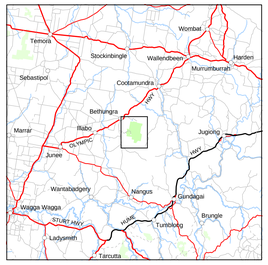
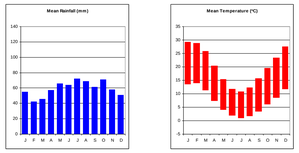
South West Slopes Region
Ulandra Nature Reserve
Fire Management Strategy 2005

Scale: Works Program map 1:55000, Location map 1:900000, other maps 1:75000
Version: May 2005 ISBN: 1 74137 341 7 DEC: 2005/182

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

Location





RESOURCE INFORMATON

Ulandra Nature Reserve was first gazetted in 1981, with additions up to 1983. The reserve covers 3931 hectares of bushland and grassland. It includes all but 40 hectares on the peak of Mount Ulandra, which is south of Bethungra Dam, the main source of water for the township of Bethungra.

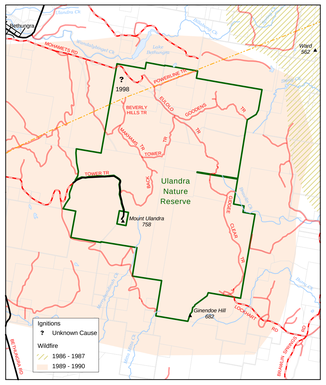
Department of Environment and Conservation	Parks and Wildlife Division, National Parks and Wildlife Service. South West Slopes Region, Murrumbidgee Area.
Rural Fire Service	Riverina Zone Bushfire Management Committee
Government Areas	Hume Riverina Federal Electorate. Burrinjuck State Electorate. Coolamundra, Gundagai & Junee Government Areas
Other Organisations/Agencies	Wagga Wagga and Young Aboriginal Land Councils Murrumbidgee Water Catchment Board

MAP 6: LANDSCAPE THRESHOLDS

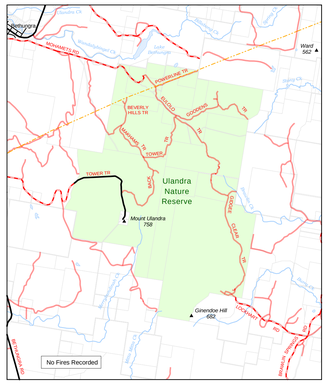
Slope Class Degrees	Fine Fuel Range in T/ha	Threshold & Impacts
0-10	3-5	• Currently, 21% of the reserve has potentially unstable soils/slopes (812 ha).
10-15	4-7	• Any disturbance to soil and slope stability will affect catchment and water quality values.
15-20	10-12	• Water quality may be compromised by soil disturbance and silt run off after by fire.
20-25	12-14	• Soil disturbance and exposure by fire may cause erosion.
25-30	16-18	• Fuel decomposition after disturbance may decrease after fire (depending on fire intensity, fire interval, cover and patchiness of the fire) due to a reduction in soil and micro-organism activity. The presence of flams and retardants within the soil may also effect soil and micro-organism activity.
>30	>20	• Fine fuel ranges below the recommended tonnes per hectare for the corresponding slope class are expected to increase slope instability, effect water quality and may effect vegetation propagation.

Fire Management Guidelines
Where possible:
- Avoid frequent and or high intensity fire in areas where the fine fuel range does not meet the slope class thresholds.
- Avoid trail construction on slopes >25 degrees.
- If hazard reduction burning, ensure burn areas are strategically implemented across the landscape for potential wildfire control and large areas and slopes are not left exposed.
- New trails, control lines or fuel breaks constructed during an incident should provide appropriate drainage to prevent wash outs.
- Rehabilitation of control lines or fuel breaks constructed during fire events will be addressed during the incident in the Incident Action Plan.

