

# Fire Management Plan

Reserves of the Southern Flinders Ranges

2009-2019



*Incorporating The Dutchmans Stern Conservation Park, Mount Brown Conservation Park, Mount Remarkable National Park and Telowie Gorge Conservation Park*

Department  
for Environment  
and Heritage



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## EXECUTIVE SUMMARY

This Fire Management Plan for Department for Environment and Heritage (DEH) Reserves of the Southern Flinders Ranges includes The Dutchmans Stern, Mount Brown and Telowie Gorge Conservation Parks and Mount Remarkable National Park. The plan has been developed to provide direction for fire management activities, including bushfire suppression in these reserves. The plan emphasises the protection of life and property, as well as providing direction for land managers in the protection and enhancement of the natural and cultural heritage of the reserves. It is important to note there will be a transitional phase where the activities and works proposed in the plan are implemented. Some degree of flexibility will need to remain for fire suppression in those areas where there has only been partial implementation of works.

The Reserves of Southern Flinders Ranges were identified as a priority for fire management planning within DEH Northern and Yorke Region to address the following issues.

- High visitor numbers, particularly in Mt Remarkable National Park.
- Protection of important habitat for many species and communities, including those with conservation ratings.
- General protection of life, property and environmental values in the plan area.
- The landscape protection of reserves, to reduce the likelihood of a whole reserve or large portion of a reserve burning in a single fire event.

These issues were addressed by:

- applying a risk assessment process to identify life, property and environmental values at risk from bushfires
- applying DEH Fire Management Zoning Principles to manage fuel in Asset and Buffer Zones
- applying Ecological Fire Management Guidelines to determine appropriate burning in Conservation Zones
- auditing tracks within the DEH reserves using the Government Agencies Fire Liaison Committee's (GAFLC) "*South Australia Guidelines for State Government Agencies: Firebreaks and Fire Access Tracks*".

A number of actions as result of applying the above processes are recommended.

- Prescribed burning to:
  - reduce fuel in Asset and Buffer zones as outlined in the plan (other methods of fuel reduction will also be used, and in some cases is specifically mentioned)
  - reduce fuel in strategic areas within the Conservation zone to provide some landscape protection for the reserves
  - create mosaics of areas with a range of different times since the last fire.
- Alteration and/or upgrade of fire access points and track classifications to increase the:
  - safety of firefighting personnel involved in a fire suppression effort
  - response time of fire suppression agencies
  - type of resources that can safely be deployed to assist in a fire suppression effort.

- Identification of suppression considerations that may assist bushfire suppression operations to contribute to improved fire management.
- The development of an emergency procedure/action plan that addresses visitor/staff safety during bushfires.

A major review of this plan will occur after ten years of implementation, or earlier if required. Recommended works will be reviewed on an annual basis.

**CONTENTS**

<b>EXECUTIVE SUMMARY .....</b>	<b>I</b>
<b>CONTENTS.....</b>	<b>III</b>
List of Tables.....	v
List of Figures.....	v
List of Attached Maps .....	v
<b>1 SCOPE AND PURPOSE .....</b>	<b>1</b>
<b>2 THE PLANNING FRAMEWORK.....</b>	<b>2</b>
2.1 Legislation .....	2
2.2 DEH Fire Management Policy .....	3
2.3 Zoning Policy .....	3
2.4 Local and Regional Environmental Planning.....	4
2.5 Reserve Management Planning .....	5
2.6 Consultation .....	5
2.7 General Objectives for Fire Management .....	5
<b>3 BUSHFIRE ENVIRONMENT .....</b>	<b>6</b>
3.1 Location .....	6
3.2 Climate, Wind and Weather.....	6
3.3 Terrain .....	6
3.4 Fuel.....	7
3.5 Extreme Fire Conditions .....	10
<b>4 FIRE HISTORY AND FIRE REGIMES.....</b>	<b>11</b>
4.1 Fire Regimes Prior to European Settlement .....	11
4.2 Mapping Fire Occurrences.....	11
4.3 Large Fires .....	11
4.4 Natural and Anthropogenic Fires.....	11
4.5 Prescribed Burning/Historical Fires.....	11
<b>5 DAMAGE POTENTIAL TO LIFE AND PROPERTY .....</b>	<b>13</b>
5.1 Potential Threats to Life.....	13
5.2 Adjoining Land Use.....	14
5.3 Built Assets and High Value Assets .....	14
5.4 Cultural Heritage.....	15
<b>6 SPECIES AND COMMUNITIES OF CONSERVATION SIGNIFICANCE.....</b>	<b>16</b>
6.1 Major Vegetation Sub-groups .....	16
6.2 Flora, Fauna and Ecological Communities .....	17
<b>7 ECOLOGICAL FIRE MANAGEMENT.....</b>	<b>23</b>
7.1 Fire Regimes for Biodiversity Conservation .....	23
7.2 Development of Ecological Fire Management Guidelines.....	23

7.3	Interpreting Ecological Fire Management Guidelines .....	24
7.4	Weeds.....	26
7.5	Pest Animals.....	27
<b>8</b>	<b>FIRE MANAGEMENT ZONES.....</b>	<b>29</b>
8.1	Zoning Background.....	29
8.2	Risk Assessment .....	29
8.3	Asset Zone (A-zone) .....	29
8.4	Buffer Zone (B-zone) .....	30
8.5	Conservation Zone (C-zone) .....	31
8.6	Prescribed Burning.....	31
8.7	Burn Preparation .....	32
<b>9</b>	<b>BUSHFIRE SUPPRESSION .....</b>	<b>34</b>
9.1	Legislation .....	34
9.2	Policies and Procedures .....	34
9.3	Response – Role of CFS and DEH .....	34
9.4	Suppression Strategies .....	35
9.5	Fire Access .....	35
9.6	Heavy Machinery .....	36
9.7	Phytophthora Management .....	36
9.8	Post-fire Rehabilitation and Recovery .....	36
9.9	Water .....	36
9.10	Landing Strips .....	36
<b>10</b>	<b>RESEARCH AND MONITORING .....</b>	<b>37</b>
10.1	Monitoring.....	37
10.2	Research .....	38
<b>11</b>	<b>FIRE MANAGEMENT BLOCKS .....</b>	<b>39</b>
11.1	Fire Management Block Prescriptions .....	39
11.2	Mapping .....	39
	THE DUTCHMANS STERN BLOCK.....	41
	MOUNT BROWN BLOCK .....	43
	ALLIGATOR BLOCK .....	45
	HILLAMS BLOCK.....	49
	REMARKABLE RANGE BLOCK .....	51
	TELOWIE GORGE BLOCK.....	53
	NAPPERBY BLOCK.....	56
<b>12</b>	<b>RECOMMENDATIONS.....</b>	<b>58</b>
12.1	Summary of Management Strategies .....	58
12.2	Summary of Works for Fire Management Blocks .....	61
<b>13</b>	<b>REFERENCES.....</b>	<b>64</b>

<b>14 APPENDICES .....</b>	<b>67</b>
Appendix 1 – Fire Response of Rated, Significant and Introduced Flora Species .....	67
Appendix 2 – Fire Response of Rated and Significant Fauna Species .....	76
Appendix 2a – Fire Response of Declining Woodland Birds .....	78
Appendix 3 – Fire Response of Ecological Communities of Conservation Significance .....	85
<b>15 SUMMARY OF CODES USED IN APPENDICES .....</b>	<b>86</b>
<b>16 GLOSSARY OF ACRONYMS AND FIRE MANAGEMENT TERMINOLOGY .....</b>	<b>87</b>

### List of Tables

Table 1 – Likely Maximum Overall Fuel Hazard for MVS .....	8
Table 2 – Ecological Fire Management Guidelines for MVS .....	25
Table 3 – Summary of Fire Management Blocks .....	39
Table 4 – Recommended Works for Fire Management Blocks.....	61

### List of Figures

Figure 1 – The Planning Framework.....	2
Figure 2 – Components of Fuel in Vegetation.....	7
Figure 3 – Overall Fuel Hazard.....	7
Figure 4 – Approach for Determining Ecological Fire Management Guidelines .....	24
Figure 5 – The Burn Planning Process.....	33

### List of Attached Maps

Map 1 – Terrain, Tenure and Infrastructure
Map 2 – Vegetation Communities
Map 3 – Fire History
Map 4 – Fire Management and Access





## 1 SCOPE AND PURPOSE

The intention of this plan is to provide strategic direction and a framework for fire management activities in The Dutchmans Stern Conservation Park (CP), Mt Brown CP, Mt Remarkable National Park (NP) and Telowie Gorge CP. The plan defines objectives for ecological fire management, life and property protection. It outlines strategies and suggests works and activities to meet these objectives. Pre-suppression works and activities will increase the level of bushfire preparedness and guide suppression strategies during bushfire incidents.

This Fire Management Plan aims to:

- review the level of risk associated with the protection of life, property and the environment and the existing fire management and reserve management objectives
- define objectives for fire management in The Dutchmans Stern CP, Mt Brown CP, Mt Remarkable NP and Telowie Gorge CP
- outline strategies to mitigate risks and proposes works and activities to increase the level of bushfire preparedness and guide suppression management during bushfire incidents.

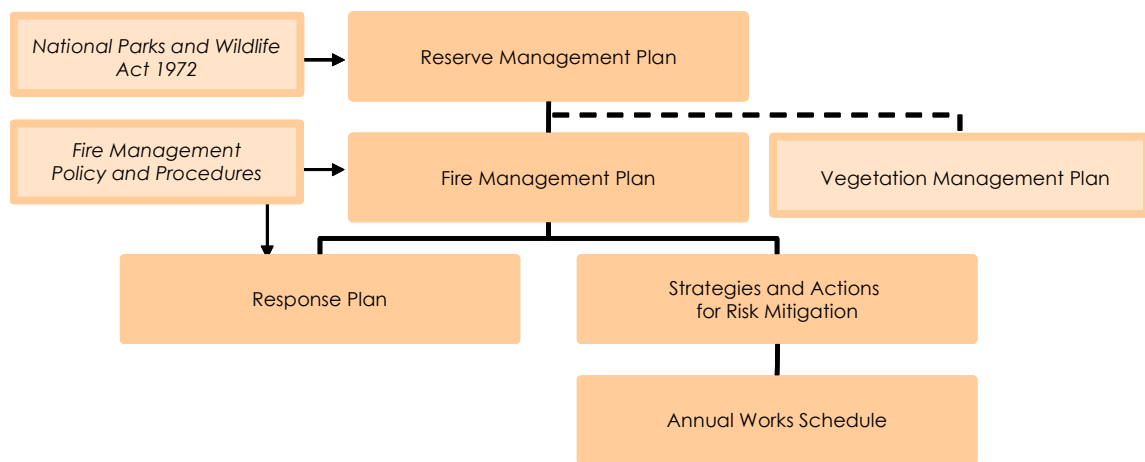
Operational works in this plan will be implemented in a staged manner, subject to resource availability. Adjoining lands are considered in this plan, but only in the context of works and activities required to minimise the risk to these assets from fires originating in the plan area. Fire management planning for land outside DEH Reserves is the responsibility of the Mt Remarkable, Flinders and Spencer District Bushfire Prevention Committees in accordance with the requirements of the *Fire and Emergency Services Act 2005*. DEH is represented on these committees along with Country Fire Service (CFS) and Local Government.

Four maps illustrating the plan area are provided as an attachment to this plan. Map 1 shows land use and terrain; Map 2 displays Major Vegetation Sub-groups, Map 3 illustrates fire history and Map 4 presents the fire management zones, access, strategies and other relevant operational information.

## 2 THE PLANNING FRAMEWORK

The policy and planning framework for fire management on DEH managed land is shown in Figure 1 (below). Reserve Management Plans provide the overarching strategy for all management activities in reserves and are prepared as a requirement under the *National Parks and Wildlife Act 1972* (or *Wilderness Protection Act 1992* where relevant). Fire Management Plans are produced for reserves in accordance with Fire Management Policy and Procedures. An outcome of the fire management planning process is the identification of strategies and operational works for risk mitigation over a 10 year period. These works are prioritised and programmed into a works schedule, which is prepared on an annual basis. Response Plans provide a greater level of detail in regards to fire suppression. Response Plans are used in the early stages of an incident and are reviewed annually to ensure currency.

**FIGURE 1 – THE PLANNING FRAMEWORK**



### 2.1 Legislation

#### 2.1.1 Federal Legislation

The Federal *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* describes the assessment and approval process required for actions likely to impact matters of national environmental significance (e.g. nationally listed species and ecological communities).

#### 2.1.2 State Legislation

Under the provisions of the *National Parks and Wildlife Act 1972* (NPW Act), DEH has responsibilities for fire management in reserves constituted under this Act. The preparation of Fire Management Plans is not a statutory requirement under this Act, but a Departmental Policy.

The *Fire and Emergency Services Act 2005* outlines the responsibilities of DEH and fire authorities in relation to fire management in DEH reserves. Under this Act, the Chief Officer (CFS) must take steps to have any relevant provisions of a management plan for a government reserve brought to the attention of members of CFS who might exercise powers under this section with respect to the reserve.

DEH is required to meet the provisions under the *Native Vegetation Act 1991* when prescribing any works that involve the clearance of native vegetation, or the use of fire (note that fire is also defined as 'clearance' under the Act). All prescribed burns must be approved through the process delegated to DEH by the Native Vegetation Council (NVC).

## 2.2 DEH Fire Management Policy

DEH has a *Fire Management Policy* (DEH, 2009) which outlines the agencies fire management responsibilities and provides a framework for bushfire suppression, prescribed burning and fuel management on DEH managed land.

Under this Policy, DEH is responsible for:

- fire management on reserves dedicated under the *National Parks and Wildlife Act 1972* or *Wilderness Protection Act 1992*
- fire management on any land under the *Crown Lands Management Act 2009* where the Minister for Environment and Conservation has fire management responsibilities
- fire suppression on other government lands where DEH have entered into a Memorandum of Understanding (MOU) or Heads of Agency Agreement (HOAA) with other government agencies.

The Policy states that DEH is will undertake fire management activities to protect life, property and environmental assets and to enhance the conservation of natural and cultural heritage values. Furthermore, it is recognised that fire is a natural component of the environment and the maintenance of biodiversity and ecosystem processes is dependent on appropriate fire regimes. Prescribed burning will be used as a management tool on DEH managed land for reducing fuel hazard to protect life, property and biodiversity values, and for ecological management.

The Policy specifies that Fire Management Plans will provide the framework for:

- the management of bushfire suppression, including identification of strategic access and control lines
- prescribed burning for ecological management and fuel reduction purposes.

## 2.3 Zoning Policy

DEH has a Zoning Policy that outlines the zoning standard that is used for fire management planning on DEH managed lands (DEH, 2008a). Zoning is derived from:

- the level of perceived risk, using the *Policy and Procedure for Risk Assessment in DEH Fire Planning* (DEH, 2008b)
- the Overall Fuel Hazard, which is assessed using the *Overall Fuel Hazard Guide for South Australia* (DEH, 2006a)
- the activities considered appropriate to mitigate the threat that fire poses to life, property and environmental assets.

Three distinct zones exist: Asset zone (A-zone), Buffer zone (B-zone) or Conservation zone (C-zone) and these are applied according to landscape objectives. A- and B-zones are determined by fuel management objectives whereas C-zones are designated to assist in the conservation of biodiversity through the application of appropriate fire regimes. For more

information on zoning, refer to Section 8 of this plan (Fire Management Zones) and the *Policy and Procedure for Fire Management Zoning in DEH Fire Planning* (DEH, 2008a).

## 2.4 Local and Regional Environmental Planning

The fire management objectives, strategies and works outlined in this plan were developed with careful consideration given to providing for the maintenance of ecological integrity. This fire management plan is consistent with the objectives outlined in the local and regional environmental plans that have been described in the following sections.

### Biodiversity Plan

The *Biodiversity Plan for the Northern Agricultural Districts of South Australia* (Graham, et al., 2001) is one of several regional biodiversity plans developed by DEH. The plan area covers approximately three million hectares spanning from Gawler in the south to Port Augusta in the north, including the entire Yorke Peninsula. The Biodiversity Plan was written to guide the conservation, management and rehabilitation of habitats at a regional level. The plan identifies the Southern Flinders Ranges as a key biodiversity area, hence a priority for management for conservation. The plan lists 'inappropriate fire regimes' as a major threat to biodiversity in the Northern Agricultural District and describes the following management actions for DEH.

- Continue to update fire scar mapping for all DEH reserves.
- Experiment with prescribed burning and encourage patchiness to promote habitat diversity, biodiversity and produce a variety of age classes within native vegetation, especially in the larger reserved areas.
- Suppress fires rapidly in smaller reserved areas.

### Planning for Threatened Species Management

The Southern Flinders Ranges provides important habitat for many species and communities including some listed under the under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The following species are listed under the EPBC Act and have recovery plans in place or in draft form.

- Bayonet Spider-orchid (*Caladenia gladiolata*) (Quarmby, 2006).
- Woolcock's Spider-orchid (*C. woolcockiorum*) (Bickerton, 2003a; Quarmby, 2006).
- Large-club Spider-orchid (*C. microclavia*) (Bickerton, 2003a).
- Yellow-footed Rock-wallaby (*Petrogale xanthopus*) - DRAFT (Baker-Gabb, 2005).

Additionally, DEH has developed an Ecological Fire Management Strategy for the Yellow-footed Rock-wallaby (DEH, 2007a).

### SA Strategic Plan

The SA Governments Strategic Plan states under *Objective Three – Attaining Sustainability*, a target of no species loss (T3.8) (DPC, 2004). As a result of this target, a strategy entitled *No Species Loss: A Biodiversity Strategy for South Australia 2007-2017* has been produced (DEH, 2007b). The Reserves of the Southern Flinders are located in the Mediterranean biome (encompassing part of the *Flinders Lofly Block IBRA Region*) in which a key threat to biodiversity is inappropriate fire regime (DEH, 2007b).

## 2.5 Reserve Management Planning

The overall management of The Dutchmans Stern CP, Mt Brown CP, Mt Remarkable NP, is described in the following Reserve Management Plans.

- The Dutchmans Stern Conservation Park (DEHAA, 1999b).
- Mount Brown Conservation Park Management Plan (DEHAA, 1999a).
- Mount Remarkable National Park Management Plan (DEH, 2006b).

The objectives and strategies in this Fire Management Plan are consistent with the strategies from the Management Plans for these Reserves. This Fire Management Plan identifies fire management zones and outlines specific objectives and prescriptions for those zones. These fire management zones are discussed further in Section 8. There is currently no Reserve Management Plan for Telowie Gorge CP.

## 2.6 Consultation

DEH is committed to close cooperation and involvement with State and Commonwealth organisations, special interest groups and the broader community to achieve the goals of biodiversity conservation and protection of life and property. To achieve this, the CFS and District Bushfire Prevention Committee (DBPC), lessees, conservation groups and ecologists have been consulted during the development of this plan.

## 2.7 General Objectives for Fire Management

In summary, DEH has responsibility for the fire management of the reserves incorporated in this Fire Management Plan. The fire management objectives that apply to all the reserves covered in this Fire Management Plan are to:

- provide for the protection of human life and property during bushfire events
- ensure that sound conservation and land management principles are applied to fire management activities (where information is available on species, habitat, cultural and built heritage, then it will be taken into account during suppression activities)
- provide for the strategic containment of bushfires
- complement CFS District Bushfire Prevention Plans
- undertake bushfire suppression activity in a safe and professional manner
- manage fire regimes to those consistent with the fire management guidelines in conservation zones.

### 3 BUSHFIRE ENVIRONMENT

The Southern Flinders Ranges is an area with a high risk of bushfires. The components of the landscape contributing to the bushfire potential include terrain, slope, climate, and the vegetation type.

#### 3.1 Location

Situated in the Southern Flinders Ranges, The Dutchmans Stern CP (3 723 ha), Mt Brown CP (2 271 ha), Mt Remarkable NP (1 8329 ha) and Telowie Gorge CP (1 967 ha), incorporate a total area of 26 290 ha of largely intact native vegetation.

The Dutchmans Stern CP is located approximately 25 km north-east of Port Augusta and 5 km north-west of Quorn. Mt Brown CP approximately 20 km east of Port Augusta and 15 km south of Quorn. Mt Remarkable NP comprises three separate land parcels. The main land parcel (16 618 ha) is located west of Melrose. The second land parcel (1 676 ha) is known as the Napperby Block and lies east of the township of Napperby and the third land parcel (35 ha) abuts Telowie Gorge CP. Telowie Gorge CP is about 15 km north-east of Port Pirie and 4 km north of the Napperby Block of Mt Remarkable.

#### 3.2 Climate, Wind and Weather

The climate of the region is typically Mediterranean, with long hot dry summers and cool wet winters. Factors such as elevation and distance from the coast influence the daily maximum and minimum temperatures of the region. On average, maximum temperatures decline with increasing elevation. Due to the moderating influence of the sea, sites nearer the coast generally have cooler summer maxima and milder overnight temperatures all year round.

Orographic uplift of the winter westerlies produces a belt of high rainfall along the western part of the Southern Flinders Ranges, while creating an extensive rain shadow to the east (BOM, 1995). The majority of rain falls from April to October.

