be discussed with the Southern Tablelands Bushfire Management Committee.

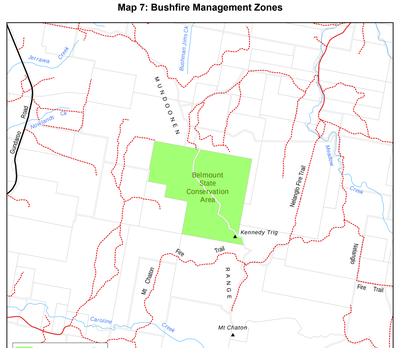
Map 5: Risk Assessment - Cultural & Natural



Map 6: Risk Assessment - Property



Map 7: Bushfire Management Zones



Map 8: Fuels & Fire Behaviour