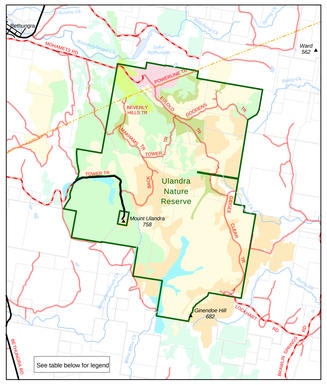
Map 1: Fire History - Wildfire



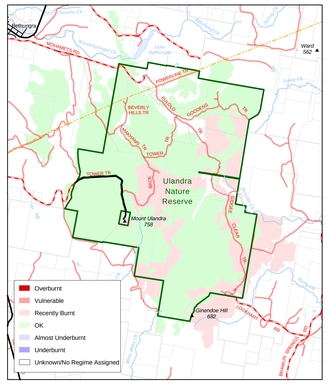
Map 2: Fire History - Prescribed Burns



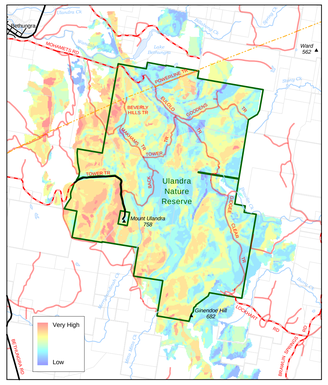
Map 3: Vegetation Communities



Map 4: Vegetation Threshold Analysis



Map 5: Bushfire Behaviour Potential



MAPS 1 & 2: FIRE HISTORY

Ignitions	1 ignition reported in 1998 (cause unknown) on the reserve. Recorded information is limited pre-1990.
Hazard Reduction	No hazard reduction burns have been implemented within the reserve by NPWS. Trail maintenance and clearing programs have been applied, including timber chopping on Back Tower Trail and slashing trail verges. Lease holders maintain Tower Trail and the Crown Land on Mount Ulandra.
Wildfire	1 wildfire was recorded in 1989/90. This fire started over 5 kms off the reserve, making its way across agricultural land before burning through the reserve and contained to the east of the reserve, short of Brawlins Springs Road. It has been recorded as burning the entire reserve and surrounding area in 1989/90, however the are no recent fire scars evident in some vegetation communities or on cultural heritage features. This suggests the fire was patchy (low to moderate intensity) or the fire may not have reached some areas of the reserve or had been mapped incorrectly. The ignition source is unknown, but occurred west of the reserve. Another fire in 1986/87, recorded to the NE of the reserve, never reached the reserve boundary.
Fire Frequency	The reserve has had one fire event in 15 years (as at 2005). It is highly probable that fire had previously burnt some areas of the reserve or had an impact on the entire reserve before 1989/90. There are limitations in available mapped information.

MAP 7: THREATENED FLORA

Fire Group	Common Name	Scientific Name	TSC Schedule
A	Yass Daisy	*Ammobium craspedioides*	V
B	Woolly ragwort	*Senecio garlandii*	V

Fire Group	Vegetation Group	Threatened Flora Management Guidelines
A	23	• Avoid ground disturbance in close proximity to populations of this species and, where possible, within the vegetation group where potential populations may exist. • Slashing may be used within this community, but not recommended during spring. • There is little to no impact expected from planned or unplanned fire. • This species may resprout after fire and should be monitored to ensure weed species do not interfere with plant recovery. • Impact from retardants and foams is unknown. Avoid application where species occur. • Manage this species within the vegetation group management guidelines
B	23	• These species seed propagation store is exhausted in first instance after fire. • Primary juvenile period is 2-3 years. Should 2 consecutive fires occur within 2-3 years of each other, seed soil stores may not be restocked and *Senecio garlandii* may become locally extinct. • Frequent fires lead to extinctions, however the impact of infrequent fire events is unknown. • Impact from retardants and foams is unknown. Avoid application where species occur. • Predicted weed invasion with frequent fire may compete with threatened flora. • Intervals between fire should be managed within the vegetation group guidelines

Note: Floristic information is based on data researched in January 2005, collated from CSIRO and NPWS floristic fire response data sets. The vegetation group numbers should be referenced against the vegetation management guidelines in the Vegetation Communities and Thresholds section of this plan, as some community regimes may be in conflict with species management guidelines.