Summer winds are mainly south-east to south-west, and in winter the most frequent winds are from the north-west to south-west. On average, strong winds (greater than 41 kph) are recorded on 2-3 days per month both in winter and summer (BOM, 1995). Topography can have a marked effect of local wind speed and direction. Valleys, for example, can channel the winds causing local wind anomalies.

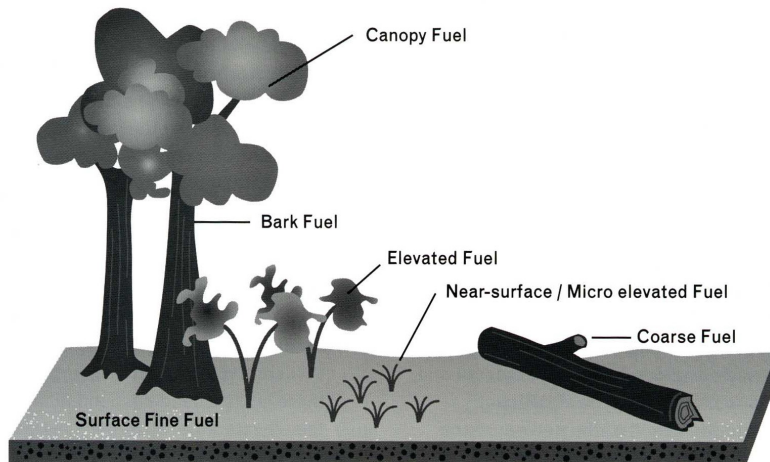
The reserves Southern Flinders Ranges experience frequent electrical storms in summer and lightning strikes are a potential cause of fires in the region.

#### 3.3 Terrain

The Southern Flinders Ranges landform is dominated by a series of north-south aligned ranges. These ranges are dissected by a system of steep gorges and rocky outcrops (Map 1). The landscape makes access to many areas difficult. Steep slopes, not only add significantly to the rate of spread of a fire, but also makes suppression in such areas extremely difficult.

### 3.4 Fuel

Fuels in forests, woodlands and shrublands can be divided into layers, based on their position in the vegetation profile (Figure 2).

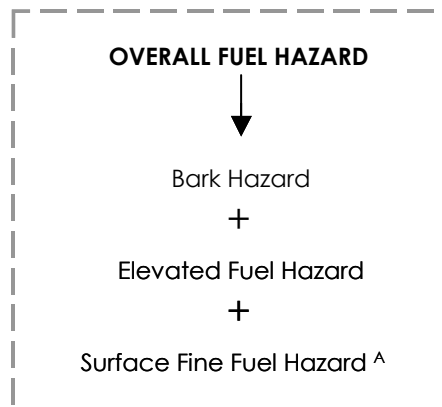


**FIGURE 2 – COMPONENTS OF FUEL IN VEGETATION**

Source: (Tolhurst and Cheney, 1999)

#### Overall Fuel Hazard

The Overall Fuel Hazard is used in fire management planning to determine the level of risk posed by bushfire to life, property and environmental assets during the risk assessment process. The Overall Fuel Hazard is derived from the assessment of four fuel layers in vegetation, as described in Figure 3 (below).



<sup>^</sup> Surface Fine Fuel Hazard adjusted to account for the presence of Near Surface Fuel

**FIGURE 3 – OVERALL FUEL HAZARD**

The Overall Fuel Hazard for vegetation types within the reserves was assessed by sampling across the plan area. In summary, Overall Fuel Hazard in The Dutchmans Stern CP ranged from *Moderate* to *Very High*. In Mt Brown CP, the Overall Fuel Hazard ranged from *Low* to *Extreme*. The sites with *Low* Overall Fuel Hazard appeared to be those that had been cleared prior to gazettal of the reserve. The Overall Fuel Hazard in Mt Remarkable NP ranged from *Low* to *Extreme*. For Telowie Gorge CP, the Overall Fuel Hazard was found to range from

Moderate to Extreme, while for the Napperby block the Overall Fuel Hazard ranged from Low to Very High.

The outcome of the assessment is explained in more detail for each reserve in Section 11 (Block Prescriptions). For more information on fuel hazard assessment methodology and evaluation refer to the *Overall Fuel Hazard Guide for South Australia* (DEH, 2006a).

### Likely Maximum Overall Fuel Hazard

Maximum Overall Fuel Hazard levels have been estimated for Major Vegetation Sub-groups (MVS) within the plan area in order to provide a guide for fire management (Table 1). The process used to derive MVS is described in Section 6.1 (Major Vegetation Sub-groups) and the extent of each MVS within the plan area is shown on Map 2.

In addition to determining the current Overall Fuel Hazard for vegetation types, the likely maximum Overall Fuel Hazard for Major Vegetation Sub-groups (MVS) that occur within the Reserves of the Southern Flinders was estimated (Table 1). The likely maximum Overall Fuel Hazard for MVS within the planning area ranged from *Low* to *Extreme*. Notably, *Eucalyptus* forests with a shrubby understorey (MVS No. 4), *Eucalyptus* woodlands with a shrubby understorey (MVS No. 8) and Mallee heath and shrublands (MVS No. 29) were found to have a likely maximum Overall Fuel Hazard of *Extreme*. For MVS No. 4 and MVS No. 8 the surface elevated and bark fuel layers are the components that contribute to the *Extreme* likely maximum Overall Fuel Hazard rating. Whereas, for Mallee Heaths and Shrublands, the elevated fuel layer is the component that mainly contributes to the *Extreme* likely maximum Overall Fuel Hazard rating. For all other vegetation communities the Likely Maximum Overall Fuel Hazard was estimated to be *Low*, *High* or *Very High*.

The likely maximum Overall Fuel Hazard for MVS can be used for planning and incident management, however should be supported by on-ground sampling as areas of vegetation remain unmapped and it is likely that other factors (such as high weed density) will influence the Overall Fuel Hazard. Refer to Section 7.4 (Weeds) for more information regarding invasive plants in the plan area.

**TABLE 1 – LIKELY MAXIMUM OVERALL FUEL HAZARD FOR MVS**

MVS No	MVS Name	Dominant Species Layers	Likely Maximum Overall Fuel Hazard	Significant Fuel Layers
4	<i>Eucalyptus</i> forests with a shrubby understorey	<i>Eucalyptus cladocalyx</i> , <i>E. camaldulensis</i> , <i>E. leucoxylon</i> ssp. <i>pruinosa</i> , <i>E. goniocalyx</i> , <i>Allocasuarina verticillata</i> , <i>Callitris glaucophylla</i> , <i>Acacia quornensis</i> , <i>Xanthorrhoea quadrangulata</i> , <i>Myoporum montalum</i> , <i>Casuarina pauper</i> , <i>Bursaria spinosa</i> , <i>Olearia decurrens</i> , <i>Cassinia laevis</i> , <i>Calytrix tetragona</i> , <i>Austrostipa breviglumis</i>	Extreme	Surface; Elevated; Bark <sup>1</sup>
5	<i>Eucalyptus</i> forests with a grassy understorey	<i>Eucalyptus odorata</i> , <i>E. leucoxylon</i> , <i>E. viridis</i> , <i>Cassinia laevis</i> , <i>Rhagodia parabolica</i>	Very High	Surface



MVS No	MVS Name	Dominant Species Layers	Likely Maximum Overall Fuel Hazard	Significant Fuel Layers
8	<i>Eucalyptus</i> woodlands with a shrubby understorey	<i>Eucalyptus leucoxylon</i> ssp. <i>pruinosa</i> , <i>E. porosa</i> , <i>E. camaldulensis</i> , <i>E. goniocalyx</i> , <i>E. odorata</i> , <i>E. cladocalyx</i> , <i>E. microcarpa</i> , <i>Cassinia laevis</i> , <i>Exocarpus cupressiformis</i> , <i>Callitris glaucophylla</i> , <i>Acacia quornensis</i> , <i>A. pycnantha</i> , <i>Allocasuarina verticillata</i> , <i>Lepidospermum viscidum</i> , <i>Xanthorrhoea quadrangulata</i> , <i>Bursaria spinosa</i> , <i>Pultenea daphnoides</i> , <i>Austrostipa</i> sp., <i>Lomandra</i> sp., <i>Triodia</i> sp., <i>Dianella revoluta</i>	Extreme	Surface; Elevated; Bark <sup>1</sup>
9	<i>Eucalyptus</i> woodlands with a grassy understorey	<i>Eucalyptus leucoxylon</i> ssp. <i>pruinosa</i> , <i>E. albens</i> , <i>E. odorata</i> , <i>E. camaldulensis</i> , <i>E. porosa</i> , <i>Cassinia laevis</i> , <i>Dodonaea viscosa</i> , <i>Acacia rupicola</i> <i>A. quornensis</i> , <i>Callitris glaucophylla</i> , <i>Olearia decurrens</i> , <i>Austrostipa eremophila</i> , <i>Lomandra densiflora</i>	Very High	Surface
12	<i>Callitris</i> forests and woodlands	<i>Eucalyptus camaldulensis</i> , <i>E. socialis</i> , <i>Callitris glaucophylla</i> , <i>Acacia quornensis</i> , <i>Allocasuarina verticillata</i> , <i>Xanthorrhoea quadrangulata</i> , <i>Cassinia laevis</i> , <i>Lomandra</i> sp., <i>Triodia</i> sp.	High	-
16	Other forests and woodlands	<i>Alectryon oleifolius</i>	High	-
21	Other <i>Acacia</i> tall open shrublands and shrublands	<i>Acacia ligulata</i> , <i>Cassinia laevis</i> , <i>Olearia decurrens</i>	High	-
22	Arid and semi-arid <i>Acacia</i> low open woodlands and shrublands with chenopods	<i>Acacia victoriae</i> ssp., <i>Avena</i> sp., emergent <i>Callitris glaucophylla</i> , <i>Rhagodia parabolica</i> , <i>Lycium ferocissimum</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Echium plantagineum</i>	High	-
23	Arid and semi-arid <i>Acacia</i> low open woodlands and shrublands with hummock grass	<i>Acacia quornensis</i> , <i>Triodia</i> sp., <i>Cassinia laevis</i> , <i>Dodonaea viscosa</i> ssp., <i>Xanthorrhoea quadrangulata</i>	Very High	-
24	Arid and semi-arid <i>Acacia</i> low open woodlands and shrublands with tussock grass	<i>Acacia victoriae</i> ssp., <i>Austrostipa</i> sp., <i>Austrodanthonia caespitosa</i>	High	-
26	<i>Casuarina</i> and <i>Allocasuarina</i> forests and woodlands	<i>Casuarina pauper</i> , <i>Allocasuarina verticillata</i> , <i>Olearia decurrens</i> , <i>Cassinia laevis</i> , <i>Callitris glaucophylla</i> , <i>C. preissii</i> , <i>Acacia victoriae</i> , <i>Xanthorrhoea quadrangulata</i> , <i>Exocarpus sparteus</i> , <i>Triodia irritans</i> , <i>Lomandra densiflora</i> , <i>Calytrix tetragona</i>	High	-
27	Mallee with hummock grass	<i>Eucalyptus odorata</i> , <i>E. socialis</i> ssp., <i>E. porosa</i> , <i>E. percostata</i> , <i>Cassinia laevis</i> , <i>Triodia</i> sp., <i>Callitris glaucophylla</i> , <i>Olearia decurrens</i> , <i>Lomandra multiflora</i> ssp. <i>dura</i> , <i>Exocarpos sparteus</i> , <i>Acacia ligulata</i>	Very High	Near Surface; Elevated; Bark <sup>1</sup>

MVS No	MVS Name	Dominant Species Layers	Likely Maximum Overall Fuel Hazard	Significant Fuel Layers
29	Mallee heath and shrublands	<i>Eucalyptus socialis</i> ssp., <i>E. porosa</i> , <i>Allocasuarina verticillata</i> , <i>Acacia pycnantha</i> , <i>Bursaria spinosa</i> ssp. <i>spinosa</i> , <i>Dianella revoluta</i> var., <i>Triodia</i> sp., <i>Austrodanthonia caespitosa</i> , <i>Austrostipa nitida</i> , <i>Lomandra multiflo</i> , <i>Beyeria lechenaultii</i> , <i>Olearia muelleri</i> , <i>Lepidium leptopetalum</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Hordeum leporinum</i> , <i>Vulpia myuros</i> forma <i>myuros</i> , <i>Austrostipa exilis</i> , <i>Rhagodia parabolica</i>	Extreme	Near Surface; Elevated; Bark <sup>1</sup>
31	Chenopod shrublands	<i>Rhagodia parabolica</i>	Low	-
32	Other shrublands	<i>Melaleuca lanceolata</i> , <i>Acacia calamifolia</i> , <i>A. ligulata</i> , <i>Zygophyllum confluens</i> , <i>Lycium australis</i> , <i>Lawrencia squamata</i> , <i>Eremophila alternifolia</i> , <i>Olearia decurrens</i> , <i>Cassinia laevis</i> , <i>Austrostipa</i> sp.	High	-
33	Arid and semi-arid hummock grasslands	<i>Triodia irritans</i> , <i>Themeda triandra</i>	Very High	Near Surface
36	Temperate tussock grasslands	<i>Lomandra effusa</i> , <i>Austrostipa</i> sp., <i>Austrodanthonia</i> sp., <i>Triodia scariosa</i>	High	-
49	Melaleuca shrublands and open shrublands	<i>Melaleuca lanceolata</i> , <i>Acacia calamifolia</i> , <i>Austrostipa</i> sp., <i>Dodonaea baueri</i> , <i>Melaleuca uncinata</i> , <i>Acacia gracillifolia</i>	Extreme	-
55	Mallee with an open shrubby understorey	<i>Eucalyptus socialis</i> ssp., <i>E. gracilis</i> , <i>Allocasuarina verticillata</i> , <i>Cassinia laevis</i> , <i>Xanthorrhoea quadrangulata</i> , <i>Melaleuca lanceolata</i> , <i>Zygophyllum confluens</i> , <i>Austrostipa</i> sp.	Very High	Elevated; Bark <sup>1</sup>

<sup>1</sup> if stringybarks are present

\* denotes introduced species

### 3.5 Extreme Fire Conditions

Strong winds, combined with high temperatures and low humidity provide conditions for moderate to severe fire intensity and fire behaviour, which is unmanageable by suppression activities. There is a dramatic increase in the likelihood of large fire events occurring when the following conditions are experienced:

- Very High to Extreme Overall Fuel Hazard levels in native vegetation.
- Low humidity, decreased soil and fuel moisture, particularly during drought years.
- High winds shifting direction during the course of a fire.
- Steep terrain

## **4 FIRE HISTORY AND FIRE REGIMES**

### **4.1 Fire Regimes Prior to European Settlement**

The pre-European fire regimes of the Southern Flinders Ranges are poorly documented. Given the frequency in occurrence of early summer lightning strikes, coupled with hot dry summer temperatures it may be assumed that the Southern Flinders Ranges experienced regular fires during summer. Unfortunately, little is known about the fire regime applied (if any) by the traditional owners prior to European settlement.

### **4.2 Mapping Fire Occurrences**

Map 3 (Fire History) has been compiled from the latest DEH fire incident reports. Last fire includes the most recent, complete firescar by year (mapped fires only). The quality of the firescar mapping varies, depending on the methods of capture, which ranges from the digitising of enlarged aerial photographs to the interpretation of hand drawn maps. It is important to note that only visible fire scars have been mapped. Consequently, the mapped fires may be regarded as a minimum estimate of fire occurrences.

### **4.3 Large Fires**

In recent history there have been a number of large fires that have occurred in DEH reserves of the Southern Flinders Ranges. In 1996 a large fire burnt the south-eastern section of Mt Brown CP. Large fires occurred in Mt Remarkable NP in 1927, 1984, and 1988, with the fire in 1988 burning the majority of the reserve as well as surrounding farmland. In 1960, Telowie Gorge CP and the northern section of the Napperby Block of Mt Remarkable NP were burnt. In 1985 a large fire occurred in Telowie Gorge CP.

### **4.4 Natural and Anthropogenic Fires**

The Southern Flinders Ranges experiences frequent electrical storms in summer. Lightning strikes have historically started a number of fires and will undoubtedly do so in the future. Most bushfires in the Southern Flinders Ranges have been a result of lightning strikes. There have, however, been some fires that have been a result of human activity. For example, the 1985 fire that burnt into Telowie Gorge CP was started accidentally by sparks from an angle grinder.

### **4.5 Prescribed Burning/Historical Fires**

Prior to 1967, the previous lessees regularly burnt sections of country now contained in Mt Remarkable NP. This was most likely also the case for The Dutchmans Stern CP with burning occurring in winter to improve grazing.

During the 1980s, DEH staff undertook prescribed burns in Mt Remarkable NP. Fifty metre wide strips across Mambray Creek, north of the residential areas were burnt for asset protection. A 35 metre peripheral burn around the former Alligator Lodge Residence and workshop was carried out during spring in the early 1980s. There are, however, no records that detail exact years that these burns were conducted.

In 2001, a small prescribed burn was undertaken within Mt Remarkable NP as part of a study examining the response of Bayonet Spider-orchids to various types of disturbance. In 2005, a prescribed burn was conducted in the old Willowie Forest Section of the reserve and in 2006 and 2007 prescribed burns were conducted along the Ring Route Track. The aim of these three burns was hazard reduction.

## 5 DAMAGE POTENTIAL TO LIFE AND PROPERTY

### 5.1 Potential Threats to Life

Of the four reserves covered in this plan, Mt Remarkable NP records the highest visitor numbers. The reserve is estimated to receive over 50 000 visitors per year. Visitation is greatest from April to October, with peak periods during Easter, long weekends and school holidays. From November to March, the visitor rate is relatively low, due primarily to hot weather. There two developed day visitor areas, one at Mambray Creek and another at Alligator Gorge.

There are presently eleven bush camping sites in Mt Remarkable NP: Stringers, Kingfisher Flat, Hidden Camp, Longhill Camp, Eaglehawk Dam, Fricks Dam, Sugar Gum Dam, Summit Camp, Stony Creek Camp, Racecourse and Goat Rock (Map 4). The use of these sites is restricted during the Fire Danger Season and campfires are prohibited throughout the year. The Mambray Creek Campground is open to visitors throughout the year, and campfires are permissible outside of the Fire Danger Season. In Telowie Gorge CP, Telowie Campground is open to visitors throughout the year and campfires are not permitted.

There is over 100 km of walking trails in reserves in the Southern Flinders Ranges. Most walking trails are signposted stating that walking trails are closed on Total Fire Ban Days. The Heysen Trail traverses through The Dutchmans Stern CP, Mt Brown CP and Mt Remarkable NP.

Visitor accommodation in Mt Remarkable NP includes Alligator Lodge and a cabin in the Mambray Creek Campground. In The Dutchmans Stern CP visitor accommodation is at The Dutchmans Homestead. There are two Heysen Trail walkers' huts: The Heysen Trail Hut in The Dutchmans Stern CP and Grays Hut in Mt Remarkable NP.

### Management Strategies

Potential Threats to Life	1. Continue to manage access to bush camping sites throughout the Fire Danger Season.
	2. Close all long walking trails on Total Fire Ban Days, and erect consistent signage across all reserves to indicate that Walking Trails are closed on these days.
	3. Develop an emergency procedure addressing visitor safety in relation to fire.
	4. Implement fuel management strategies appropriate to asset protection and visitor safety (refer to Block Prescriptions and Map 4 for further information).
	5. Reinforce CFS "Plan to Stay and Defend or Go Early" message to visitors and potential visitors.

## 5.2 Adjoining Land Use

Areas adjoining the reserves have a range of land uses including rural residential, native vegetation conserved under Heritage Agreement, Forestry Reserve, SA Water Reserve, and farmland (Map 1). Much of the native vegetation outside of the reserves has been cleared for agriculture, resulting in lower fuel loads. There are, however, significant remnants of native vegetation adjoining DEH reserves.

All landholders are obliged to comply with the *Fire and Emergency Services Act 2005*, which outlines responsibilities for fire preparedness.

### Management Strategies

<b>Land Use</b>	6. Implement fuel management strategies on DEH managed lands to minimise the risk to life, property and the environment (refer to Section 11 (Block Prescriptions) and Map 4 for further information).
	7. Encourage adjacent property owners to comply with the <i>Fire and Emergency Services Act 2005</i> by implementing fire management works on their own land to minimise the threat of fire.

## 5.3 Built Assets and High Value Assets

There are numerous on-reserve built assets at risk from bushfires including:

- the buildings in The Dutchmans Stern Homestead Precinct
- TV and radio towers at the summit of Mt Brown
- Southern Flinders District Office (including two residential houses) at the Mambray Creek precinct in Mt Remarkable NP
- Baroota Ruins at the Mambray Creek precinct in Mt Remarkable NP
- Mambray Creek campground in Mt Remarkable NP
- radio site including solar panels and GRN tower located on Battery Ridge Track in Mt Remarkable NP
- Alligator Lodge, solar panels and workshop in Mt Remarkable NP
- Alligator Gorge day visitor facilities in Mt Remarkable NP
- Grays Hut in Mt Remarkable NP
- Bush camping toilets at Kingfisher Flat in Mt Remarkable NP
- the footbridge in Telowie Gorge CP.

There are numerous built assets and high value assets off-reserve nearby at risk from bushfires including:

- SA Water Shed near the Napperby Block of Mt Remarkable NP
- the township of Melrose closely adjoins the eastern boundary of Mt Remarkable NP
- Wirrabara Forest Reserve (ForestrySA) native forest and pine plantations
- small settlements adjoin the western boundary of Telowie Gorge CP and the Napperby Block of Mt Remarkable NP
- Scout Hall on the south-eastern boundary of the Napperby Block

- surrounding farms.

More detailed information on built assets is provided on Map 4.

### Management Strategies

<b>Built Assets</b>	8. Undertake fire management works and activities to minimise impact on built assets, for both public and private buildings, agroforestry and farmlands.
	9. Implement fuel management strategies appropriate to asset protection (refer to Section 11 (Block Prescriptions) and Map 4 for further information).

## 5.4 Cultural Heritage

The Southern Flinders Ranges forms part of the 'Country' of the Nukunu people (Tindale, 1974). There are significant Aboriginal Heritage sites within the reserves. DEH staff will liaise with the Nukunu people and undertake site-specific works to protect these sites. Work will be in accordance with the *Aboriginal Heritage Act 1988* and the *Aboriginal Heritage Handbook and Strategy* (DEH, 2006c). There is a cultural heritage site within Mt Remarkable NP, which could be impacted upon by fire suppression vehicles.

There are no national estate heritage sites within the reserves. However, there are a number of sites within the reserves that are of local historic interest including the Spring Creek mine and Baroota Ruins at Mt Remarkable NP and the Homestead precinct at The Dutchmans Stern CP.

### Management Strategies

<b>Cultural Heritage</b>	10. Implement fuel management strategies for the protection of heritage values where practicable (refer to Section 11 (Block Prescriptions) and Map 4 for further information);
	11. Ensure liaison at bushfires occurs to identify heritage values, where time allows. Once the fire has passed evaluate sites to establish if any damage has occurred;
	12. Ensure liaison occurs at bushfires before commencing off-track vehicle based fire suppression due to the potential to impact upon cultural heritage sites in Mt Remarkable NP.

## 6 SPECIES AND COMMUNITIES OF CONSERVATION SIGNIFICANCE

Major Vegetation Sub-groups (MVS) occurring within the plan area are outlined in the following section, followed by flora and fauna of conservation significance. Threatened ecological communities are then discussed. Although there are many State rated species within the plan area (included in Appendix 1 and 2), the species that are specifically discussed are those that are Nationally rated that have a Recovery Plan prepared or in draft stage. A recovery plan for woodland-dependent birds has not yet been developed, however they are also discussed in this plan due to the perceived risk of a large bushfire on bird populations.

### 6.1 Major Vegetation Sub-groups

Floristic mapping for this plan uses a compilation of regional vegetation mapping data that has been reclassified to comply with the National Vegetation Information System (NVIS) for Australia. The MVS level of the NVIS classification emphasises the structural and floristic composition of the dominant stratum but with additional types identified according to typical shrub or ground layers occurring with a dominant tree or shrub stratum. There are 19 MVS within the plan area (Map 2). Ecological Fire Management Guidelines for these MVS are outlined in Section 1.

The MVS represented in the planning area are:

- Eucalyptus forests with a shrubby understorey (MVS No. 4)
- Eucalyptus forests with a grassy understorey (MVS No. 5)
- Eucalyptus woodlands with a shrubby understorey (MVS No. 8)
- Eucalyptus woodlands with a grassy understorey (MVS No. 9)
- Callitris forests and woodlands (MVS No. 12)
- Other forests and woodlands (MVS No. 16)
- Other Acacia tall open shrublands and shrublands (MVS No. 21)
- Arid and semi-arid acacia low open woodlands and shrublands with chenopods (MVS No. 22)
- Arid and semi-arid acacia low open woodlands and shrublands with hummock grass (MVS No. 23)
- Arid and semi-arid acacia low open woodlands and shrublands with tussock grass (MVS No. 24)
- Casuarina and Allocasuarina forests and woodlands (MVS No. 26)
- Mallee with hummock grass (MVS No. 27)
- Mallee heath and shrublands (MVS No. 29)
- Chenopod shrublands (MVS No. 31)
- Other shrublands (MVS No. 32)
- Arid and semi-arid hummock grasslands (MVS No. 33)
- Temperate tussock grasslands (MVS No. 36)
- Melaleuca shrublands and open shrublands (MVS No. 49)
- Mallee with an open shrubby understorey (MVS No. 55)



## 6.2 Flora, Fauna and Ecological Communities

The Environmental Databases of South Australia contain records from several data sources including the Threatened Plant Population Database, the Biological Survey of South Australia, Reserve database and Opportunistic sightings of significant flora and fauna.

Fire response information, where known, is included for these species and communities of conservation significance in Appendix 1, 2, 2a and 3. In most cases, species distributions are derived from the database, which only contains point locations from site visits or observations.

In this plan 'of conservation significance' is used to describe ecological communities and populations or species of flora and fauna that have a conservation rating under State or Federal Legislation. Species may be:

- Nationally rated, that is, listed as threatened (with a rating of Extinct, Critically Endangered, Endangered, Vulnerable or Conservation Dependent) under the federal *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*;
- South Australian rated, listed as Threatened (with a rating of Endangered, Vulnerable or Rare) under the *National Parks and Wildlife Act 1972, Revised Schedules 7, 8 and 9*.

Several species of flora and fauna of conservation significance as well as important ecological communities occur in The Dutchmans Stern CP, Mt Brown CP, Mt Remarkable NP and Telowie Gorge CP. The most significant in terms of this plan are:

- Yellow-footed Rock-wallaby - Nationally *Vulnerable*
- Woolcock's Spider-orchid - Nationally *Endangered*
- Bayonet Spider-orchid - Nationally *Endangered*
- Woodland-dependent Birds - No current rating
- Peppermint Box (*Eucalyptus odorata*) Grassy Woodland – Nationally *Critically Endangered*

### 6.2.1 Yellow-footed Rock-wallaby

The Yellow-footed Rock-wallaby is listed as *Vulnerable* at both that National and State levels. A draft Yellow-footed Rock-wallaby recovery plan has been produced (Baker-Gabb, 2005). Furthermore, a draft Ecological Fire Management Strategy for the Yellow-footed Rock-wallaby has been developed by DEH in consultation with the Yellow-footed Rock-wallaby Recovery Team (DEH, 2007a).

#### Habit

Yellow-footed Rock-wallabies grow to 70cm tall (when sitting) and weigh around 6-8kg. Yellow-footed Rock-wallabies live in groups that occupy their own rock-pile. A number of groups that occupy adjacent rock-piles are considered to be a colony. Colonies are usually separated by unsuitable habitat. For the purpose of this Fire Management Plan a colony or tight clusters of adjacent colonies will be termed a local population.

#### Location

There are Yellow-footed Rock-wallaby populations in The Dutchmans Stern CP, Mt Remarkable NP and Telowie Gorge CP.

**Risk**

Different fire regimes will affect the population size of Yellow-footed Rock-wallabies. Fires can result in the mortality of individual Yellow-footed Rock-wallabies due to radiant heat, smoke and flame. Fires can indirectly impact on the species by severely depleting food resources, and increasing post-fire competition from herbivores. Fires also result in loss of vegetation cover, exposing any surviving Yellow-footed Rock-wallabies to predators and also may affect habitat quality due to changes in floristic composition.

The overall risk to colonies, populations and their habitats and home ranges from bushfires is considered Extreme. This means that if there are no actions to mitigate the negative effects of bushfires, the impacts could be Major.

**Management Strategies**

<b>Yellow-footed Rock-wallaby</b>	13. In order to reduce the risk of losing more than one population during a single bushfire event, fuel reduction works should be undertaken, where possible, between local populations. These areas will be zoned as B-zones (see Section 8.4).
	14. Strategic fire access tracks should be maintained in the vicinity of and between local populations to the current GAFLC Standards.
	15. Fires should be restricted from burning the entire home range of a colony or population.
	16. Fires should be restricted from burning area between shelter sites and known water/feeding sources.
	17. Any prescribed burning conducted near known Yellow-footed Rock-wallaby habitat will be planned in conjunction with the Yellow-footed Rock-wallaby Recovery Team.

For detailed recommendations refer to the draft Yellow-footed Rock-wallaby Ecological Fire Management Strategy (DEH, 2007a).

**6.2.2 Threatened Spider-orchids**

Woolcock's Spider-orchid and Bayonet Spider-orchid are both rated as Endangered at the National Level. A draft recovery plan covering both species has been developed (Quarmby, 2006). A national recovery plan was prepared in 2003 for Woolcock's Spider-orchid (Bickerton, 2003a). The Flinders Ranges Spider-orchid (*Caladenia* aff. *arenaria*) and the Rancid Spider-orchid (*Caladenia* aff. *stellata*) are two recently described species found within the planning area that will be nominated for NPW Act and EPBC Act status by DEH.

**Habit**

All of the above species lie dormant during summer months and resprout from underground tuberoids during May or June. Flowering occurs from August until October.

**Location**

All species occur within Mt Remarkable NP and potential habitat has been identified on south facing slopes within Mt Brown CP (Quarmby, 2006). Threatened Spider-orchid populations are known to occur on or near edges of tracks in Mt Remarkable NP (Bickerton, 2003b).

Subpopulations of Woolcock's Spider-orchid within Mt Remarkable NP at risk of impact that have been identified within the national recovery plan include those at Woods Hut and Sugar Gum Camp and outlying subpopulations at Blue Gum Flat and Eaglehawk Dam (2 to 3 km west of the main subpopulations) (Bickerton, 2003b).

### Risk

The impact of fire on threatened Spider-orchids is poorly understood. Lack of disturbance or fire is thought to pose a moderate risk to the recovery of Bayonet Spider-orchid. Conversely Spider-orchid populations that occur near fire access tracks have been assessed to be at moderate risk from damage through suppression activities (i.e. vehicle access and machinery use).

### Management Strategies

Threatened Spider-orchids	18. Minimise the likelihood of vehicles or earthmoving equipment impacting on threatened Spider-orchid populations during fire suppression operations
	19. Avoid prescribed burning or slashing within threatened Spider-orchid populations during winter and spring
	20. Avoid prescribed burning or slashing within threatened Spider-orchid populations more frequently than every 5 years
	21. Minimise the likelihood of large areas of threatened Spider-orchid habitat burning in a single fire event
	22. Liaise with the Northern Lofty Block Orchid Recovery Team to develop strategies to reduce the risk of fire suppression vehicles impacting threatened Spider-orchid populations
	23. Undertake ecological/experimental burns on threatened Spider-orchid populations to examine the response of these species to different disturbance regimes
	24. Refer to Appendix 1 for fire management guidelines for threatened Spider-orchids

#### 6.2.3 Declining Woodland Birds

Many woodland-dependent bird species are considered to be in decline in the DEH Northern and Yorke Region. A recently formed Declining Woodland Bird Recovery Team for the Northern and Yorke Region has identified 43 species believed to be in decline. Of these 43 species, 38 species occur within the planning area (Appendix 2a). This list was developed through consultation with the Recovery Team and the examination of DEH Biological Databases. To date, no recovery plan has been developed for these woodland-dependent birds. Until a recovery plan has been prepared, the following information and approach has been developed to guide Fire Management activities.

### Habit

The woodland-dependent birds do not have common life history attributes, nor do they all share the same habitat requirements, breeding sites, or preferred food sources (Appendix 2a). This means that any given fire regime is likely to affect species differently.

**Location**

Woodland-dependent birds occur within all reserves incorporated in this Fire Management Plan; but not all species are present in all reserves (Appendix 2a). The specific habitat requirement for all the species is unknown.

**Risk**

The apparent decline of the woodland-dependent bird species is thought to be, in part, a result of loss and fragmentation of habitat through land clearing. The reserves in this plan represent a significant proportion of the remaining remnant vegetation in the Southern Flinders Ranges. There is concern that large-scale bushfires will result in short- to medium-term loss of habitat and further the decline of some of these species. There is anecdotal evidence that such declines occurred following the large 1988 bushfire in Mt Remarkable NP. It is considered that there is a high risk of population decline of bird species if a large portion of any reserve is burnt in a single fire event. In particular, large fire events (either bushfires or prescribed burns) during spring are likely to affect nestlings or species that have breeding sites in tree canopies and hollows, in the shrub layer or at the ground level.

**Management Strategies**

<b>Declining Woodland Birds</b>	25. Refer to Appendix 2a for fire management guidelines for declining woodland birds
	26. Strategic fire access tracks in reserves should be maintained to the current GAFLC Standards
	27. B-zones (see Section 8.4) should be established, where possible, to reduce the likelihood of large portions of reserves being burnt in a single fire event
	28. Landscape Protection Burns in C-zones (see Section 8.5) should be used to create a mosaic of areas with a range of different times since the last fire
	29. Before implementing any Landscape Protection Burns (see Section 8.5) within reserves, consideration should be given to the proportion of landscape that has been burnt within the reserve in the last five years, as well as the proportion of the landscape that has been burnt outside of the reserve. Until a more appropriate benchmark has been determined, no more than 30% of the identified woodland bird habitat within the reserves in the plan area should be burnt within a five year period. This benchmark was arrived at through consultation with the Recovery Team

**6.2.4 Peppermint Box Grassy Woodland****Status**

Peppermint Box Grassy Woodland is an extensively depleted community of conservation significance. It has been estimated that within South Australia the community occurs across 1.6% of its former range, that is only 15 000 ha remains of the 900 000 ha that existed at the time of European settlement (TSSC, 2007). The community survives largely on freehold and leasehold lands, with only a maximum of 210 ha protected within DEH reserves and under Heritage Agreement (TSSC, 2007).

Peppermint Box Grassy Woodland of South Australia is listed as Critically Endangered under the federal EPBC Act because of a considerable reduction in distribution and continued loss of integrity (DEWR, 2007).

### Components

The overstorey of this community is dominated by the woodland tree form Peppermint Box, as opposed to the whipstick mallee form (TSSC, 2007). Other overstorey species that are likely to be present include SA Blue Gum (*Eucalyptus leucoxylon*), Grey Box (*E. microcarpa*), Mallee Box (*E. porosa*), Southern Cypress Pine (*Callitris preissii*), White Cypress Pine (*C. glaucophylla*) and Drooping Sheoak (*Allocasuarina verticillata*) (TSSC, 2007). The understorey is comprised predominantly of native grasses and herbs, including Wallaby-grasses (*Austrodanthonia* spp.), Spear-grasses (*Austrostipa* spp.), Iron-grasses (*Lomandra* spp.) and Black-anther Flax Lily (*Dianella revoluta*) (TSSC, 2007). Shrubby understorey species are sparse, the most common species recorded are Sweet Bursaria (*Bursaria spinosa*) and Golden Wattle (*Acacia pycnantha*) (TSSC, 2007). Remnant patches are highly fragmented and subjected to grazing and pasture improvement (TSSC, 2007).

### Location

The community is restricted to South Australia, extending from the Southern Flinders Ranges to Lake Alexandrina (TSSC, 2007). In the Southern Flinders Ranges, the community was historically recorded primarily on hilly terrain, typically with red-brown soils or sometimes on solonized brown soils (DEH (Cwlth), 2006). Today, Peppermint Box Grassy Woodland is restricted to gentle to moderate slopes, hilltops and adjacent plains on sandy-loam to clay-loam soils (TSSC, 2007). A total of 30 ha of the community is conserved within Mt. Brown CP and 30 ha within Mt. Remarkable NP (TSSC, 2007). Between 100 to 150 ha is protected under Heritage Agreement and a small remnant occurs within Sandy Creek Conservation Park in the Mount Lofty Ranges (TSSC, 2007).

### Risk

As a result of the historical distribution of this community inhabiting highly productive soils, much of it was cleared for agricultural purposes and now is severely fragmented (DEH (Cwlth), 2006). Invasion by weedy species is considered a significant threat to this community, especially due to its distribution across somewhat fertile soils and its proximity to agricultural areas (DEH (Cwlth), 2006). Salvation Jane (*Echium plantagineum*) and Wild Oats (*Avena barbata*) are common invaders of Peppermint Box woodland. Bushfire is considered a significant threat to this community, as it is likely that the remnants could be burnt in their entirety during a single fire event. During the fire management planning process it was assessed that there was a *Moderate* risk of Mt Brown CP burning in its entirety in a single fire event and a *High* risk of Mt Remarkable NP burning in its entirety in a single fire event.

## Management Strategies

Peppermint Box Woodland	30. Refer to fire management guidelines when implementing prescribed burns and aim to manage within these guidelines. Refer to Appendix 3 for Fire Management Guidelines
	31. Avoid burning continuous remnants of Peppermint Box Grassy Woodland in its entirety during a single fire event, instead aim to increase patchiness within the remnants
	32. Implement ecological/experimental burns as part of an integrated weed management strategy in order to reduce the abundance of environmental weeds posing a threat to the integrity of Peppermint Box Grassy Woodland
	33. Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns

## 7 ECOLOGICAL FIRE MANAGEMENT

The use of fire to maintain biodiversity is detailed within the DRAFT *Ecological Fire Management Guidelines* (DEH, 2008i) document. This approach is being advocated as a sound basis for the management of fire for biodiversity across Australia (Andersen, *et al.*, 2003; FEWG, 2004; Hopkins and Saunders, 1987; Whelan, *et al.*, 2002). It is based on accumulating knowledge of species, populations and communities and their response to fire regimes, and then applying this knowledge to fire management practices to maximise biodiversity outcomes. Ecological Fire Management Guidelines are used to assist in achieving management objectives in C-zones within all DEH Fire Management Plans. For more information on C-zones refer to Section 8.5 of this Fire Management Plan.

### 7.1 Fire Regimes for Biodiversity Conservation

Fire regime is described as the history of fire in a particular vegetation type or area including the fire frequency, interval, intensity, extent and seasonality of burning (Brooks, *et al.*, 2004). It is therefore assumed that avoiding adverse fire regimes across the majority of the habitat for any given species should minimise the risk of adverse impacts or local extinction. That is, an adverse fire regime confined to a minor proportion of the habitat of any particular species may influence local distribution, but will have little effect on the persistence of that species across the landscape. A range of different fire intensities, frequencies, seasons and scales of burning need to be incorporated into ecologically based regimes if they are to result in the conservation of biodiversity.

### 7.2 Development of Ecological Fire Management Guidelines

#### Vital Attributes

Ecological fire management guidelines for an area will be developed from knowledge of the life histories (vital attributes) of the flora and fauna species that inhabit that particular area. The vital attributes of a species are the characteristics which affect its persistence at a site after fire, the environmental conditions required for re-establishment, and the longevity of the species following disturbance (Noble and Slatyer, 1981). For fauna, these vital attributes are the habitat and life history characteristics: shelter, food, and breeding requirements of species (Friend and Williams, 1996).

#### Key Fire Response Species

Examination of vital attributes of the species present in a particular area assists in defining the *Key Fire Response Species* for a particular community or vegetation type. These are the species most susceptible to decline due to inappropriate fire regimes: either too frequent or too infrequent fire, low or very high intensity fire, or fire in a particular season. These species and their needs in relation to fire regime provide a guide to the acceptable thresholds of fire regime (interval, season or intensity) for that particular area.

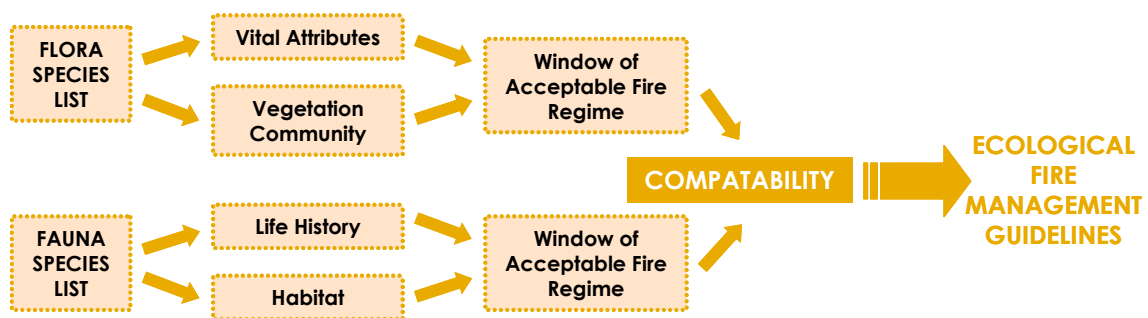
#### Methodology

Ecological Fire Management Guidelines have been developed from the research and analysis of available data relating to the *Key Fire Response Species* within the Reserves of the Southern Flinders. The approach used by DEH to define the Ecological Fire Management

Guidelines involves the identification of fire regime thresholds using flora and the assessment of the potential impacts of these thresholds against known faunal requirements, particularly the requirements of species of conservation significance. The steps taken in the development of the Ecological Fire Management Guidelines are as follows:

- Vital attributes data of plant and animal species, and ecological communities are gathered and assessed.
- This knowledge is used to identify the *Thresholds of Potential Concern* (TPC) of fire regime (fire interval, intensity, season & type) where species significantly decrease.
- Ecological Fire Management Guidelines are formed from these thresholds and are then used to guide the fire management practices to ensure that adequate habitat is available to maintain biodiversity (i.e. species, populations & communities) (Section 7.3).

Figure 4 (below) illustrates this process.