MAP 7: THREATENED FAUNA

Fire Group	Common Name	Scientific Name	TSC Schedule	Vulnerable Period
A	*Black-chinned honeyeater	*Melithreptus gularis gularis*	V	Jul-Dec
B	*Regent honeyeater	*Xanthomyza phrygia*	E	Jul-Feb
	Turquoise parrot	*Neophema pulchella*	V	Aug-Dec
C	Brown treecreeper	*Climacteris picumnus*	V	May-Dec
	Speckled warbler	*Pyrrholaemus sagittatus*	V	Aug-Dec

* Species recorded off the reserve, however the proximity of available habitat within the reserve may be crucial for species survival.

Fire Group	Veg Group	Threatened Fauna Management Guidelines
A	• 23 • 33 • 39	This species does not persist in remnants less than 200 ha in size. Where possible, • Fire should be kept to a small area (<25% of any vegetation group in any fire season). • Vegetation management guidelines should be managed at maximum fire intervals (25-100 years). • Protect areas of habitat from fire, which consumes the canopy & or large & hollow bearing trees. • HR's should be small, long-term mosaic burns that are more suitable in protecting this species habitat. • Least likely period of vulnerability to fire is between January and June.
B	• 23 • 39 • 34	Frequent fire and or high intensity fires will effect these species. Altered fire regimes may lead to extinctions. Fire often leads to a decline in insect abundance and diversity, which some species are dependent on. Felling hollow bearing trees during 'mopping up' activities potentially decreases nest hollow availability. Where possible; • Maintain (maximum) vegetation management guidelines. • Fire should be kept to smallest possible size (<25% of any vegetation group in any fire season). • HR's should ensure large patches of shrubs, standing and fallen timbers are left in tact. • Implement mosaic fire regimes designed to maintain the floristic & structural diversity of the understorey. • Protect hollow bearing trees and minimise canopy scorch. • Least likely period of vulnerability to fire is between March and June.
C	• 23 • 33 • 42	Removal of dead and down trees limits potential available foraging & nesting sites. The decrease in invertebrate abundance and diversity following fire effects these species. Frequent fire may disadvantage these species by simplification of forest structure. Where possible; • Maintain vegetation communities within vegetation management guidelines. • Avoid frequent and or high intensity fires. • Protect areas of habitat from any fire that consumes the canopy & or large & hollow bearing trees. • HR's should be of minimal in size (not exceeding 20% of vegetation group across the reserves). • Small, long-term mosaic burns (may be more suitable in protecting this species habitat. • Least likely period of vulnerability to fire is between January and April.

Note: The vegetation group numbers should be crosschecked against the vegetation communities in the Vegetation section of this plan, as fauna species requirements may differ to fire requirements. Ulandra NR is isolated from other natural similar vegetation communities essential for species survival and should be a consideration in all management strategies.

MAP 8: RISK ASSESSMENT – PROPERTY

Asset	Vulnerability & Impacts	Reserve Fire Management Guidelines
Broadcast Australia Lease (off park)	• Crown Lease Land (including access road) • Located on ridge top with steep westerly, southerly and easterly slopes. • Priority access via Tower Trail, through private property to the west of the reserve. • Vegetation comprises medium regeneration woodland and sparse with grass fire break and grazing land to the immediate west. • There is no accommodation associated with the sites. • Potential cost if damaged by fire >$50K.	• Maintain access Trails on the reserve. • Cooperate and coordinate programs with Bushfire Management Committee and lessee to reduce risks where appropriate. • Respond to all unplanned ignitions and reported fires within the reserve.
Other assets (including private property or other lands adjacent to the park)	• Property assets may be damaged by fire escaping the park.	• Maintain access trails and firebreaks within the park that will assist in fire fighting efforts. • Participate in fire management proposals through RFS Zone Bush Fire Management Committee meetings. • During the fire season rapidly respond to all unplanned fires to minimise potential spread to private lands.