**FIGURE 4 – APPROACH FOR DETERMINING ECOLOGICAL FIRE MANAGEMENT GUIDELINES**

(Adapted from DEH, 2008i)

### 7.3 Interpreting Ecological Fire Management Guidelines

Ecological Fire Management Guidelines have been defined for Major Vegetation Sub-groups (MVS), enabling fire management to strategically plan and manage fire across the Reserves of the Southern Flinders Ranges in a way that will ensure the maintenance and enhancement of biodiversity (Table 2). Guidelines for five aspects of fire regime (interval, frequency, spatial, intensity and season) have been determined for all MVS within the planning area (where data is available). The upper and lower limits of fire interval for a particular MVS have been proposed, as well as recommendations on the management of fire frequency. Fire intensity requirements for species regeneration and undesired seasonal burning patterns have also been identified. Ecological Fire Management Guidelines should not be used as prescriptions; instead they define a window of “acceptable” fire regime that ensures the conservation of existing species.



TABLE 2 – ECOLOGICAL FIRE MANAGEMENT GUIDELINES FOR MVS

		FIRE REGIME						
		Thresholds of Potential Concern (TPC)		Spatial Criteria	Frequency		Intensity	Season
MVS No	MVS Name	TPC1 Lower threshold in years	TPC2 Upper threshold in years	Inter-fire intervals within TPC1 and TPC2 across more than X% of the extent of this MVS within the planning area	Avoid more than 2 fires within a period of X years	Avoid more than 2 successive fires of low intensity	Some medium to high intensity fire needed to regenerate some species	Avoid 2 or more successive fires in season <sup>1</sup>
4	<i>Eucalyptus</i> forests with a shrubby understorey	10	50	50%	40	Y	Y	Spring
5	<i>Eucalyptus</i> forests with a grassy understorey	5	40	50%	35	Y	Y	Spring
8	<i>Eucalyptus</i> woodlands with a shrubby understorey	20	35	50%	40	Y	Y	Spring
9	<i>Eucalyptus</i> woodlands with a grassy understorey	20	25	50%	40	Y	Y	Spring
12	<i>Callitris</i> forests and woodlands	15	60	50%	50	Y	Y	Dry
16	Other forests and woodlands	15	50	50%	40	Y	Y	Spring
21	Other <i>Acacia</i> tall open shrublands and shrublands	10	50	50%	40	Y	Y	Dry
22	Arid and semi-arid <i>Acacia</i> low open woodlands and shrublands with chenopods	#	#	#	#	#	#	#
23	Arid and semi-arid <i>Acacia</i> low open woodlands and shrublands with hummock grass	#	#	#	#	#	#	#
24	Arid and semi-arid <i>Acacia</i> low open woodlands and shrublands with tussock grass	#	#	#	#	#	#	#
26	<i>Casuarina</i> and <i>Allocasuarina</i> forests and woodlands	10	60	50%	50	Y	Y	Dry
27	Mallee with hummock grass	20	50	40	40	Y	Y	Dry
29	Mallee heath and shrublands	20	34	50%	40	Y	Y	#
31	Chenopod shrublands	#	#	50%	30	#	#	#
32	Other shrublands	20	35	50%	40	#	#	#

		FIRE REGIME						
		Thresholds of Potential Concern (TPC)		Spatial Criteria	Frequency	Intensity	Season	
MVS No	MVS Name	TPC1 Lower threshold in years	TPC2 Upper threshold in years	Inter-fire intervals within TPC1 and TPC2 across more than X% of the extent of this MVS within the planning area	Avoid more than 2 fires within a period of X years	Avoid more than 2 successive fires of low intensity	Some medium to high intensity fire needed to regenerate some species	Avoid 2 or more successive fires in season <sup>1</sup>
33	Arid and semi-arid hummock grasslands	10	34	50%	20	Y	Y	Dry
36	Temperate tussock grasslands	10	20	50%	20	#	#	Autumn
49	Melaleuca shrublands and open shrublands	#	#	#	#	#	#	#
55	Mallee with an open shrubby understorey	20	50	40	40	Y	Y	Dry

# Denotes that fire response is unknown or ambiguous for this MVS thus the required data is not available to propose Ecological Fire Management Guidelines. When data becomes available this table will be updated.

<sup>1</sup> This is not restricted to the same year, but may relate to fires in the same season over many years.

### Thresholds of Potential Concern

The *Threshold of Potential Concern* (TPC) for a vegetation type or community is the level of fire regime element (i.e. fire interval, frequency, intensity or season) where *Key Fire Response Species* are likely to significantly decline if exceeded. Fire regimes beyond that level are likely to lead to local extinction of significant biodiversity.

- TPC1 demonstrates the recommended lower limit for fire interval for a particular MVS. That is, vegetation within this MVS will be represented predominantly by early successional species if the inter-fire interval is less than the time specified, and those species that require longer to flower and set seed can disappear from a community.
- TPC2 demonstrates the recommended upper limit for fire interval for a particular MVS. That is, populations of some species (e.g. obligate seeders) are likely to reduce within this MVS if fire is absent for more than the time specified.

### 7.4 Weeds

Relatively large, weed free blocks are less likely to have their integrity threatened by weeds post-fire compared to disturbed or modified blocks where the “edge effect” (perimeter to area ratio) is high (Saunders, *et al.*, 1991). However, high post-fire weed densities may occur in areas adjacent to farmland or in existing modified vegetation. The post-fire abundance of any particular weed species, like all plant species, will be influenced by a number of factors including life history attributes, pre-fire density of the propagule source and fire regime (e.g. fire season, fire intensity and fire frequency) (Hobbs and Huenneke, 1992).

The weeds of main concern in the planning area are Bridal Creeper (*Asparagus asparagoides*), European Olive (*Olea europaea* ssp. *europaea*), Boxthorn (*Lycium ferocissimum*), Dog Rose (*Rosa canina*), Horehound (*Marrubium vulgare*) and Salvation Jane (Graham, *et al.*, 2001). Fire management guidelines for these species are included in Appendix 1. Until a weed management plan has been prepared, guidelines for weed management are included in Appendix 1.

Fire has been accepted as a tool for weed management, prescribed as part of an integrated approach (Hobbs, 2003). An integrated approach to weed management involves the planned use of fire coupled with other weed control techniques (including herbicide, biological, mechanical and physical control) noting that the combination, timing and application of methods is likely to differ depending on the target species. For example:

- Bridal creeper may be burnt in autumn (after the annual shoot cohort emerges) followed by the application of herbicide on post-fire growth (Willis, *et al.*, 2003).
- Horehound may be treated using low intensity fire in autumn and follow up control using herbicide on any regrowth the subsequent autumn or spring (Weiss, *et al.*, 2000; Weiss and Wills, 2000). Follow up revegetation with native species of the burnt area is also suggested to reduce the re-establishment of the weed (Weiss and Wills, 2000).
- Mechanical removal of Boxthorn using a tractor, front-end loader or chainsaw is recommended followed by burning to remove the remaining debris (Turnbull, 1998).

Any prescribed burn conducted by DEH will have weed control prioritised in the Environmental Assessment Table (EAT), completed as a requirement of the prescribed burn planning process. Nevertheless, it is unreasonable to assume that this follow-up weed control will have an influence on all post-fire weeds. The EAT will describe the weed control to be implemented post-burn, however investment will be based on habitat quality and priorities within the region. Refer to the *Policy and Procedure for Prescribed Burning* for more information on the planning process (DEH, 2008k).

### Management Strategies

Weeds	34. Refer to Ecological Fire Management Guidelines (Table 2) and fire management guidelines for introduced flora species (Appendix 1) during prescribed burn planning.
	35. Consider the use of fire as part of an integrated weed management strategy.
	36. Conduct post-fire weed control subject to regional priorities.
	37. Prior to any prescribed burn, the potential impact of weed species is identified in prescribed burn panning, as part of the environmental assessment. This will identify any priority weed species and recommend post-fire actions to mitigate the impact of weeds.
	38. Monitoring of weeds pre and post-fire to determine what post-fire weed control is required and its effectiveness.
	39. Implement hygiene practices to reduce weed spread across the plan area.

### 7.5 Pest Animals

The conditions that result following a fire can be favourable to some animal species, but for other species these conditions may result in population decline. There is evidence that pest

animals can flourish in the conditions existing after a fire. Herbivorous animals, such as the introduced Rabbit (*Oryctolagus cuniculus*) and native Kangaroos (*Macropus* spp.) can benefit from the post-fire regeneration, finding suitable food within the recently burnt area (Gill and Catling, 2002; Murphy and Bowman, 2007). Predation on small mammals and birds by Foxes (*Vulpes vulpes*) may increase post-fire due to the reduction in shelter sites or cover and the increased access a fire provides (Gill and Catling, 2002). The degree of impact by these pest species post-fire depends on a number of factors, including the pre-fire abundance of the species and characteristics of the fire (e.g. fire size, shape, season, intensity and location).

It is important that the information collected on pest animals and plants pre-fire is used to determine appropriate management post-fire. There is the opportunity to increase the rate of eradication programs for pest animals and plants after fire, to take advantage of the reduced vegetation cover and/or possible concentration of animals in a smaller area.

### Management Strategies

<b>Pest Species</b>	40. Collect relevant information in prescribed burn planning as part of the EAT of pest animals to determine appropriate post-fire management.
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## 8 FIRE MANAGEMENT ZONES

### 8.1 Zoning Background

Fire management zones as detailed in the *Policy and Procedures for Fire Management Zoning* (DEH, 2008a) have been introduced into DEH fire management planning to:

- ensure that appropriate management actions are implemented to meet the requirements for asset protection and ecological management in DEH reserves
- clarify, the areas where different fire management activities will be undertaken on DEH managed land and reserves
- ensure a standard approach to the application of fire management zones on DEH managed lands and reserves in South Australia
- assist in the development of Fire Management Plans and programs for reserves.

Fire management zones are categorised according to the primary objective for fire management: Asset Zone (A-zone), Buffer Zone (B-zone) or Conservation Zone (C-zone). These zones were determined, giving consideration to the level of risk and the protection and management of built assets, natural and cultural values (DEH, 2008a). The zones allocated to sections of blocks are described in Section 11 and are also displayed on Map 4 (Fire Management & Access).

### 8.2 Risk Assessment

A risk assessment was conducted in line with the *Policy and Procedures for Risk Assessment in DEH Fire Planning* (DEH, 2008b), as a requirement of the compilation of this fire management plan. The risk assessment is a tool used to gauge the risks arising from bushfire to life, property and environmental values, within and adjacent to the reserves in the plan area. The risk assessment considered visitor use, assets (built, heritage and environmental) and neighbouring properties for all reserves in the plan area. The likelihood of a risk occurring was scored on a scale from Rare to Almost Certain (*Rare, Unlikely, Possible, Likely* and *Almost Certain*). The consequence of that risk was scored on a scale from Insignificant to Critical (*Insignificant, Minor, Moderate, Major* and *Critical*). The Likelihood score and the Consequence score were then used in conjunction with a Risk Matrix to determine the Overall Risk for each scenario, ranked from *Low* to *Extreme* (*Low, Moderate, High, Extreme*). The Overall Risk rating was then used to determine Fire Management Zones.

The following sections briefly describe each of the zoning categories, and describe the objectives and strategies for each category.

### 8.3 Asset Zone (A-zone)

An A-zone aims to provide the highest level of protection to human life and property by implementing the most intensive fuel management strategies. A-zones are mainly used in reserves areas immediately adjacent to built assets requiring protection from bushfires. The asset may also fall within the zone.

In this plan, A-zones are proposed for The Dutchmans Stern CP, Mt Brown CP, Mt Remarkable NP and Telowie Gorge CP, and are located to protect neighbouring built assets, Mambray Creek campground, ranger residences, Southern Flinders District Office, and Solar Panels and

visitor accommodation (Alligator Lodge and Dutchmans Homestead). The A-zones in this plan are a minimum of 40 metres wide around assets.

### Prescriptions for Fuels in A-zones

The Overall Fuel Hazard (see DEH, 2006a) should not exceed *Moderate*. Fine fuel at ground and near surface levels should be at Low to Moderate levels, and discontinuous to reduce the potential for a fire to carry across the zone at, or close to ground level.

Slashing, mowing, selective fine fuel removal, trail or firebreak construction and prescribed burning are acceptable methods of fuel management in the area. Fuel reduction by prescribed burning or other techniques should be undertaken, as appropriate when fuel levels exceed prescribed limits. In some areas designated as an A-zone selective removal of shrubs or woody weeds may be prescribed.

### A-zone Objectives

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- To provide a buffer from radiant heat damage, flame contact and short distance ember attack to property/built assets, owners, occupiers and firefighters protecting assets.
- To reduce fire intensity and provide a control line for the suppression of bushfires as safely and efficiently as possible.
- To provide a high level of pre-emptive protection to human life and built assets.
- To provide a control line for the suppression of bushfires as safely and efficiently as possible.
- To provide a high level of protection to human life and built assets.
- To provide access, wherever safe and practicable, between properties and vegetated areas.

## 8.4 Buffer Zone (B-zone)

A B-zone is generally 40 to 1000 m wide and may apply to bushland areas in close proximity to assets requiring protection from bushfire in the urban interface, or urban fringe. B-zones may be used to provide strategic fuel reduction for a landscape that would otherwise carry High to Extreme Overall Fuel Hazard levels. This may include firebreaks in or around a reserve.

In this plan, B-zones are proposed in Mt Remarkable NP, Telowie Gorge CP, and in the Napperby Block. B zones are proposed along a number of tracks, including Battery Ridge Track, Ring Route Track, Alligator Gorge Road, BBQ Track, Whytes Track, Go Kart Track, Bain Track and the Bluff Track.

### Prescriptions for Fuels in B-zones

The Overall Fuel Hazard (see DEH, 2006a) should not exceed High. Fuel management will be primarily undertaken by prescribed burning to achieve desired fuel levels.

### B-zone Objectives

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- To assist in reducing bushfire intensity, ember attack and spotting potential.
- To provide a suppression advantage to assist in containing bushfires within defined areas.
- To enhance safe access for firefighters.

- To provide strategic cyclic fuel reduction for a landscape, reserve, district or region.

## 8.5 Conservation Zone (C-zone)

The Conservation zone or C-zone is the default zone for all areas within a reserve that are not otherwise zoned as Asset or Buffer zones. The majority of The Dutchmans Stern CP, Mt Brown CP, Mt Remarkable NP and Telowie Gorge CP are designated as C-zones. The C-zone allows for fire management activities to meet ecological and conservation management objectives.

### Fire Management Strategies in C-zones

Fire management for areas within the C-zone should aim to meet fire management guidelines for that Major Vegetation Sub-group as set out in Table 2.

Prescribed burning for ecological management (i.e. an *Ecological Burn*) can be undertaken within C-zones and must follow the *Policy and Procedures on Ecological Burning* (DEH, 2008j). Ecological Burns must:

- aim to meet Ecological Fire Management Guidelines for the MVS that occur within the burn area (Table 2)
- have explicit ecological and burn objectives, which are consistent with this plan
- have specific monitoring established to assess that burn and ecological objectives are achieved and collect additional vital attribute data to contribute to refining fire management guidelines.

Prescribed burning for Landscape Protection (i.e. a *Landscape Protection Burn*) can occur within C-zones. The primary aim of a Landscape Protection Burn is to reduce the likelihood of a whole reserve or contiguous block of vegetation burning in a single fire event. The appropriate Ecological Fire Management Guidelines (Table 2) for the MVS concerned should be met. If the proposed burn is outside the stated guidelines for the MVS in question then justification must be provided in the Environmental Assessment Table (EAT) developed for the proposed prescribed burn. Priority should be given to Landscape Protection Burns that link existing areas of low fuel hazard (e.g. recent bushfires) to create strategic corridors that will assist in restricting the extent of bushfires.

### C-zone Objectives

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- To manage fire to meet the reserve management objectives.
- To assist in the conservation of species, populations, communities, habitats, wilderness areas or cultural heritage values, through the application of appropriate fire regimes.
- To provide landscape protection.

## 8.6 Prescribed Burning

Where prescribed burning is used to modify fuel hazard in any Reserve, regardless of zoning, burn proposals will be assessed for impact against other issues (e.g. a prescribed burn for a threatened species must not significantly affect general habitat/vegetation values, cause weed spread or cause an unbalanced age class distribution). This will be done using the Environmental Assessment Table (EAT) as part of the prescribed burn planning process following the *Policy and Procedure for Prescribed Burning* (DEH, 2008k). All prescribed burns

must be approved through the process delegated to DEH by the Native Vegetation Council (NVC).

### **8.7 Burn Preparation**

All prescribed burning (regardless of the objective or tenure) within C-zones will adhere to the planning process utilising the EAT, as detailed in Figure 5 (below) and detailed within the *Policy and Procedure for Prescribed Burning* (DEH, 2008k). The prescribed burn proposals will be assessed for impact against other issues (e.g. a prescribed burn for a threatened species must not significantly affect general habitat/vegetation values, cause weed spread or cause an unbalanced age class distribution). Approval will only be given if the potential risks of inaction outweigh the risks of conducting the burn on both target and non-target species.



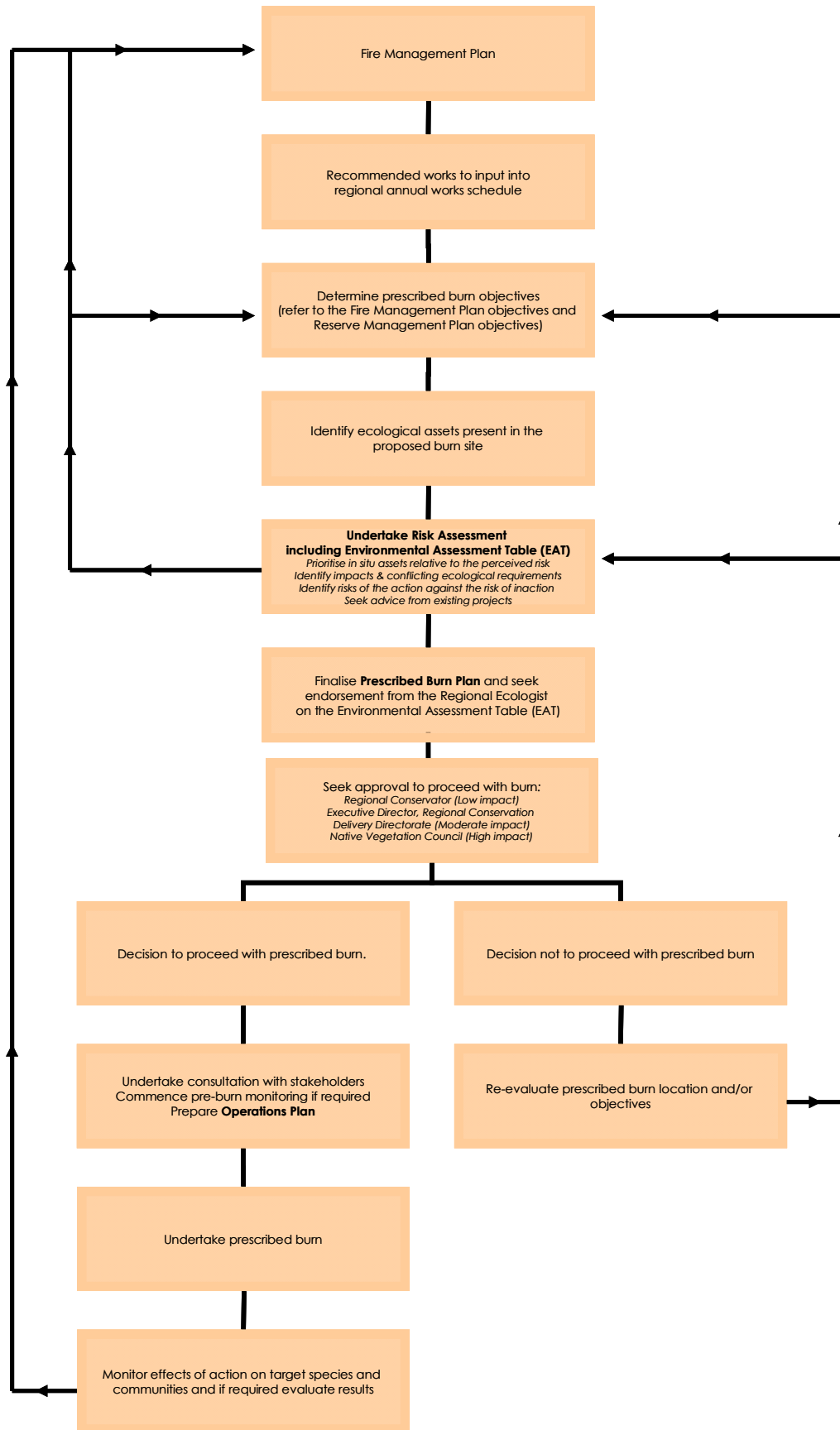


FIGURE 5 – THE BURN PLANNING PROCESS

## 9 BUSHFIRE SUPPRESSION

### 9.1 Legislation

Section 97 of the *Fire and Emergency Services Act 2005* explains the importance of this fire management plan and the role of the CFS during a fire incident on DEH land. The legislation states that under fire or threat of a fire a member of the CFS must consult with the person in charge (if that person is in the presence of, or may be immediately contacted by, the member of the CFS of that reserve) and if the prescribed action would affect a government reserve, they must take into account any relevant provisions of a management plan for the reserve that have been brought to the attention of the member.

### 9.2 Policies and Procedures

The following Policies and Procedures are to be used in conjunction with this fire management plan.

- DEH Fire Management Policy (DEH, 2008d).
- DEH Fire Policy and Procedures Manual (DEH, 2008h).
- CFS Chief Officer Standing Orders (COSOs).
- CFS Standard Operating Procedures (SOPs).
- CFS Operations Management Guidelines (OMGs).

An Incident Management Team (IMT), taking this plan into account, will determine strategies to be put in place during an incident.

### 9.3 Response – Role of CFS and DEH

The Country Fire Service has overall responsibility for fire suppression activities in SA country areas (that is, areas outside the MFS fire districts). Response to a fire in The Dutchmans Stern CP, Mt Brown CP, Mt Remarkable NP and Telowie Gorge CP is undertaken jointly by CFS and DEH brigades who form the Mt Remarkable, Flinders and Spencer CFS Groups.

There are a number of CFS stations in close proximity to these DEH reserves. Quorn and Stirling North Brigades are a short distance from The Dutchmans Stern CP and Mt Brown CP. Mambray, Wilmington and Melrose Brigades are all in close proximity to Mt Remarkable. Napperby and Pt Germein Brigades are in close proximity to Telowie Gorge CP. Napperby Brigade is also in close proximity to the Napperby Block of Mt Remarkable NP.

The minimum DEH response for on-reserve fires, or fires threatening reserves, is set out in Response Plans for the Northern and Yorke Region (DEH, 2008g) and the Outback Region (DEH, 2008f) and response is determined according to the fire danger level of the day. DEH first response to The Dutchmans Stern CP and Mt Brown CP is by staff and appliances based at Port Augusta. DEH first response to Mt Remarkable NP and Telowie Gorge CP is by staff and appliances based at Mambray Creek. As a fire escalates, DEH responds according to a staged District, Region and Statewide response with available resources. DEH appliances and staff in the Northern and Yorke Region that form part of the second response are located at Burra, Clare and Stenhouse Bay. For a Statewide response, DEH staff and appliances may be drawn from around the state.

Local CFS brigades are heavily relied upon for fire suppression activities, particularly for first and second response to an incident. The cooperation, support and understanding between CFS, DEH brigades and the local community have been critical to successful fire suppression both on and off reserve in the past, and will be critical to the success of this plan.

#### 9.4 Suppression Strategies

Where fuel management strategies have been implemented, an effort to contain bushfires will be made using existing control lines, previously burnt areas and natural low fuel areas. Predicted fire intensity should be considered before adopting a suppression strategy or combination of strategies. Firefighter safety and the protection of life are paramount.

Suppression strategies may include:

- use of aerial suppression techniques, where appropriate and conditions permit
- direct attack when fire intensities are below safe/acceptable levels
- Direct attack where weather conditions, fuel hazard and access are suitable
- backburning from control lines or access tracks (taking into account specific management objectives for each block) where appropriate and conditions permit
- during extreme conditions, suppression activities may be confined to asset protection
- any suppression operations within the plan area are to be undertaken with precautionary hygiene measures to reduce the risk of *Phytophthora* infestation, that is:
  - all vehicles and equipment are to arrive at the fireground in a clean state, as outlined in the *DEH Standard Operating Procedure for Phytophthora Threat Management* (DEH, 2002).
- the use of retardant should be restricted to critical situations, such as the protection of built assets and critical habitat. Retardant may also be a good strategy in remote areas. It is important that:
  - retardant is not dropped in creek lines
  - retardant is only used where ground crews are available to back up.
- the use of foams should be minimised along creek lines.

Specific suppression information is provided in the individual block prescriptions in Section 11.

#### 9.5 Fire Access

Guidelines for Fire Access Tracks and Firebreaks in South Australia have been developed by GAFLC (GAFLC, 2005). The guidelines include prescriptions and standards for various fire access tracks and firebreaks. They also provide guidelines for adjacent fuel management, location and maintenance, mapping, signage and safety.

During the preparation of this plan all track classifications were recorded using GAFLC standards. It should be noted that the track classification may vary depending on what works have been completed and whether there has been any degradation of track since assessment was conducted. For the most current information on track conditions seek local advice. Gates providing access to DEH lands are included on Map 4.

Fire access has been reviewed as part of this plan. The proposed changes outlined in block prescriptions (Section 11) aim to increase the:

- safety of fire fighting personnel involved in a fire suppression effort
- rapidity with which fire suppression agencies are able to access a fire
- type of resources that can safely be made available to a fire suppression effort.

New fire access on reserves will only be constructed for the purpose of fire suppression, where provided for in planning, or where approved by the IMT, in liaison with DEH staff.

## 9.6 Heavy Machinery

Use of heavy machinery will be in accordance with the *Policy and Procedure for Earthmoving Equipment* (DEH, 2008c), which states that “CFS wherever possible, must not engage earthmoving equipment to undertake works on DEH managed lands without consultation or prior approval from a delegated DEH officer”.

When using earthmoving equipment, the IMT or delegated DEH Officer, must consider all practical options, effectiveness, likelihood of success and likely positive and negative impacts on environmental and cultural values. Minimum impact suppression techniques and specialised equipment that reduces disturbance to the landscape shall be used wherever possible.

## 9.7 Phytophthora Management

DEH will implement procedures to minimize the spread of viruses and pathogens such as Phytophthora during fire management operations, consistent with DEH Standard Operating Procedures (DEH, 2002). This includes wash down procedures for fire appliances prior to leaving high-risk areas. As per the *Policy and Procedure for Earthmoving Equipment*, any heavy machinery entering the fire ground is required to be washed down prior to entering any given area.

## 9.8 Post-fire Rehabilitation and Recovery

DEH has a *Policy and Procedure for Post-fire Rehabilitation* (DEH, 2008e) to ensure that the post-fire rehabilitation and recovery of a reserve is identified during an incident. A post-fire rehabilitation plan should be prepared and should describe the areas affected by fire and impacts on the natural and built environment. Specific objectives of post-fire rehabilitation plans are outlined within the Policy and Procedure.

## 9.9 Water

The existing water sources and facilities have been mapped for the area (Map 4). Access to water sources for fire-fighting purposes should be negotiated directly with neighbours, through the CFS Group or the District Bushfire Prevention Committee. Water sources generally consist of static water supplies such as dams, tanks, bores or creeks. The Morgan to Whyalla pipeline also runs along the western foothills of the ranges, however attendance by SA Water Staff is required to access water from the pipeline. For most current information on water sources in reserves, refer to the relevant Response Plans (DEH, 2008f; g) (updated annually).

## 9.10 Landing Strips

CFS approved landing grounds are located at Port Pirie, Port Augusta and Quorn.

## 10 RESEARCH AND MONITORING

Where prescribed burns in C-zones are likely to impact on species of conservation significance, planning will be undertaken in conjunction with the relevant Recovery Teams, including:

- Northern Lofty Block Threatened Orchid Recovery Team
- Yellow-footed Rock-wallaby Recovery Team
- Declining Woodland Birds Recovery Team.

### 10.1 Monitoring

Monitoring will be established in conjunction with any prescribed burns conducted within the plan area, in accordance with DEH Policy and Procedures. This includes the *Policy and Procedure for Prescribed Burning* (DEH, 2008k), incorporating the Environmental Assessment Table and monitoring procedures. Refer to Section 8.6 and 8.7 of this plan for general information on prescribed burning and the planning requirements.

It is recommended that monitoring be undertaken to:

Monitoring	41. Investigate the fuel accumulation rates of the various MVS that occur within the plan area. These data will help DEH staff determine if and when fuel reduction works are required, ultimately assisting in the scheduling of operational works and activities in B-zones
	42. Assess the suitability of the proposed fire interval guidelines for Bayonet Spider-orchid populations, in conjunction with the Northern Lofty Block Orchid Recovery Team (Appendix 1)
	43. Examine the appropriateness of the proposed fire interval and season of burn guidelines for Woolcock's Spider-orchid populations, in conjunction with the Northern Lofty Block Orchid Recovery Team (Appendix 1)
	44. Assess the proposed guidelines for prescribed burning in Yellow-footed Rock-wallaby habitat including season, extent and time of day as set out in the <i>Yellow-footed Rock-wallaby Ecological Fire Management Strategy</i> (DEH, 2007a)
	45. Evaluate the post-fire vegetation response, in relation to the regeneration of Yellow-footed Rock-wallaby preferred food species
	46. Observe the behavioural response of Yellow-footed Rock-wallabies during fire
	47. Record any change in Yellow-footed Rock-wallaby home range and/or location after fire to assist planning of future prescribed burns in Yellow-footed Rock-wallaby habitat
	48. Examine the suitability of the proposed Ecological Fire Management Guidelines for species of Declining Woodland Birds, including fire interval, fire frequency and extent in conjunction with the Declining Woodland Birds Recovery Team (Appendix 2a)
	49. Evaluate the suitability of the proposed Ecological Fire Management Guidelines for Peppermint Box woodland including fire interval, frequency, season, intensity and extent (Appendix 3)

## 10.2 Research

Any fire-related research that is proposed within the plan area should be discussed with the Senior Fire Research Officer, Fire Management Branch.

It is recommended that research should be undertaken to:

Research	50. Investigate the suitability of the Ecological Fire Management Guidelines for MVS through the assessment of historical fire regimes in similar communities across the state (Table 2 )
	51. Explore the effects of slashing and soil disturbance as well as varying fire season, intensity and frequency on Bayonet Spider-orchid populations and use this information to update the Ecological Fire Management Guidelines (Appendix 1)
	52. Investigate the effects of slashing and soil disturbance as well as varying fire intensity and frequency on Woolcock's Spider-orchid populations and use this information to propose guidelines for ecological fire management (Appendix 1)
	53. Examine the effects of fire regime, specifically fire frequency, fire intensity and fire interval on populations and the habitat of Yellow-Footed Rock-wallabies and use this information to update the Ecological Fire Management Guidelines (Appendix 2)
	54. Explore the effects of fire regime, particularly season of burn and fire intensity on Declining Woodland Birds and use this information to update the Ecological Fire Management Guidelines (Appendix 2a)

## 11 FIRE MANAGEMENT BLOCKS

The plan area has been divided into seven Fire Management Blocks to ensure that information and issues unique to a particular area have been addressed (Map 4). Block boundaries are based on access and the practicalities of implementing fire management objectives of a particular area. The parcel of Mt Remarkable NP lying west of Melrose has been divided into three blocks: Alligator Block, Hillams Block and Remarkable Range Block. The second parcel of land that forms part of Mt Remarkable NP lies east of the township of Napperby and for the purpose of this plan is referred to as Napperby Block. In addition to the DEH land, the adjacent Heritage Agreement Site (Hundred of Napperby) has also been included and the combination of these lands represents a single block. The third parcel of land that forms part of Mt Remarkable NP is adjacent Telowie Gorge CP and is grouped with Telowie Gorge CP as Telowie Gorge Block. Refer to Table 3 (below) for information on the name, size and location of each block.

**TABLE 3 – SUMMARY OF FIRE MANAGEMENT BLOCKS**

Fire Management Block Name	Reserve	Area (Ha)
The Dutchmans Stern Block	The Dutchmans Stern CP	3723
Mt Brown Block	Mt Brown CP	2271
Alligator Block	Mt Remarkable NP	12554
Hillams Block	Mt Remarkable NP	762
Remarkable Range Block	Mt Remarkable NP	3302
Telowie Gorge Block	Mt Remarkable NP	35
	Telowie Gorge CP	1967
Napperby Block	Mt Remarkable NP	1859

### 11.1 Fire Management Block Prescriptions

Block prescriptions describe the block and identify specific zones and proposed works relating to that block. Block prescriptions include summaries of relevant information such as land use, vegetation, fuel hazard, fire risk, fire access, assets, zoning, recommended works and guidelines for suppression. Known species and communities of conservation significance are listed in Appendices 1, 2, 2a and 3 along with the block name, the associated MVS as well as corresponding fire response and fire management guidelines. Objectives and actions that only apply to a specific Fire Management Block are also included in the Fire Management Block Prescriptions. For objectives that apply to the whole planning area refer to Section 2.7. A map to supplement the fire management strategies has been created for the plan area (Map 4).

### 11.2 Mapping

Four maps have been produced to complement this Fire Management Plan. These maps are provided as an attachment to the plan.

Map 1 (Terrain, Tenure and Infrastructure) illustrates physical landscape features with land ownership, generalised land use and infrastructure relevant to the plan area:

- Physical landscape is displayed using a combination of contours, drainage & water bodies
- DEH reserves are shown in context with neighbouring land tenures
- Generalised land use is depicted, including built up areas, recreational reserves as well as the distribution of native and planted vegetation (e.g. pine plantations)
- Regional scale infrastructure is displayed including roads, CFS stations and communication towers.

Map 2 (Vegetation Communities) depicts:

- Vegetation communities mapped as Major Vegetation Sub-groups

Map 3 (Fire History):

- Shows fire frequency overlain by fire history for the last 10 years.

Map 4 (Fire Management and Access) shows the plan area in terms of the management strategies presented in Section 11 (Block Prescriptions):

- Proposed zoning is displayed in a context of fire management block boundaries
- Proposed burn areas are also depicted. Note: each burn area identified may not be burnt in its entirety within a season (i.e. the burn may itself be patchy, or the area could be divided and burnt over a number of seasons)
- Current fire access is symbolised according to the GAFLC track classification
- Fire related infrastructure and infrastructure other than roads is depicted including gates, buildings and leased assets where data are available
- Significant assets within and adjacent the reserves are shown and labelled, as are the names of fire tracks within reserves.



## THE DUTCHMANS STERN BLOCK

### Tenure, Size and Land Use

The Dutchmans Stern Conservation Park (3 723 ha) will be treated in its entirety as The Dutchmans Stern Block for fire management purposes.

### Vegetation

MVS No. 4, 8, 12, 16, 23, 26, 33, 55

This block supports Spinifex (*Triodia irritans*) hummock grasslands, Quorn Wattle (*Acacia quornensis*) shrubland and Inland South Australian Blue Gum low woodland on lower hills and slopes. The mid slopes are characterised by Beaked Red Mallee (*Eucalyptus socialis*) very open mallee and Sugar Gum closed forest occurs on upper slopes. Some areas are highly degraded resulting from clearing of Sugar Gum forest.

### Fire History

A number of small fires occurred in the southern section of the reserve in 1996. There have also been a number of small fires resulting from lightning strikes at other times. However, the majority of the reserve has not been burnt in recent history.

### Fuel Hazard

Predominantly *Moderate* to *Very High* overall fuel hazard. There are some areas with *Low* overall fuel hazard that are a result of past clearing and grazing. For likely maximum overall fuel hazard for MVS see Table 1 (Section 3.4).

### Natural Values

Fauna and flora of conservation significance that have been recorded for this block are included in Appendix 1, 2 and 2a. Notably, this block contains Yellow-footed Rock-wallaby and Large-flower Groundsel (*Senecio megaglossus*) populations. This block also contains Quorn Wattle (*Acacia quornensis*) shrubland and the northernmost population of Sugar Gum.

### Heritage Values

While not listed on the National or State Heritage register, the Dutchmans Stern Homestead precinct is of local historic interest.

### Built Assets

**On-reserve** Dutchmans Stern Homestead precinct.

**Off-reserve** Rural homesteads are some distance from the reserve boundary.

### Fire Risk

The likelihood of a lightning-caused fire starting in this reserve is *Likely*. The likelihood of fires spreading from farming lands is *Possible*.

### Fire Tracks (GAFLC Classification)

**Minor** Eastern Boundary Track

**Service** Dutchman Valley Track

Albury Creek Track

Switchback Track

### Specific Management Objectives for The Dutchmans Stern Block

- Ensure visitor safety (particularly on walking trails).

- Minimise the likelihood of fires exiting the reserve and impacting on adjacent properties.
- Minimise the risk of damage to reserve infrastructure.
- Minimise the risk of the entire Yellow-footed Rock-wallaby habitat being burnt in a single fire event and refer to recommendations in Section 6.2.1.
- Minimise the likelihood of the entire reserve being burnt in a single fire event.

### Proposed Zoning

- A-zone (minimum 40 m) around The Dutchmans Stern Homestead Precinct.
- C-zone for all other areas of the reserve.

### Recommended Works

#### **Pre-suppression**

- Develop an emergency procedure to ensure visitor safety during bushfires.
- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Fuel reduce A-zone to the required levels (refer to Proposed Zoning section above).
- Install consistent signage across reserves stating that walking trails are closed on Total Fire Ban Days. Signage should be erected at the Dutchmans Stern carpark and the Heysen Trail entry and exit points.
- Stabilise sections of the Switchback Track using steel mesh in order to increase access to the reserve and increase safety of fire crew.
- Undertake landscape protection burns within the C-zone to reduce the risk of the whole reserve burning in one event and to create a mosaic of areas with different times since the last fire (for proposed areas refer to Map 4).

#### **Suppression**

##### Protection of Life:

- Priority would be to protect life of walkers on the walking trails. All efforts should be made to locate visitors in the event of a fire. The car park should be checked to determine if it is likely that there are walkers within the reserve.

##### Protection of Property:

- This reserve contains significant built assets that require protection.

##### Protection of Environmental Values:

- Refer to the *Yellow-footed Rock-wallaby Ecological Fire Management Strategy* (DEH, 2007a) for information regarding suppression in Yellow-footed Rock-wallaby habitat.

##### General Suppression Issues:

- Steel mesh on Switchback Track will be damaged by tracked machinery. In order for tracked machinery to access this track, rubber matting (or similar) should be placed over the steel mesh. Support personnel should be deployed to provide assistance.
- Prevailing weather conditions will dictate suppression activities. Ground crew should only be deployed under mild conditions.
- The walking trail may assist suppression, increasing access to areas of the reserve.
- Except in the vicinity of access tracks suppression would involve the extensive use of ground crews with the assistance of aerial bombers if necessary.
- Vehicle based suppression is likely to be hindered by steep terrain.

## MOUNT BROWN BLOCK

### Tenure, Size and Land Use

Mount Brown Conservation Park (2 271 ha) will be treated in its entirety as Mount Brown Block for fire management purposes.

### Vegetation

MVS No. 4, 8, 9, 12, 24, 26, 32, 33, 36, 49, 55

This block supports Grey Box woodland on the upper and lower slopes in the southern and central area. Long-leaf Box woodland is found on the mid and upper slopes in the south. White Cypress-pine and Drooping Sheoak woodland occur on the middle-upper slopes and ridges in the north-west. Beaked Red Mallee open mallee is found on the lower slopes in the central west. On the hilltops and slopes in the north-eastern section, Spinifex hummock and Spear-grass (*Austrostipa elegantissima*) tussock grasslands have been recorded.

### Fire History

Most of the reserve has not burnt since 1910. In 1996 a large fire burnt the southern section.

### Fuel Hazard

Predominantly *Moderate* to *Very High* overall fuel hazard. There are some areas with *Low* overall fuel hazard that are a result of past clearing and grazing. For likely maximum overall fuel hazard for MVS see Table 1 (Section 3.4).

### Natural Values

Fauna and flora of conservation significance that have been recorded for this block are included in Appendix 1, 2 and 2a. Notably this block contains Silver Daisy-bush (*Olearia pannosa* ssp. *pannosa*), Robust Leek-orchid (*Prasophyllum validum*) and Flinders Worm Lizard (*Aprasia pseudopulchella*). The block contains 30 ha of Peppermint Box Grassy Woodland, listed as *Critically Endangered* under the EPBC Act (Refer to Section 6.2.4 and Appendix 3).

### Heritage Values

There are no items listed on the National or State Heritage register for Mt Brown Block.

### Built Assets

- On-reserve** Radio tower and solar panels near the summit of Mt Brown owned by Umeewarra Aboriginal Media Association and Telstra.
- Off-reserve** Olive Grove Station to the east which is used as tourist accommodation. Rural homesteads to north, south and east of the reserve.

### Fire Risk

The likelihood of a lightning-caused fire starting in this reserve is *Likely*. The likelihood of fires spreading from farming lands is *Possible*.

### Fire Tracks (GAFLC classification)

- Standard** Richmans Valley Road
- Service** Waukarie Falls Track  
Unnamed Track (eastern boundary)

### Specific Management Objectives for Mt Brown Block

- Ensure visitor safety (particularly on the Mt Brown Walking Trail and Heysen Trail).

- Minimise the likelihood of fires exiting the reserve and impacting on adjacent properties.
- Minimise the likelihood of damage to infrastructure at the Mt Brown Summit.
- Minimise the likelihood of the entire reserve being burnt in a single fire event.
- Minimise the likelihood of the entire remnant Peppermint Box Grassy Woodland burning in a single fire event (refer to recommendations in Section 6.2.4).
- Increase access within the reserve.