MAP 7: CULTURAL HERITAGE

Key Management Guidelines	
• Identified sites must be protected. • DEC Databases, AHIMS and HHIMS, must be accessed during incidents and or for preparation of Review of Environmental Factors for fuel reduction burning or other works programs to ensure new records are included. Aboriginal site information from AHIMS is sensitive and subject to a Memorandum of Understanding. Site data must respect this agreement and must be used appropriately. • For fuel reduction burning programs, protection measures will be outlined in the Review of Environmental Factors and burning program outlines. • Where possible, trained officers will provide advice on site protection methods. • Comply with all conservation management plans.	
Aboriginal Heritage	• Sites must be clearly identified and protected during fire suppression and fuel reduction burning programs. • Identified sites include, stone & rock arrangements and open camp sites. • Potential site locations include over hangs, gully beds and ridgelines around the area, which may have significant sites, such as art sites, quarries and burials (which have been recorded within in the local area).
Historic Heritage	• Eulolo shearing shed and homestead ruins are susceptible to destruction by fire, disturbance during fire suppression and works programs. A heritage action statement (includes significance statement) is currently being prepared for the Eulolo complex. • The 'pig pens' are located the western side of Pig Pen FT. The wooden structures would be destroyed by fire and could be disturbed by inappropriate fire suppression tactics or management strategies. The Eulolo complex heritage action statement will include a significance assessment of the 'pig pens'. • There are relics of a rural dwelling, and associated structures of agricultural living, off Ruins Trail on the SW edge of the reserve. The wooden remnants are susceptible to destruction by fire and inappropriate suppression strategies. • Steam shaft cutting engines, farm machinery and other artefacts of rural existence may be disturbed or destroyed by fire, inappropriate management and or neglect.

Note: Cultural heritage sites are based on data recorded on AHIMS and HHIMS databases as at November 2004.

MAP 3: VEGETATION COMMUNITIES & THRESHOLDS

VegGroup	Vegetation Description	Ha's	% Cover
23	Yellow Box & Blakelys Red Gum - Woodland	758.2	19%
33	Blakely's Red Gum/Apple Box & Yellow Box - Grass/Forb Forest	107.6	3%
34	Blakely's Red Gum & Callitris Pine - Flax Lily Open Forest	996.7	25%
39	Black Cypress Pine & Dwyers Red Gum Woodland	1634.7	42%
42	Currawang Wattle & She-Oak Shrubland	88.6	2%
170	Secondary Grassland	165.7	4%
171	Previous Pasture	126.2	3%
178 & 199	Natural Vegetation - Partially Cleared	53.3	1%

Fire Interval	Vegetation Group	Vegetation Management Guidelines
10-110	Black Cypress Pine & Dwyers Red Gum Woodland 39	• Species decline predicted if successive fires occur <10 years apart. • Community decline predicted if fires occur >110 years apart. • Ecosystem most vulnerable to intensive and frequent fires. • Soils prone to erosion from high intensity and frequent fire. • Where possible, contain fires to small areas.
10-100	Blakely's Red Gum & Callitris Pine - Flax Lily Open Forest 34	• Species decline predicted if successive fires occur <10 years apart. • Community decline predicted if fires occur >100 years apart. • This vegetation community is susceptible to simplification. • Soils prone to erosion and weed invasion predicted with frequent fire.
10-90	Currawang Wattle & She-Oak Shrubland 42	• Species decline predicted if successive fires occur <10 years apart. • Community decline predicted if fires occur >90 years apart. • Where possible, all fires should be contained to small areas. • Soils prone to erosion.
10-90	Blakely's Red Gum/Apple Box & Yellow Box - Grass/Forb Forest 33	• Species decline predicted if successive fires occur <10 years apart. • Community decline may result if fires occur >90 years apart. • This vegetation community is susceptible to simplification. • Soils prone to erosion with intensive & or frequent fire.
15-25	Yellow Box & Blakelys Red Gum - Woodland 23	• Species decline predicted if successive fires occur <15 years apart. • Community decline predicted if fires occur >25 years apart. • Local extinctions may occur if fire occurs >40-50 years apart. • This vegetation contains TSC threatened species, which should be protected during fire events where possible. • Soils prone to erosion and weed invasion with frequent fire.
8-25	Secondary Grassland & Previous Pasture 170 & 171	• Fire may promote weed coverage and abundance in these communities. • Soils and prone to erosion and weed invasion predicted with frequent fire. • Should not be subjected to planned burning programs unless supported by longer term weed control programs.