### **Proposed Zoning**

- A-zone (minimum 40 m) around the infrastructure at the Mt Brown Summit.
- C-zone for all other areas of the reserve

### **Recommended Works**

#### ***Pre-suppression***

- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Install consistent signage across reserves stating that walking trails are closed on Total Fire Ban Days. Signage should be erected at the Waukarie Falls carpark and at the entry and exit points of the Heysen Trail.
- Develop an emergency procedure to ensure visitor safety during bushfires.
- Fuel reduce A-zone to the required level (refer to Proposed Zoning section).
- Upgrade the Unnamed Track (eastern boundary) to a Minor Track to increase access.
- Repair the Waukarie Falls Track in order to increase access within the reserve.
- Investigate establishing a vehicle track within the reserve in order to increase access. Ideally the vehicle track would dissect the reserve and run east to west.
- Undertake landscape protection burns within the C-zone to reduce the risk of the whole reserve burning in one event and to create a mosaic of areas with different times-since the last fire (for proposed areas refer Map 4).

#### ***Suppression***

##### Protection of Life:

- Priority would be to protect life of walkers on the walking trail. All efforts should be made to locate visitors in the event of a fire. The carpark should be checked to determine if it is likely that there are walkers within the reserve.
- Priority would also be to protect visitors at Olive Grove Station.

##### Protection of Property:

- This reserve contains infrastructure at the summit of Mt Brown that requires protection. Aerial support is likely to be required if these assets are threatened.
- Aim to protect Olive Grove Station.

##### General Suppression Issues:

- Except in the vicinity of access tracks, suppression would involve the extensive use of ground crews with the assistance of aerial bombers if necessary.
- Vehicle based suppression is likely to be hindered by steep terrain.
- Prevailing weather conditions will dictate suppression activities. Ground crews should only be deployed under mild conditions.
- Steel mesh on Unnamed Track will be damaged by tracked machinery. In order for tracked machinery this track, rubber matting (or similar) should be placed over the steel mesh. Support personnel should be deployed to provide assistance

## ALLIGATOR BLOCK

### Tenure, Size and Land Use

The western portion of Mount Remarkable NP is identified as Alligator Block (12 554 ha) for fire management purposes.

### Vegetation

MVS No. 4, 5, 8, 9, 12, 21, 22, 24, 26, 27, 31, 32, 33, 36, 49, 55

This block supports Long-leaf Box woodland on the mid-slopes, Inland South Australian Blue Gum woodland, Mallee Box mallee and White Cypress-pine woodland. Sugar Gum closed forest dominates on steep southern slopes and the creeklines are dominated by River Red Gum (*E. camaldulensis*).

### Fire History

A large fire in 1984 burnt part of the block known as the Battery. The majority of the block was burnt in 1988. There have been small fires in the block in 1996, 2000, 2001, 2004 and 2006.

### Fuel Hazard

Predominantly *High* to *Extreme* overall fuel hazard. For likely maximum overall fuel hazard for MVS see Table 1 (Section 3.4)

### Natural Values

Flora and fauna of conservation significance are included in Appendix 1, 2 and 2a. Alligator Block is significant as it contains two Yellow-footed Rock-wallaby populations. It also supports populations of the Bayonet Spider-orchid, Woolcock's Spider-orchid, Flinders Ranges White Caladenia (*Caladenia xantholeuca*), Pale Leek-orchid (*Prasophyllum pallidum*) and Flinders Worm Lizard.

### Heritage Values

There are significant Nukunu cultural heritage sites within this block.

### Built Assets

- |                    |   |
|--------------------|---|
| <b>On-reserve</b>  | Mambray Creek precinct including the Southern Flinders District Office, residential housing and the Mambray Creek Campground.<br>Radio site including GRN tower and solar panels on Battery Ridge Track.<br>Alligator Lodge (including workshop and solar panels).<br>The toilet block at Alligator Gorge carpark, Blue Gum Flat picnic area and Kingfisher Flat. |
| <b>Off-reserve</b> | Rural homesteads and Eaglehawk Hut to the west of the reserve boundary.<br>Rural homesteads to the north and west of the reserve boundary.  |

### Fire Risk

The likelihood of a lightning-caused fire starting in this block is *Likely*. It is *Possible* that a fire will start due to human causes at the Mambray Creek Campground. The likelihood of fires spreading from farming lands is *Possible*.

### Fire Tracks (GAFLC Classification)

- |              |   |
|--------------|---|
| <b>Major</b> | National Park Road<br>Northern Section of Battery Ridge Track<br>Alligator Gorge Road |
|--------------|---|

<b>Standard Minor</b>	Cattle Track	
	Cemetery Track	
	Baroota Ruins Track	
	Western Boundary Track	
	Southern Section of Battery Ridge Track	
	Little Pound Track (terminates with a no through road)	
	Ring Route Track	
	Kingfisher Track	
	Pines Track	
	Hillams Track (eastern section)	
	<b>Service</b>	Unnamed Track
		Mambray Creek Track
		Fricks Track
Stony Creek Track		
Slees Track		
Woods Hut Track		
Tower Track		
Hillams Track (western section)		
Dump Track		
Old Hut Track		

### Specific Management Objectives for Alligator Block

#### Protection of Life:

- Ensure visitor safety (particularly on walking trails, at Mambray Creek campground, Blue Gum Flat picnic area, Alligator Gorge day visitor area and at Alligator Lodge).

#### Protection of Property:

- Minimise the likelihood of fires exiting the reserve and impacting on adjacent properties.
- Minimise risk of damage to reserve infrastructure including: Southern Flinders District Office, residential houses and Mambray Creek Campground, Alligator Lodge (including workshop), GRN tower, solar panels, Alligator Gorge day visitor area, Kingfisher Flat and Blue Gum Flat picnic area.
- Increase access within the block.

#### Protection of the Environment:

- Minimise the impact of fire suppression activities on all threatened Spider-orchid populations, refer to recommendations in Section 6.2.2.
- Minimise the likelihood of fire impacting on Yellow-footed Rock-wallaby habitat, refer to recommendations in Section 6.2.1.
- Minimise the likelihood of the reserve burning in its entirety in a single fire event.

### Proposed Zoning

- A-zone (minimum 40 m) around the Southern Flinders District Office and houses.
- A-zone (minimum 40 m) around Mambray Creek campground.
- A-zone (minimum 40 m) around Blue Gum Flat picnic area.
- A-zone (minimum 40 m) around Alligator Lodge and workshop.
- B-zone (minimum 60 m) along Battery Ridge Track to reduce the likelihood of fires moving through the reserve.
- B-zone (minimum 200 m) along Battery Ridge Track to reduce the likelihood of burning Yellow-footed Rock-wallaby habitat in its entirety in a single fire event.

- B-zone (minimum 50 m) along the Ring Route Track (northern edge of track) and Alligator Gorge Road (northern edge of road) to reduce the likelihood of fires moving through the reserve.
- B-zone (minimum 80 m) along Battery Ridge Track to reduce the likelihood of damage to the radio site, including the solar panels and GRN tower.
- C-zone for the rest of the block.

## Recommended Works

### **Pre-suppression**

- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Continue to restrict bush camping at Stony Creek, Eaglehawk, Frick Dam and Longhill, Kingfisher Flat, Hidden Gorge, Sugar Gum Dam and Stringers during the Fire Danger Season. Continue to prohibit campfires at bush campsites all year round.
- Maintain Alligator Lodge sprinkler system and regularly clean up leaf litter within gutters.
- Fuel reduce A-zone and B-zones to the required levels (refer to Proposed Zoning).
- Develop an emergency procedure to ensure visitor safety during bushfires.
- Install consistent signage across reserves stating that walking trails are closed on days declared a Total Fire Ban by the CFS. Signage should be erected at the Mambray Creek carpark and Alligator Gorge carpark.
- Place a dead end sign at the start of the Little Pound Track and establish a turnaround point at the end of the track.
- Investigate opening up the Old Hut Track.
- Upgrade Fricks Track and Sleses Track from Service Tracks to Minor Tracks.
- Upgrade a section of Dump Track from Service Track to Minor Track.
- Upgrade sections of Hillams Track from a Service Track to Minor Track.
- Undertake an ecological burn to investigate the influence of fire regimes on all threatened Spider-orchids.
- Undertake ecological burns to as part of a weed strategy to manage Horehound on Pines Track.
- Undertake landscape protection burns within the C-zone to reduce the risk of the whole reserve burning in one event and to create a mosaic of areas with different times-since the last fire (for proposed areas refer to Map 4).

### **Suppression**

#### Protection of Life:

- Priority would be to protect visitors. All efforts should be made to locate visitors in the event of a fire. The carparks at Alligator Lodge, Alligator Gorge day visitor area and Blue Gum Flat picnic area and Mambray Creek campground should be checked.

#### Protection of Property:

- This block contains significant built assets that require protection (including Southern Flinders District Office, houses and Mambray Creek Campground, Alligator Lodge (including solar panels and workshop), GRN tower and solar panels, Alligator Gorge day visitor area, Kingfisher Flat and Blue Gum Flat picnic area).

#### Protection of the Environment:

- Refer to the *Yellow-footed Rock-wallaby Ecological Fire Management Strategy* (DEH, 2007a) for detailed information on suppression in Yellow-footed Rock-wallaby habitat.
- There are significant cultural heritage sites within the block.

- Consultation with DEH Threatened Species Unit is recommended prior to any widening of Alligator Gorge Track, Woods Hut Track, Pines Track, Ring Route Track, Battery Ridge Track and Mambray Creek Track. Consider falling back to Pines Track before widening Tower Track or Woods Hut Track.
- DEH liaison is required for off-track vehicle suppression.

General Suppression Issues:

- Widening of fire tracks within the reserve should only be undertaken with a roller.
- Attendance by SA Water staff is required to access pipeline water.
- Vehicle based suppression is likely to be hindered by steep terrain.
- Except in the vicinity of access tracks suppression would involve the extensive use of ground crew with the assistance of aerial bombers if necessary.
- Numerous gorges and cliffs may impede off track suppression activities by ground crew.
- Consider overnight attack.
- Fire towers are located on Battery Ridge Track and Tower Track for fire observation. It is worthwhile to check the surrounding landscape from these towers after lightning storms to assist in the early detection of fires.
- Prevailing weather conditions will dictate suppression activities. Ground crew should only be deployed under mild conditions.
- Steel mesh on Fricks Track, Battery Track and Ring Route Track will be damaged by tracked machinery. In order for tracked machinery to access these tracks, rubber matting (or similar) should be placed over the steel mesh. Support personnel should be deployed to provide assistance.
- The walking trail in this block will assist with fire fighting efforts.
- The Mt Cavern area and the Black Range area are the most difficult areas to access in the reserve due to the complex topography of the upper Mambray Creek Catchment.



## HILLAMS BLOCK

### Tenure, Size and Land Use

The central portion of Mount Remarkable NP that connects Alligator Block and Remarkable Range Block will be identified as Hillams Block (762 ha) for fire management purposes.

### Vegetation

MVS No. 4, 8, 9, 26

This block supports Inland South Australian Blue Gum woodland.

### Fire History

The entire block was burnt in the 1988 fire.

### Fuel Hazard

*Moderate* overall fuel hazard in areas dominated by Inland SA Blue Gum with an understorey of Wild Oats. This lower fuel hazard is probably a result of the previous land use; the area was grazed until 1998 and previously was also logged for sleepers. For likely maximum overall fuel hazard for MVS see Table 1 (Section 3.4).

### Natural Values

Fauna and flora of conservation significance that have been recorded for this block are attached in Appendix 1, 2 and 2a. Woolcock's Spider-orchid has been recorded in the block in the past. Notably this block contains Flinders Worm Lizards.

### Heritage Values

There are no items listed on the National or State Heritage register for Hillams Block.

### Built Assets

**On-reserve** Grays Hut

### Fire Risk

The likelihood of a lightning-caused fire starting in this block is *Likely*. The likelihood of fires spreading from farming lands is *Possible*.

### Fire Tracks (GAFLC classification)

<b>Minor</b>	Pines Track
	Mungola Hut Track
<b>Service</b>	Webbs Cutting Track
	Spring Creek Track
	Racehorse Track
	Woolfords Track
	Grave Track
	Centre Track
	Bonython Track

### Specific Management Objectives for Hillams Block

- Ensure visitor safety.
- Reduce the likelihood of fire spreading into adjacent blocks.
- Minimise the likelihood of damage to Grays Hut.

**Proposed Zoning (Map 4)**

- A-zone (minimum 40 m) around Grays Hut.
- C zone for the rest of the block.

**Recommended Works*****Pre-suppression***

- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Restrict access to walking trails on days declared a Total Fire Ban.
- Continue to manage access camping at Goat Rock and the Racecourse during the Fire Danger Season.
- Fuel reduce A-zone to the required levels (refer to Proposed Zoning section above).
- Consider implementing ecological burns to improve grassy woodland structure and floristic composition.

***Suppression***

- Contain fire within the grassy area.
- Flatter terrain and extensive internal tracks will allow suppression from appliances.
- Grays Hut will require protection during a fire event.

## REMARKABLE RANGE BLOCK

### Tenure, Size and Land Use

The eastern portion of Mount Remarkable NP will be identified as Remarkable Range Block (3 302 ha) for fire management purposes.

### Vegetation

MVS No. 4, 5, 8, 9, 12, 26

This block supports Sugar Gum woodland on higher slopes and Peppermint Box grassy woodland on lower slopes. Inland SA Blue Gum woodland also occurs in this block.

### Fire History

The entire block was burnt in 1988.

### Fuel Hazard

The Overall Fuel Hazard within this block is *Moderate to Extreme*. For likely maximum Overall Fuel Hazard for MVS see Table 1 (Section 3.4).

### Natural Values

Fauna and flora of conservation significance that have been recorded for this block are listed in Appendix 1, 2 and 2a. This block contains the nationally *Critically Endangered* Peppermint Box Grassy Woodland (refer to Section 6.2.4 and Appendix 3). This block also contains Pale Leek-orchid and Robust Leek-orchid populations. Bayonet Spider-orchid and Flinders Ranges White Caladenia have been recorded in the past.

### Heritage Values

Spring Creek Mine may be heritage listed in the future.

### Built Assets

<b>On-reserve</b>	Camper's shelter at the Summit Campsite.
<b>Off-reserve</b>	Melrose Township is 600 m from the reserve boundary. Numerous houses along the eastern boundary (some as close as 45 m). The Melrose Caravan Park is approximately 550 m from the reserve boundary.

### Fire Risk

It is considered *Likely* that a lightning-caused fire will start in this block. The likelihood of a human caused fire is *Possible*. The likelihood of fires spreading from farming lands is *Possible*.

### Fire Tracks (GAFLC classification)

<b>Major</b>	Melrose to Wilmington Road
<b>Standard</b>	Spring Creek Mine Road (from the junction of Main North Road to the junction of the Mt Remarkable Range Track)
<b>Service</b>	Mungola Hut Track Gibraltar Rock Track Spring Creek Mine Track Mt Remarkable Range Track

### Specific Management Objectives for Remarkable Range Block

- Ensure visitor safety particularly on the Mt Remarkable Summit Hike Track and at the Summit Campground.

- Minimise the likelihood of fires exiting the reserve and impacting on adjacent properties (including township of Melrose).
- Reduce the likelihood of fire burning into adjacent blocks (Hillams Block).
- Minimise the impact of fire and suppression activities on the Peppermint Box Grassy Woodland threatened ecological community. Refer to the recommendations in Section 6.2.4 and Appendix 3.
- Minimise the likelihood of the entire reserve being burnt in a single fire event.

### **Proposed Zoning**

- C- zone

### **Recommended Works**

#### ***Pre-suppression***

- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Continue to restrict camping at the Summit Campground during the Fire Danger Season.
- Upgrade sections of Spring Creek Mine Track from a Service Track to a Minor Track where possible
- Develop an emergency procedure to ensure visitor safety during bushfires.
- Install consistent signage across reserves stating that walking trails are closed on Total Fire Ban Days. Signage should be erected at the Monument carpark.

#### ***Suppression***

##### Protection of Life:

- Priority would be to protect visitors using the walking trail. All efforts should be made to locate visitors in the event of a fire. The Monument carpark should be checked to determine if it is likely that there are bushwalkers within the reserve.
- Firefighting crew near the Spring Creek Mine should be aware of the hazards in the area, including holes, mining spoil and building ruins.
- Melrose township and Melrose Caravan Park are potentially at risk under north-westerly winds, even though they are some distance from the park boundary.

##### Protection of Property:

- This block is adjacent to built assets that require protection.

##### General Suppression Issues:

- Access to some sections of block will be very difficult due to steep terrain limiting vehicle-based suppression.
- Except in the vicinity of access tracks suppression would involve the use of ground crews with the assistance of aerial bombers if necessary.
- The walking trail in this section would assist with firefighting efforts.
- Prevailing weather conditions will dictate suppression activities. Ground crew should only be deployed under mild conditions.
- Steel mesh on Mt Remarkable Range Track will be damaged by tracked machinery. In order for tracked machinery to access Mt Remarkable Range Track, rubber matting (or similar) should be placed over the steel mesh. Support personnel should be deployed to provide assistance.

## TELOWIE GORGE BLOCK

### Tenure, Size and Land Use

Telowie Gorge CP (1 967 ha) and the adjoining land gazetted as Mt Remarkable NP (35 ha) have been grouped as Telowie Gorge Block (2 002 ha) for fire management purposes.

### Vegetation

MVS No. 4, 5, 8, 12, 21, 22, 24, 26, 27, 29, 31, 32, 36, 55

This block supports Umbrella Bush (*Acacia ligulata*) open shrubland on the lower slopes, Beaked Red Mallee very open mallee on the mid slopes and Sugar Gum open forest on the upper slopes. River Red Gum and White Cypress-pine woodland with sparse understorey also occurs within the block.

### Fire History

The northern section of the reserve was burnt in 1985. The entire reserve was burnt in 1960.

### Fuel Hazard

*Moderate to Extreme* overall fuel hazard occurs throughout this block. For likely maximum overall fuel hazard for MVS see Table 1 (Section 3.4).

### Natural Values

Fauna and flora of conservation significance that have been recorded for this reserve are included in Appendix 1, 2 and 2a. Notably this reserve contains the Large-club Spider-orchid (*Caladenia macroclavia*), Pale Leek-orchid and Robust Leek-orchid. This reserve also contains the southernmost known Yellow-footed Rock-wallaby population.

### Heritage Values

The springs and gorges in the area are of cultural heritage significance to the Nukunu people.

### Built Assets

<b>On-reserve</b>	Footbridge Telowie Creek Campground with associated infrastructure.
<b>Off-reserve</b>	Numerous houses adjacent the Telowie Creek section boundary. Rural homesteads to west of the reserve. High value forestry land located east of the reserve.

### Fire Risk

The likelihood of a lightning-caused fire starting in this reserve is *Likely*. The likelihood of fires spreading from farming lands to the west of the reserve is *Possible*. The likelihood of a human caused fire is *Possible*, although, campfires are banned during the Fire Danger Season.

### Fire Tracks (GAFLC classification)

<b>Standard</b>	BBQ Track Telowie Entrance Track Pipeline Track
<b>Minor</b>	Go Kart Track Whytes Track
<b>Service</b>	Western Boundary Track unnamed tracks (leading off BBQ Track) unnamed tracks (leading to houses off Telowie Entrance Track)

### Specific Management Objectives for Telowie Gorge Block

- Ensure visitor safety (particularly along Nukunu Walking Trail and Telowie Campground).
- Minimise the likelihood of fires exiting the reserve and impacting on adjacent properties.
- Minimise the impact of fire on the Yellow-footed Rock-wallaby habitat, refer to the recommendations in Section 6.2.1.
- Minimise the likelihood on fire impacting on all threatened Spider-orchids, refer to the recommendations in Section 6.2.2.
- Minimise the likelihood of the entire reserve being burnt in a single fire event.

### Proposed Zoning

- A-zones (minimum 40 m) around neighbouring houses.
- B-zone (minimum 100 m) along BBQ Track to strengthen control line.
- B-zone (minimum 50 m) along Whytes Track to strengthen the control line in order to reduce the likelihood burning Yellow-footed Rock-wallaby habitat in its entirety in a single fire event.
- B-zone (minimum 50 m) along the Go Kart Track to strengthen control line.
- C-zone for the rest of the reserve

### Recommended Works

#### *Pre-suppression*

- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Fuel reduce the A-zone and B-zones to required levels (refer to Proposed Zoning).
- Develop an emergency procedure to ensure visitor safety during bushfires.
- Install consistent signage across reserves stating that walking trails are closed on Total Fire Ban Days. Signage should be erected at the Telowie Gorge car park and the entry and exist points of the Heysen Trail.
- Undertake landscape protection burns within the C-zone to reduce the risk of the whole reserve burning in one event and to create a mosaic of areas with different times-since the last fire (for proposed areas refer to Map 4).
- Upgrade the two unnamed tracks heading north off the Telowie Gorge Entrance Track from Service Tracks to Minor Tracks in order to increase access.
- Upgrade the Telowie Entrance Track from a Standard Track to a Major Track to minimise the likelihood of fire threatening neighbouring houses.

#### *Suppression*

##### Protection of Life:

- Priority would be to protect life of walkers on the Nukunu walking trail, visitors at the Telowie Campground, and neighbouring property owners. All efforts should be made to locate visitors in the event of a fire. The car park should be checked to determine if it is likely that there are walkers within the reserve.

##### Protection of Property:

- Protect the wooden Footbridge using foam.
- Neighbouring properties may require protection

Protection of the Environment:

- Refer to the *Yellow-footed Rock-wallaby Ecological Fire Management Strategy* (DEH, 2007a) for detailed information regarding fire suppression in Yellow-footed Rock-wallaby habitat.

General Suppression Issues:

- Existing breaks may be rolled to provide more effective control lines.
- Except in the vicinity of access tracks, suppression would involve the extensive use of ground crews with the assistance of aerial bombers if necessary.
- Prevailing weather conditions will dictate suppression activities. Ground crew should only be deployed under mild conditions.
- Access to some sections of block will be very difficult due to steep terrain limiting vehicle-based suppression.
- Steel mesh on BBQ Track and Whytes Track will be damaged by tracked machinery. In order for tracked machinery to access these tracks, rubber matting (or similar) should be placed over the steel mesh. Support personnel should be deployed to provide assistance.

## NAPPERBY BLOCK

### Tenure, Size and Land Use

The southern-most land parcel gazetted as Mt Remarkable NP (1 676 ha) and an adjacent Heritage Agreement (Hundred of Napperby) are incorporated into Napperby Block (1 859 ha) in order to adopt a landscape approach to fire management.

### Vegetation

MVS No. 4, 8, 9, 12, 21, 22, 24, 26, 27, 29, 32, 36, 55

This block supports Umbrella Bush open shrubland on the lower slopes, Beaked Red Mallee open mallee on the mid slopes and Sugar Gum open forest on the upper slopes.

### Fire History

Most of the block was burnt in 1960.

### Fuel Hazard

Predominantly *Moderate* to *Very High* overall fuel hazard. For likely maximum overall fuel hazard for MVS see Table 1 (Section 3.4).

### Natural Values

Flora of conservation significance for this block are included in Appendix 1. There are no fauna with a conservation rating recorded for Napperby Block.

### Heritage Values

The springs and gorges in the area are of cultural heritage significance to the Nukunu people.

### Built Assets

<b>On-reserve</b>	Quarry and associated infrastructure.
<b>Off-reserve</b>	SA Water shed. A house site is located close to the reserve boundary. Bluff compound (including TV tower). Rural homesteads to west of the reserve. Scout camp on the south-western boundary. Beetaloo Reservoir on adjoining land to the east of the block.

### Fire Risk

The likelihood of a lightning-caused fire starting in this block is *Likely*. The likelihood of fires spreading from farming lands to the west of the reserve is *Possible*. The likelihood of fires spreading from adjacent native vegetation is *Possible*.

### Fire Tracks (GAFLC classification)

<b>Major</b>	Bluff Track
<b>Standard</b>	Pipeline Track
<b>Service</b>	Bains Track unnamed track (locally known as Lightning Track) unnamed track (the Nelshaby Access Track) Nobles Track

### Specific Management Objectives for Napperby Block

- Ensure visitor safety (particularly near the scout camp).



- Minimise the likelihood of fires exiting the reserve and impacting on adjacent properties.
- Minimise the risk of damage to the Bluff compound (including TV tower).
- Minimise the likelihood of the entire reserve being burnt in a single fire event.

### **Proposed Zoning**

- A-zone (minimum 40 m) around SA Water Shed.
- B-zone (minimum 100 m) along Bains Track to strengthen the control line and to increase suppression opportunities for fires burning north or south. The zone will also increase safety of firefighters using Bains Track.
- B-zone (minimum 50 m) along Bluff Track to strengthen the control line and to increase suppression opportunities for fires burning east.
- B-zone (minimum 50 m) along Bluff Track to provide protection to the Bluff compound.
- C-zone for the rest of the block.

### **Recommended Works**

#### ***Pre-suppression***

- Maintain tracks to the current GAFLC classification (unless otherwise stated).
- Fuel reduce the A-zone and the B-zones to required levels (refer to Proposed Zoning).
- Undertake landscape protection burns within the C-zone to reduce the risk of the whole reserve burning in a single fire event and to create a mosaic of areas with different times-since last fire (for proposed areas refer to Map 4).
- Develop an emergency procedure to ensure visitor safety during bushfires.
- Stabilise sections of Bains Track with steel mesh.
- Install a fire tank at the top of Bains Track to increase water supplies.
- Investigate the feasibility of reopening Nobles Track.

#### ***Suppression***

##### Protection of Life:

- Priority would be to protect life of visitors to the adjoining Scout Camp. The Scout Camp should be checked for visitors.
- A house site is located near the block.

##### Protection of Property:

- Priority would be protection of nearby houses.
- The Bluff compound (including TV tower) will require protection.

##### General Suppression Issues:

- Prevailing weather conditions will dictate suppression activities. Ground crew should only be deployed under mild conditions.
- Containment of a fire within this block will be very difficult due to steep terrain limiting vehicle-based suppression.
- Except in the vicinity of tracks, suppression would involve the extensive use of ground crews with the assistance of aerial bombers if necessary.
- Existing breaks may be rolled to provide more effective control lines.
- Steel mesh on Bains Track will be damaged by tracked machinery. In order for tracked machinery to access this track, rubber matting (or similar) should be placed over the steel mesh. Support personnel should be deployed to provide assistance.

## 12 RECOMMENDATIONS

### 12.1 Summary of Management Strategies

#### Potential Threats to Life

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1. Continue to manage access to bush camping sites throughout the Fire Danger Season.
2. Close all long walking trails on Total Fire Ban Days, and erect consistent signage across all reserves to indicate that Walking Trails are closed on these days.
3. Develop an emergency procedure addressing visitor safety in relation to fire.
4. Implement fuel management strategies appropriate to asset protection and visitor safety (refer to Block Prescriptions and Map 4 for further information).
5. Reinforce CFS "Plan to Stay and Defend or Go Early" message to visitors and potential visitors.

#### Land Use

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6. Implement fuel management strategies on DEH managed lands to minimise the risk to life, property and the environment (refer to Section 11 (Block Prescriptions) and Map 4 for further information).
7. Encourage adjacent property owners to comply with the *Fire and Emergency Services Act 2005* by implementing fire management works on their own land to minimise the threat of fire.

#### Built Assets

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8. Undertake fire management works and activities to minimise impact on built assets, for both public and private buildings, agroforestry and farmlands.
9. Implement fuel management strategies appropriate to asset protection (refer to Section 11 (Block Prescriptions) and Map 4 for further information).

#### Cultural Heritage

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10. Implement fuel management strategies for the protection of heritage values where practicable (refer to Section 11 (Block Prescriptions) and Map 4 for further information);
11. Ensure liaison at bushfires occurs to identify heritage values, where time allows. Once the fire has passed evaluate sites to establish if any damage has occurred;
12. Ensure liaison occurs at bushfires before commencing off-track vehicle based fire suppression due to the potential to impact upon cultural heritage sites in Mt Remarkable NP.

#### Yellow-footed Rock-wallaby

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13. In order to reduce the risk of losing more than one population during a single bushfire event, fuel reduction works should be undertaken, where possible, between local populations. These areas will be zoned as B-zones (see Section 8.4).
14. Strategic fire access tracks should be maintained in the vicinity of and between local populations to the current GAFLC Standards.
15. Fires should be restricted from burning the entire home range of a colony or population.
16. Fires should be restricted from burning area between shelter sites and known water/feeding sources.
17. Any prescribed burning conducted near known Yellow-footed Rock-wallaby habitat will be planned in conjunction with the Yellow-footed Rock-wallaby Recovery Team.

## Threatened Spider-orchids

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18. Minimise the likelihood of vehicles or earthmoving equipment impacting on threatened Spider-orchid populations during fire suppression operations
19. Avoid prescribed burning or slashing within threatened Spider-orchid populations during winter and spring
20. Avoid prescribed burning or slashing within threatened Spider-orchid populations more frequently than every 5 years
21. Minimise the likelihood of large areas of threatened Spider-orchid habitat burning in a single fire event
22. Liaise with the Northern Lofty Block Orchid Recovery Team to develop strategies to reduce the risk of fire suppression vehicles impacting threatened Spider-orchid populations
23. Undertake ecological/experimental burns on threatened Spider-orchid populations to examine the response of these species to different disturbance regimes
24. Refer to Appendix 1 for fire management guidelines for threatened Spider-orchids

## Declining Woodland Birds

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25. Refer to Appendix 2a for fire management guidelines for declining woodland birds
26. Strategic fire access tracks in reserves should be maintained to the current GAFLC Standards
27. B-zones (see Section 8.4) should be established, where possible, to reduce the likelihood of large portions of reserves being burnt in a single fire event
28. Landscape Protection Burns in C-zones (see Section 8.5) should be used to create a mosaic of areas with a range of different times since the last fire
29. Before implementing any Landscape Protection Burns (see Section 8.5) within reserves, consideration should be given to the proportion of landscape that has been burnt within the reserve in the last five years, as well as the proportion of the landscape that has been burnt outside of the reserve. Until a more appropriate benchmark has been determined, no more than 30% of the identified woodland bird habitat within the reserves in the plan area should be burnt within a five year period. This benchmark was arrived at through consultation with the Recovery Team

## Peppermint Box Woodland

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30. Refer to fire management guidelines when implementing prescribed burns and aim to manage within these guidelines. Refer to Appendix 3 for Fire Management Guidelines
31. Avoid burning continuous remnants of Peppermint Box Grassy Woodland in its entirety during a single fire event, instead aim to increase patchiness within the remnants
32. Implement ecological/experimental burns as part of an integrated weed management strategy in order to reduce the abundance of environmental weeds posing a threat to the integrity of Peppermint Box Grassy Woodland
33. Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns

## Weeds

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34. Refer to Ecological Fire Management Guidelines (Table 2) and fire management guidelines for introduced flora species (Appendix 1) during prescribed burn planning.
35. Consider the use of fire as part of an integrated weed management strategy.
36. Conduct post-fire weed control subject to regional priorities.
37. Prior to any prescribed burn, the potential impact of weed species is identified in prescribed burn planning, as part of the environmental assessment. This will identify any priority weed species and recommend post-fire actions to mitigate the impact of weeds.

38. Monitoring of weeds pre and post-fire to determine what post-fire weed control is required and its effectiveness.
39. Implement hygiene practices to reduce weed spread across the plan area.

## Pest Species

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40. Collect relevant information in prescribed burn planning as part of the EAT of pest animals to determine appropriate post-fire management.

## Monitoring

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41. Investigate the fuel accumulation rates of the various MVS that occur within the plan area. These data will help DEH staff determine if and when fuel reduction works are required, ultimately assisting in the scheduling of operational works and activities in B-zones
42. Assess the suitability of the proposed fire interval guidelines for Bayonet Spider-orchid populations, in conjunction with the Northern Lofty Block Orchid Recovery Team (Appendix 1)
43. Examine the appropriateness of the proposed fire interval and season of burn guidelines for Woolcock's Spider-orchid populations, in conjunction with the Northern Lofty Block Orchid Recovery Team (Appendix 1)
44. Assess the proposed guidelines for prescribed burning in Yellow-footed Rock-wallaby habitat including season, extent and time of day as set out in the *Yellow-footed Rock-wallaby Ecological Fire Management Strategy* (DEH, 2007a)
45. Evaluate the post-fire vegetation response, in relation to the regeneration of Yellow-footed Rock-wallaby preferred food species
46. Observe the behavioural response of Yellow-footed Rock-wallabies during fire
47. Record any change in Yellow-footed Rock-wallaby home range and/or location after fire to assist planning of future prescribed burns in Yellow-footed Rock-wallaby habitat
48. Examine the suitability of the proposed Ecological Fire Management Guidelines for species of Declining Woodland Birds, including fire interval, fire frequency and extent in conjunction with the Declining Woodland Birds Recovery Team (Appendix 2a)
49. Evaluate the suitability of the proposed Ecological Fire Management Guidelines for Peppermint Box woodland including fire interval, frequency, season, intensity and extent (Appendix 3)

## Research

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50. Investigate the suitability of the Ecological Fire Management Guidelines for MVS through the assessment of historical fire regimes in similar communities across the state (Table 2)
51. Explore the effects of slashing and soil disturbance as well as varying fire season, intensity and frequency on Bayonet Spider-orchid populations and use this information to update the Ecological Fire Management Guidelines (Appendix 1)
52. Investigate the effects of slashing and soil disturbance as well as varying fire intensity and frequency on Woolcock's Spider-orchid populations and use this information to propose guidelines for ecological fire management (Appendix 1)
53. Examine the effects of fire regime, specifically fire frequency, fire intensity and fire interval on populations and the habitat of Yellow-footed Rock-wallabies and use this information to update the Ecological Fire Management Guidelines (Appendix 2)
54. Explore the effects of fire regime, particularly season of burn and fire intensity on Declining Woodland Birds and use this information to update the Ecological Fire Management Guidelines (Appendix 2a)

## 12.2 Summary of Works for Fire Management Blocks

A five-year works schedule is being developed in tandem with this plan, to address the recommendations summarised below (Table 4). The works schedule will provide additional detail about track upgrades, fuel reduction works and prescribed burns. From the proposed works schedule, an annual works program will be developed and implemented by the DEH Region or District. Individual burn plans will be produced prior to any implementation of a prescribed burn. Post-fire burn assessments will be conducted and used as a basis for performance reporting against objectives.

Table 4 (below) provides a summary of recommendations for each fire management block. Works are dependent on a number of variables including funding, staff and resources, bushfire events (that have occurred since time of writing), and prescribed burning opportunities. There must be flexibility to reschedule works as variables can impact on the ability to implement works.

Note: Works and activities off-reserve should be developed through liaison with the District Bushfire Prevention Committee.

**TABLE 4 – RECOMMENDED WORKS FOR FIRE MANAGEMENT BLOCKS**

	Recommendations
All blocks in the planning area	<ul style="list-style-type: none"> <li>• Develop an emergency procedure or action plan for visitor/staff safety during bushfires; to address walking trails, visitor accommodation, campgrounds, day visitor use areas and Southern Flinders District Office precinct. In particular: <ul style="list-style-type: none"> <li>▪ Campgrounds: Mambray Creek Campground; Telowie Gorge Campground.</li> <li>▪ Accommodation: Alligator Lodge and Mambray Creek Cabin, Dutchmans Homestead.</li> <li>▪ Day use areas: Mambray Creek precinct, Blue Gum Flat Picnic Area.</li> <li>▪ Walking trails and bushcamping sites.</li> <li>▪ Reinforce the CFS “plan to stay and defend or go early” message to visitors.</li> </ul> </li> <li>• Liaise with the local Aboriginal community about the protection of Aboriginal cultural heritage sites.</li> <li>• Maintain tracks to current GAFLC standard, unless otherwise stated in this table.</li> <li>• DEH to acquire resources and skills in order to implement some of the prescribed burns using aerial ignition.</li> <li>• Install consistent signage across all reserves stating that walking trails are closed on Total Fire Ban Days.</li> </ul>
Neighbours of DEH Reserves	<ul style="list-style-type: none"> <li>• It is recommended that neighbours implement fire management strategies around their own assets to complement the work to be undertaken in the fire management plan area.</li> </ul>

	Recommendations
The Dutchmans Stern Block	<ul style="list-style-type: none"> <li>Fuel reduce A-zone to the required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Stabilise sections of the Switchback Track using meshing in order to increase access to the reserve and increase the safety of fire crew.</li> </ul>
	<ul style="list-style-type: none"> <li>Undertake landscape protection burns to reduce the likelihood of large-scale fires.</li> </ul>
Mt Brown Block	<ul style="list-style-type: none"> <li>Upgrade Unnamed Track (Eastern Boundary) to at least a Minor Fire Track.</li> </ul>
	<ul style="list-style-type: none"> <li>Repair Waukarie Falls Track in order to increase access within the reserve.</li> </ul>
	<ul style="list-style-type: none"> <li>Investigate establishing a vehicle track within the reserve in order to increase access.</li> </ul>
	<ul style="list-style-type: none"> <li>Undertake landscape protection burns to reduce the likelihood of large-scale fires.</li> </ul>
Alligator Block	<ul style="list-style-type: none"> <li>Continue to restrict access to bush camping sites at Stony Creek, Eaglehawk, Frick Dam and Longhill, Kingfisher Flat, Hidden Gorge, Sugar Gum Dam and Stringers during the Fire Danger Season. Continue to prohibit campfires at bush campsites all year round.</li> </ul>
	<ul style="list-style-type: none"> <li>Fuel reduce A-zones to the required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Fuel reduce B-zones to the required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Place a dead end sign at the start of the Little Pound Track and also establish a turnaround point at the end of the track.</li> </ul>
	<ul style="list-style-type: none"> <li>Investigate opening up Old Hut Track.</li> </ul>
	<ul style="list-style-type: none"> <li>Upgrade of Fricks Track from a Service Track to a Minor Fire Track.</li> </ul>
	<ul style="list-style-type: none"> <li>Upgrade of Sleses Track from a Service Track to a Minor Fire Track.</li> </ul>
	<ul style="list-style-type: none"> <li>Upgrade a section of Dump Track from Service Track to Minor Fire Track.</li> </ul>
	<ul style="list-style-type: none"> <li>Undertake an ecological burn to investigate the influence of fire regimes on all threatened Spider-orchids.</li> </ul>
<ul style="list-style-type: none"> <li>Undertake landscape protection burn to reduce the likelihood of large-scale fires.</li> </ul>	
Hillams Block	<ul style="list-style-type: none"> <li>Continue to restrict access to bush camping sites at Goat Rock and the Racecourse during the Fire Danger Season.</li> </ul>
	<ul style="list-style-type: none"> <li>Fuel reduce A-zone to the required levels.</li> </ul>

	Recommendations
Remarkable Range Block	<ul style="list-style-type: none"> <li>Continue to restrict access to bush camping sites at the Summit Camp during the Fire Danger Season.</li> </ul>
	<ul style="list-style-type: none"> <li>Upgrade sections of Spring Creek Mine Track to a Minor Track where possible.</li> </ul>
Telowie Gorge Block	<ul style="list-style-type: none"> <li>Fuel reduce A-zone to required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Fuel reduce B-zones to the required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Undertake a landscape protection burn to reduce the likelihood of a large scale fire.</li> </ul>
	<ul style="list-style-type: none"> <li>Upgrade the unnamed tracks to neighbouring properties in the Telowie Creek section of the reserve from Service Tracks to Minor Fire Tracks.</li> </ul>
	<ul style="list-style-type: none"> <li>Upgrade the Telowie entrance track from a Standard Track to a Major Fire Track to increase protection to the neighbouring houses.</li> </ul>
Napperby Block	<ul style="list-style-type: none"> <li>Fuel reduce A-zone to the required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Fuel reduce B-zones to the required levels.</li> </ul>
	<ul style="list-style-type: none"> <li>Undertake landscape protection burns to reduce the likelihood of large scale fires</li> </ul>
	<ul style="list-style-type: none"> <li>Stabilise sections of Bains Track with meshing.</li> </ul>
	<ul style="list-style-type: none"> <li>Install a fire tank at the top of Bains Track on SA Water land to increase access to water.</li> </ul>
	<ul style="list-style-type: none"> <li>Investigate the feasibility of reopening Nobles Track.</li> </ul>

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## 14 APPENDICES

## Appendix 1 – Fire Response of Rated, Significant and Introduced Flora Species

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Acacia gracilifolia</i>	Graceful Wattle		R	4 8 9 12 21 26 27 49 55	AL TG	Shrub	<ul style="list-style-type: none"> <li>Probably hardseeded</li> <li>Flowers: August-September</li> </ul>	<ul style="list-style-type: none"> <li>Requires medium to high intensity fire for seedling recruitment</li> </ul>	SA^
<i>Acacia iteaphylla</i>	Flinders Ranges Wattle		R	8 12 27	NA TG	Shrub	<ul style="list-style-type: none"> <li>Probably hardseeded</li> <li>Flowers: March-September</li> </ul>	<ul style="list-style-type: none"> <li>Requires medium to high intensity fire for seedling recruitment</li> </ul>	SA^
<i>Acacia montana</i>	Mallee Wattle		R	12 27	TG	Shrub	<ul style="list-style-type: none"> <li>Probably hardseeded</li> <li>Flowers: August-September</li> </ul>	<ul style="list-style-type: none"> <li>Requires medium to high intensity fire for seedling recruitment</li> </ul>	SA^
<i>Acacia quornensis</i>	Quorn Wattle		R	4 8 23	DS	Shrub	<ul style="list-style-type: none"> <li>Probably hardseeded.</li> <li>Fire may promote recruitment.</li> <li>Obligate seeder</li> <li>5 years to reproductive maturity</li> <li>Flowers: September-November</li> </ul>	<ul style="list-style-type: none"> <li>Fire intervals greater than 7 years required</li> <li>Requires medium to high intensity fire for seedling recruitment</li> </ul>	SA^
<i>Anthocercis angustifolia</i>	Narrow-leaf Ray-flower		R	5 8 12 21	TG	Shrub	<ul style="list-style-type: none"> <li>At times locally abundant after fire</li> <li>Flowers: May-November</li> </ul>	#	SA^
<i>Asparagus asparagoides</i> *	Bridal Creeper				TG	Herb	<ul style="list-style-type: none"> <li>Adults resprout following fire</li> </ul>	<ul style="list-style-type: none"> <li>Weed control required post-fire.</li> </ul>	SA^