Note: The vegetation community labelled Natural Vegetation (Partially Cleared) has no available species lists to determine intervals, thresholds or model potential impacts of fire on the community. Vegetation group management may affect TSC species habitat requirements. Flora and Fauna management guidelines should be consulted in conjunction with vegetation management guidelines.

MAP 4: VEGETATION THRESHOLD ANALYSIS

Threshold	Vegetation Group	% of Reserves	Interpretation & Management Guidelines
Overburnt	N/A	0%	• According to the vegetation regime thresholds, two consecutive inter-fire intervals have been recorded too close together and the area is over burnt. • Fire in this area will lead to adverse fire regimes and may threaten community biodiversity.
Vulnerable	N/A	0%	• Will be over burnt if the area burns before 2006. • Fire should be avoided for this year and until another analysis of thresholds is modelled to reassess threats.
Recently burnt	23	20%	• Time since fire is less than the threshold intervals, but will be considered OK after 2005. • Fire this year will push this vegetation into the vulnerable class. • Fire should be avoided for this year, but could be assessed for proposed burning or other fuel reduction program for the following year.
Underburnt	N/A	0%	• May require fire after 2005 – either for Asset protection, strategic or biodiversity reasons. • Planned fire may be introduced for fuel reduction burning for asset or strategic protection programs. • Unplanned fire events may be allowed to burn if conditions are suitable and the intensity meets desirable vegetation community, flora and fauna guidelines.
Almost Underburnt	N/A	0%	• Planned fire may be introduced for fuel reduction burning for asset or strategic protection programs. • This area will fall into the underburnt category by the end of 2006 if it remains unaffected by fire, but would fall into recently burnt if burnt in 2005.
OK	33, 34, 39 & 42	72%	• Areas which thresholds have been assigned to, which don t fall into one of the above categories. • Fire is neither required or to be avoided.
Unknown/ No Regime Assigned	170, 171, 178 & 179	8%	• The fire history is too short to determine whether it is underburnt or over burnt. • Areas that do not have a threshold assigned to them or there is missing data, limiting the modelling capabilities in DEC GIS.

Note: The vegetation threshold analysis are derived from calculations from vegetation community fire thresholds and fire history.

MAP 10: LANDSCAPE FUELS

Fuel Landscape	T/ha	Notes
Minimum Fuels (Modelled April 2004)	2.0	Data based on 10 fuel sites within Ulandra NR (n 50). This data is used to determine the relationship of fuel sites with NDVI (Vegetation Index) from LANDSAT Imagery to calculate fuel/vegetation density across the reserve. 16 additional sample sites required to test accuracy.
Maximum Fuels (Modelled April 2004)	10.6	
Average Fuels (Modelled April 2004)	5.7	
Average Fuels (Recorded April 2004)	**9.5**	50% of sites measured under 10 t/ha & 40% under 12 t/ha.
Highest Fuels (Recorded April 2004)	**15.4**	Vegetation Group 33 –high NDVI.

MAP 5: BUSHFIRE BEHAVIOUR POTENTIAL

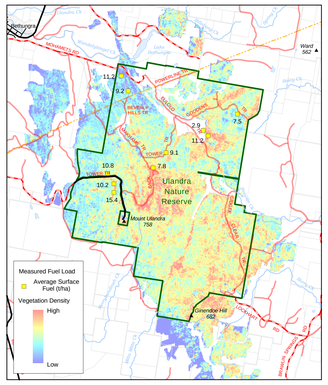
Vegetation Bushfire Behaviour Rating

Rating	Vegetation Type	Hectares	% of Reserve
Low	Previous Pasture - Weed Infested Secondary Grassland	342	8%
Medium	Natural Vegetation - Partially Cleared	3	<1%
High	Black Cypress Pine & Dwyers Red Gum Woodland Blakely's Red Gum/Apple Box & Yellow Box - Grass/Forb Forest Currawang Wattle & She-Oak Shrubland Yellow Box & Blakelys Red Gum – Woodland	2589	76%
Very High	Blakely's Red Gum & Callitris Pine - Flax Lily Open Forest	997	25%

Aspect Bushfire Behaviour		Slope Bushfire Behaviour	
Rating	**Aspect in degrees**	**Rating**	**Slope in degrees**
Low	60 - 160	Low	0 - 10 degrees
Medium	160 - 220 & 30 - 60	Medium	11 - 20 degrees
High	220 - 260 & 350 - 30	High	20 - 30 degrees
Very High	260 - 350	Very High	>30 degrees

Note: To determine the Bushfire Behaviour Potential, Vegetation (dominant communities), aspect and slope ratings where utilised to identify areas or predicted low to very high fire behaviour, using Arcview 3.2 and DEC developed Fire Tools extension.

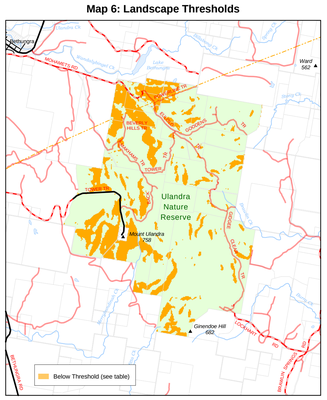
Map 10: Landscape Fuels



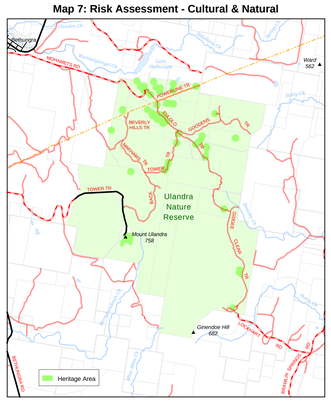
MAP 9: BUSHFIRE MANAGEMENT ZONES

Management Zone	Definition	Management Guidines
Asset (APZ)	Life, property and commercial assets in high risk Bushfire Behaviour Potential on DEC estate	• Assets should be evaluated annually to measure potential hazard build up. • Works program to follow Risk Assessment of Economic & Private Property Guidelines.
Strategic (FMZ)	Strategic Fuel Management Zones are areas used to target potential risks of high fire intensity, increased rate of spread, spotting or to consolidate APZ's. This zone is a target area for any prescribed programs attempting to break up large areas of high Bushfire Behaviour Potential and or high fuels.	• Zones should be assessed regularly to measure potential increase in hazard or risk. • These zones are suitable for implementing prescribed burns or other fuel or vegetation manipulation program (where appropriate).
Heritage 1 (HMZ1)	Areas of high priority conservation value. It identifies areas of recorded cultural assets and natural values. This zone is important for the protection of cultural heritage and the conservation of some species habitat to prevent extinctions.	• Heritage areas should be assessed annually to determine potential hazard, threats and thresholds to Cultural Heritage, species and habitat (vegetation group communities). • Fire may be applied in these areas if appropriate for the protection of cultural heritage or for ecological principles.
Heritage 2 (HMZ2)	This zone identifies areas of significance for natural and cultural features across the broader landscape.	• These heritage zones should be monitored to determine threats to thresholds and biodiversity. • Implement programs and or recovery plan guidelines

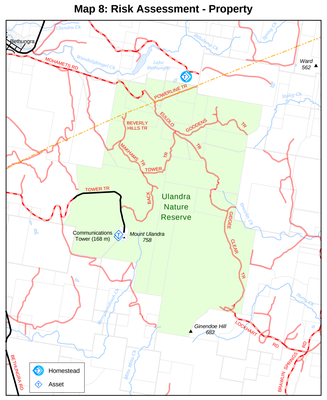
Map 6: Landscape Thresholds



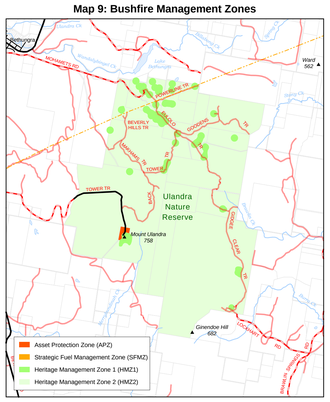
Map 7: Risk Assessment - Cultural & Natural



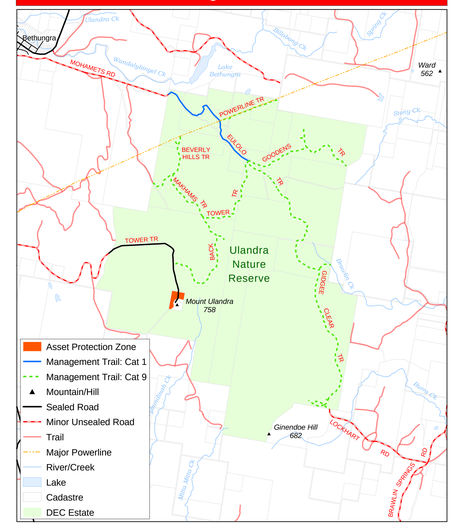
Map 8: Risk Assessment - Property



Map 9: Bushfire Management Zones



Works Program 2005 - 2010



WORKS PROGRAM

Asset	Priority	Name, Area or Detail	Management Strategy	Proposed Works
Reserve Trails	High	Management Trails (Cat 1 Vehicles)	• Maintain access for Cat 1-9 Vehicles	• Assess Annually. • Maintain as required or as specified in Regional Operations Program.
	Medium	Management Trails (Cat 9 Vehicles)	• Maintain access for Cat 9 vehicles.	• Assess Annually. • Maintain as required or as specified in Regional Operations Program.
	These trails do not comply with the Bush Fire Coordinating Committee Guidelines for the Classification of Fire Trails – Policy No. 1/03.			
Asset PZ	High	• Economic, commercial and private property Assets	• Where appropriate, compliment leaseholder & DPNR works with Strategic Fuel Management Zones.	• As agreed through the Bushfire Management Committee.
Strategic FMZ	High	• Where and if they have been identified.	• Work with neighbours and local RFS to ensure appropriate access and fire breaks adjacent to the reserve are maintained to protect assets and reserve features.	• As agreed through the Bush Fire Management Committee.
Heritage MZ 1	Medium	• Cultural heritage, threatened, vulnerable & endangered species, habitats, communities and the landscape.	• Manage and protect natural & cultural heritage values with appropriate fire management regimes.	• Monitor risks. Especially before works programs. • Monitor thresholds to assess biodiversity values, especially after fire.
Heritage MZ 2	Medium	• Landscape	• Monitor vegetation structure, bushfire behaviour potential (including fuels) that may increase vulnerability of biodiversity.	• Assess when possible and especially after fire events.
Information & Research	Low	• Fuel and vegetation monitoring.	• Continue measuring/monitoring fuels at all established sites. • Maintain photographic site records.	• Every 3 years (minimum photo's). • After fire (recovery monitoring).
Fuel or Hazard Reduction Burns	Low	• No specific burns proposed for life of this plan (5 years).	• Monitor and assess changes in potential hazards to assets. • Any proposed hazard reduction burns must be managed in accordance with DEC policy and agreements with Local Bush Fire Management Committee.	• Negotiated proposed works programs at Bushfire Management Committee Meetings.