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Austrodanthonia tenuior</i>	Short-awn Wallaby-grass		R	8	TG	Perennial Grass	<ul style="list-style-type: none"> <li>Persistent soil seed bank</li> <li>Adhesive seed dispersal</li> <li>Flowers: September-May</li> </ul>	#	SA^
<i>Austrostipa breviglumis</i>	Cane Spear-grass		R	4 8 23 26 27 55	DS MB AL	Perennial	<ul style="list-style-type: none"> <li>Flowers: August-December</li> </ul>	#	SA^
<i>Austrostipa gibbosa</i>	Swollen Spear-grass		R	8 26	AL RR NA	Perennial	<ul style="list-style-type: none"> <li>Resprouts</li> <li>Flowers: October-June</li> </ul>	#	Aus^
<i>Austrostipa petraea</i>	Flinders Ranges Spear-grass		R	23	DS		<ul style="list-style-type: none"> <li>Flowers: August-October</li> </ul>	#	SA^
<i>Austrostipa tenuifolia</i>	-		R	9 49	MB RR		<ul style="list-style-type: none"> <li>Flowers: July-October</li> </ul>	#	SA^
<i>Brachycome ciliaris</i> var. <i>subintegrifolia</i>	-		R	9	MB	Perennial Herb/Forb	<ul style="list-style-type: none"> <li>Flowers most of the year</li> </ul>	#	SA^
<i>Caladenia gladiolata</i>	Bayonet Spider-orchid	EN	E	4 8 12	MR	Perennial Herb	<ul style="list-style-type: none"> <li>Flowers: September to October</li> <li>Capsules dehisce in October</li> <li>Populations survived bushfires in 1982 and 1988, but flowering plants decreased after fire.</li> <li>Life Span: 5-15 years</li> <li>Generally occurs along tracks.</li> </ul>	<ul style="list-style-type: none"> <li>Fire intervals greater than 5 years required.</li> <li>Avoid prescribed burning between May and November.</li> </ul>	SA^

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NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Caladenia macroclavia</i>	Large-club Spider-orchid	EN	E	8	TG	Perennial Herb	<ul style="list-style-type: none"> <li>The species has not been recorded in the reserve since 1989 and is now assumed to be extinct within reserve.</li> <li>Flowers Aug-Sept</li> <li>Capsules dehisce in October</li> </ul>	<ul style="list-style-type: none"> <li>Consider implementing experimental burns at known historic locations.</li> </ul>	SA <sup>^</sup>
<i>Caladenia woolcockiorum</i>	Woolcock's Spider-orchid	VU	V	4 8 9	MR	Perennial Herb	<ul style="list-style-type: none"> <li>Flowers August-September</li> <li>Generally occurs along tracks.</li> </ul>	<ul style="list-style-type: none"> <li>Slashing or control burning during the months of May to November would be harmful to plants in the active stage of growth.</li> <li>Fire intervals greater than 10 years recommended</li> </ul>	SA <sup>^</sup>
<i>Caladenia xantholeuca</i>	Flinders Ranges White Caladenia	EN	E	8 9 12	MR TG	Perennial Herb	<ul style="list-style-type: none"> <li>The species has not been recorded in the reserves in the last 24 years and might be extinct.</li> <li>Alternatively lack of flowering might be due to low winter rainfall.</li> <li>Flowers: August to mid September.</li> <li>Capsules dehisce in October.</li> </ul>	<ul style="list-style-type: none"> <li>If flowering plants are observed seek advice from DEH Threatened Species Unit before conducting prescribed burning.</li> </ul>	SA <sup>^</sup>
<i>Calotis lappulacea</i>	Yellow Burr-daisy		R	8	DS	Perennial Forb	<ul style="list-style-type: none"> <li>Fruit: Burr</li> </ul>	#	SA <sup>^</sup>
<i>Carex inversa</i> var. <i>inversa</i>	Knob Sedge		R	8	RR	Perennial	<ul style="list-style-type: none"> <li>Congeners resprout</li> <li>Flowers: August-April</li> </ul>	#	Aus <sup>^</sup>
<i>Choretrum glomeratum</i> var. <i>chrysanthum</i>	Yellow-flower Sour-bush		R	4 8 27 49	AL	Shrub	<ul style="list-style-type: none"> <li>Killed by fire</li> <li>Fruit: Drupe</li> <li>Primary Juvenile Period: 1 year</li> <li>Flowers throughout the year</li> </ul>	#	SA <sup>^</sup>
<i>Cryptandra amara</i> var. <i>longiflora</i>	Long-flower Cryptandra		R	12	MB TG	Shrub	<ul style="list-style-type: none"> <li>Resprouts</li> <li>Secondary Juvenile Period: &lt;1 year</li> <li>Seeds dispersed by ants</li> <li>Flowers: June-October</li> </ul>	#	SA <sup>^</sup>

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Derwentia decorosa</i>	Showy Speedwell		R	4 8 12 23 27 33 55	DS MB MR	Shrub	<ul style="list-style-type: none"> <li>Little is known about the biology and ecology of this species</li> <li>Flowers: July-November</li> </ul>	#	SA^
<i>Deyeuxia densa</i>	Heath Bent-grass		R	9 12	MB	Perennial Grass	<ul style="list-style-type: none"> <li>Flowers: October-January</li> </ul>	#	SA^
<i>Dianella longifolia</i> var. <i>grandis</i>	Pale Flax-lily		R	8 23	DS AL	Perennial	<ul style="list-style-type: none"> <li>Congeners resprout</li> <li>Flowers: September -January</li> </ul>	#	Aus^
<i>Echinopogon ovatus</i> var. <i>ovatus</i>	Rough-beard Grass		R	4 8 26	MB	Annual Grass	<ul style="list-style-type: none"> <li>Adults killed by fire</li> <li>Primary juvenile period: 1 year</li> <li>Flowers: October-January</li> </ul>	#	Aus^
<i>Echium Plantagineum</i> *	Salvation Jane			4 5 8 9 12 21 23 24 26 27 32 33 36 59 55	AL RR TG DS MB NA	Herb	<ul style="list-style-type: none"> <li>Adults killed by fire</li> <li>Seedlings readily recruit post-fire</li> <li>Some seeds are killed by fire</li> </ul>	<ul style="list-style-type: none"> <li>Weed control required post-fire.</li> </ul>	Aus^

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices  
NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Eremophila subfloccosa</i> ssp. "glandulosa" ms	Green-flower Emubush		R	12	TG	Shrub	<ul style="list-style-type: none"> <li>Flowers: June-November</li> </ul>	#	SA^
<i>Eryngium rostratum</i>	Blue Devil		V	8	DS AL	Perennial Herb	<ul style="list-style-type: none"> <li>Killed by fire</li> <li>Primary juvenile period: 1 year</li> <li>Flowers: November-January</li> </ul>	#	SA^
<i>Eucalyptus</i> aff. <i>viridis</i>	Green Mallee		R	8 9	DS MB	Mallee Tree	<ul style="list-style-type: none"> <li>Presumably resprouts from lignotuber</li> <li>Canopy-held seed bank</li> </ul>	#	SA^
<i>Eucalyptus albens</i>	White Box		R	4 8 9 12	RR	Tree (Single Stem)	<ul style="list-style-type: none"> <li>Resprouts from lignotuber and epicormic buds</li> <li>Canopy-held seed bank</li> <li>Flowers: May-June</li> </ul>	#	SA^
<i>Eucalyptus percostata</i>	Ribbed White Mallee		R	4 8 9 23 27 49 55	DS AL TG	Mallee	<ul style="list-style-type: none"> <li>Resprouts from lignotuber</li> </ul>	#	SA^
<i>Festuca benthamiana</i>	Bentham's Fescue		R	4 8 23	DS RR	Perennial Herb	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	#	-
<i>Haeckeria punctulata</i>	Sticky Haeckeria		R	9 27	MR TG	Shrub	<ul style="list-style-type: none"> <li>Little is known about the biology and ecology of this species</li> <li>Flowers: October-November</li> </ul>	#	SA^
<i>Hovea purpurea</i>	Tall Hovea		R	4 8	MR	Shrub	<ul style="list-style-type: none"> <li>Resprouts</li> <li>Persistent soil stored seed bank</li> <li>Seeds dispersed by ants</li> <li>Hard seedcoat</li> </ul>	#	Aus^

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Lepidium pseudotasmanicum</i>	Shade Peppergrass		V	8	MB		<ul style="list-style-type: none"> <li>Obligate seeder</li> <li>Persistent soil stored seed bank</li> <li>Relies on gap forming disturbance (e.g. fire) for recruitment.</li> </ul>	#	SA^
<i>Leptorhynchus elongatus</i>	Lanky Buttons		R	23	DS	Perennial Herb	<ul style="list-style-type: none"> <li>Resprouter</li> <li>Wind dispersed</li> <li>Flowers: August-November</li> </ul>	#	SA^
<i>Logania saxatilis</i>	Rock Logania		R	4 8 9 12 27	RR		<ul style="list-style-type: none"> <li>Little is known about the biology and ecology of this species</li> </ul>	#	SA^
<i>Lycium ferocissimum</i> *	Boxthorn			4 8 9 12 26 27 31 32 36 49 55	AL TG DS MB NA	Shrub	<ul style="list-style-type: none"> <li>Primary juvenile period: 2 years</li> <li>Fruit: Berry</li> <li>Fruits dispersed by birds &amp; foxes</li> <li>Adults resprout following fire</li> </ul>	<ul style="list-style-type: none"> <li>Weed control required post-fire.</li> </ul>	SA^
<i>Maireana excavata</i>	Bottle Fissure-plant		V	36	MB	Perennial	<ul style="list-style-type: none"> <li>Congeners killed by fire</li> <li>Flowers: July-December</li> </ul>	#	Aus^
<i>Maireana rohrlachii</i>	Rohrlach's Bluebush		R	27	MR	Shrub	<ul style="list-style-type: none"> <li>Flowers: December-June</li> </ul>	#	Aus^

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NOTE: List includes species known or likely to occur within the plan area.



Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Marrubium vulgare</i> *	Horehound			4 8 9 12 27 32 33 36 49 55	MR MB	Shrub	<ul style="list-style-type: none"> <li>Adults killed by fire</li> <li>Seedlings readily recruit post-fire</li> </ul>	<ul style="list-style-type: none"> <li>Weed control required post-fire either through spraying or burning at a short inter-fire interval</li> </ul>	SA^
<i>Olea europea</i> *	European Olive			9 26	NA MR MB	Tree	<ul style="list-style-type: none"> <li>Adults resprout following fire.</li> <li>Seedlings are killed by fire</li> <li>Flowers late spring</li> <li>Seeds germinate in autumn.</li> <li>Fruit: Berry - dispersed by birds</li> </ul>	<ul style="list-style-type: none"> <li>Weed control required post-fire.</li> </ul>	SA^
<i>Olearia pannosa</i> ssp. <i>cardiophylla</i>	Velvet Daisy-bush		R	4 8 23 27	DS	Shrub	<ul style="list-style-type: none"> <li>Flowers: August-October</li> </ul>	#	SA^
<i>Olearia pannosa</i> ssp. <i>pannosa</i>	Silver Daisy-bush	VU	V	8 9 23	MB	Shrub	<ul style="list-style-type: none"> <li>Flowers: August-October</li> <li>Resprouts from lignotuber</li> </ul>	#	SA^
<i>Olearia picridifolia</i>	Rasp Daisy-bush		R	12 23	DS TG	Shrub	<ul style="list-style-type: none"> <li>Flowers: June-October</li> </ul>	#	SA^
<i>Ozothamnus scaber</i>	Rough Bush-everlasting		V	4 9	MB	Shrub	<ul style="list-style-type: none"> <li>Little is known about the biology and ecology of this species</li> <li>Flowers: October-December</li> </ul>	#	-
<i>Pimelea curviflora</i> var.	Curved Riceflower		R	8 21 29 32 36	MB	Shrub	<ul style="list-style-type: none"> <li>Congeners resprout</li> </ul>	#	Aus^

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Poa drummondiana</i>	Knotted Poa		R	23	DS	Perennial	<ul style="list-style-type: none"> <li>Flowers: September-November</li> </ul>	#	SA^
<i>Prasophyllum pallidum</i>	Pale Leek-orchid	VU	V	4 8 12	RR TG	Herb	<ul style="list-style-type: none"> <li>Fire stimulated flowering</li> <li>Flowers: September-November</li> </ul>	#	SA^
<i>Prasophyllum validum</i>	Robust Leek-orchid	VU	V	4 8 9 12	MB RR TG	Herb	<ul style="list-style-type: none"> <li>Possibility of fire stimulated flowering</li> <li>Flowers: November-December</li> </ul>	#	SA^
<i>Rosa canina</i> *	Dog Rose				MR	Shrub	<ul style="list-style-type: none"> <li>Rose hips are eaten by birds</li> <li>Adults resprout following fire</li> <li>Response of seedlings &amp; seeds unknown</li> </ul>	<ul style="list-style-type: none"> <li>Weed control required post-fire.</li> </ul>	SA^
<i>Scutellaria humilis</i>	Dwarf Skullcap		R	8	RR		<ul style="list-style-type: none"> <li>Flowers: August-December</li> <li>Fruit: small nutlet</li> </ul>	#	SA^
<i>Senecio megaglossus</i>	Large-flower Groundsel	VU	V	8 23 33 55	DS	Shrub	<ul style="list-style-type: none"> <li>Congeners killed by fire.</li> <li>Flowers: August-December</li> </ul>	#	Aus^
<i>Swainsona behriana</i>	Behr's Swainson-pea		V	5 23	DS	Perennial herb	<ul style="list-style-type: none"> <li>Congeners killed by fire.</li> <li>Hardseeded</li> <li>Flowers: July-October</li> </ul>	#	Aus^
<i>Swainsona tephrotricha</i>	Ashy-haired Swainson-pea		R	8 21 33	DS	Perennial	<ul style="list-style-type: none"> <li>Flowers: July-October.</li> <li>Quiescent from summer to winter</li> </ul>	#	SA^

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Life Form	Species Ecology and Fire Response	Fire Management Guidelines or Post-fire Management Recommendations	Source
<i>Veronica parkalliana</i>	Port Lincoln Speedwell		V	8 12 27 55	MR TG	Perennial herb	<ul style="list-style-type: none"> <li>• Considered extinct, but has been rediscovered after bushfires which suggests that this species is a fire ephemeral</li> <li>• Flowers: September-October</li> <li>• Lifespan around 2 years</li> </ul>	#	SA^
<i>Wurmbea latifolia</i> ssp. <i>latifolia</i>	Broad-leaf Nancy		V	9	RR	Herb (growing from corms)	<ul style="list-style-type: none"> <li>• Presumably resprouts</li> <li>• Flowers: July-September</li> </ul>	#	SA^

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices  
 NOTE: List includes species known or likely to occur within the plan area.

## Appendix 2 – Fire Response of Rated and Significant Fauna Species

Some rated birds are included in Appendix 2a

Type	Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Diet	Breeding	Species Ecology and Fire Response	Fire Management Guidelines	Source
Bird	<i>Falco peregrinus</i>	Peregrine Falcon		R	8	DS MB MR TG	C	<ul style="list-style-type: none"> <li>Sites: rock crevices</li> <li>Material: rock</li> <li>Season: Aug-Sept</li> </ul>	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	#	Aus <sup>^</sup>
Bird	<i>Gerygone olivacea</i>	White-throated Gerygone		R	26	MB	I	<ul style="list-style-type: none"> <li>Sites: canopy</li> <li>Material: plant material</li> <li>Season: Aug-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	#	Aus <sup>^</sup>
Bird	<i>Pyrholaemus brunneus</i>	Redthroat		R	4 8 9 27 33	DS MB TG	I	<ul style="list-style-type: none"> <li>Sites: shrubs</li> <li>Material: strips of bark, grass and feathers</li> <li>Season: July - Nov</li> </ul>	<ul style="list-style-type: none"> <li>Frequent fires - destroy the habitat of this species</li> </ul>	<ul style="list-style-type: none"> <li>Avoid 2 or more successive intervals less than 10 years apart</li> </ul>	Aus <sup>^</sup>
Mammal	<i>Petrogale xanthopus</i>	Yellow-footed Rock-wallaby	VU	V	4 8 12 21 23 24 27 33 55	TG DS MR	V	<ul style="list-style-type: none"> <li>Sites: Rocky outcrops</li> <li>Material: #</li> <li>Season: Non distinct season: influenced by rainfall</li> </ul>	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	<ul style="list-style-type: none"> <li>Refer to the draft Ecological Fire Management Strategy for Yellow-footed Rock-wallaby (DEH, 2006d)</li> </ul>	SA <sup>^</sup>

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Type	Species	Common Name	EPBC Act Status	NPW Act Status	MVS No	Block/s	Diet	Breeding	Species Ecology and Fire Response	Fire Management Guidelines	Source
Reptile	<i>Aprasia pseudopulchella</i>	Flinders Worm Lizard	VU	V	4849	MB MR	I	<ul style="list-style-type: none"> <li>• Site: under rocks or underground</li> <li>• Material: unknown</li> <li>• Season: unknown</li> </ul>	<ul style="list-style-type: none"> <li>• Unknown</li> </ul>	#	Aus <sup>^</sup>
Reptile	<i>Morelia spilota</i>	Carpet Python		R	9	MR TG	C	<ul style="list-style-type: none"> <li>• Sites: Burrows</li> <li>• Material: soil</li> </ul>	<ul style="list-style-type: none"> <li>• Unknown</li> </ul>	#	Aus <sup>^</sup>
Reptile	<i>Notechis ater ater</i>	Krefftt's Tiger Snake (Flinders Ranges)	VU		Riparian areas	MR	C	<ul style="list-style-type: none"> <li>• Sites: rocky, often steep margins of watercourses that often dry in summer</li> <li>• Material: unknown</li> <li>• Season: possibly spring</li> </ul>	<ul style="list-style-type: none"> <li>• Population decline noted following the 1988 fire. Cause unknown.</li> <li>• Food sources (eg frogs) may be adversely affected if foam and retardants enter creek systems</li> </ul>	<ul style="list-style-type: none"> <li>• Limit use of foam and retardant near creek lines</li> </ul>	Aus <sup>^</sup>
Reptile	<i>Varanus varius</i>	Tree Goanna/ Lace Monitor		R	48 Arboreal	MR AL	C	<ul style="list-style-type: none"> <li>• Sites: arboreal or terrestrial termite mounds</li> <li>• Season: unknown</li> </ul>	<ul style="list-style-type: none"> <li>• Unknown</li> </ul>	#	Aus <sup>^</sup>

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices  
NOTE: List includes species known or likely to occur within the plan area.

## Appendix 2a – Fire Response of Declining Woodland Birds

Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Acanthiza apicalis</i>	Inland Thornbill	4 5 8 9 12 26 27 29 32 33	DS MB MR TG NA	<ul style="list-style-type: none"> <li>Material: grass &amp; fine material</li> <li>Season: July-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Common throughout area</li> <li>Feeds in dense vegetation</li> <li>Will decrease in abundance or disappear in recently burnt areas, but will return 2-3 years post-fire</li> </ul>	<ul style="list-style-type: none"> <li>Avoid burning more than 30% of a particular Major Vegetation Sub-group within a 5 year period</li> </ul>
<i>Acanthiza nana</i>	Yellow Thornbill	4 5 8 9 12 21 26 27 29 32 33 36	DS MB MR TG NA	<ul style="list-style-type: none"> <li>Material: grass &amp; fine material</li> <li>Season: July-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Prefers long unburnt areas</li> </ul>	<ul style="list-style-type: none"> <li>Some intervals greater than 30 years are desirable</li> </ul>
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	8 9 21 27	MR TG NA	<ul style="list-style-type: none"> <li>Material: grass &amp; fine material</li> <li>Season: July-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Population may decline following large non-patchy burns</li> </ul>	<ul style="list-style-type: none"> <li>Avoid burning more than 30% of a particular MVS within a 5 year period</li> </ul>
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	8 9	MB MR TG NA	<ul style="list-style-type: none"> <li>Material: sticks &amp; bark</li> <li>Season: Aug-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Returns to burnt areas within a few weeks</li> <li>Some Honeyeaters become more abundant in areas with frequent fires of low intensity due to the profuse post-fire flowering</li> </ul>	#
<i>Aegotheles cristatus</i>	Owlet Nightjar	9	DS MR MB TG	<ul style="list-style-type: none"> <li>Sites: hollows</li> <li>Material: dried leaves</li> <li>Season: Aug-Oct</li> </ul>	<ul style="list-style-type: none"> <li>Feeds mostly on the ground</li> </ul>	#

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Aphelocephala leucopsis</i>	Southern Whiteface	4 9	DS MR MB TG	<ul style="list-style-type: none"> <li>Material: grass &amp; fine material</li> </ul>	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	#
<i>Artamus cyanopterus</i>	Dusky Woodswallow	4 8 9 27 29 32	NA MR MB TG	<ul style="list-style-type: none"> <li>Site: hollows &amp; tree forks</li> <li>Material: fine twigs</li> <li>Season: Aug-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Population moves north in summer</li> <li>Increased breeding in burnt areas</li> <li>Higher abundance in burnt (8 months post-fire) than unburnt vegetation</li> <li>Recorded eating charcoal</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Hylacola pyrrhopygia</i>	Chestnut-rumped Heathwren	4 8 9 26 27	DS MB MR TG NA	<ul style="list-style-type: none"> <li>NPW Act Status: V</li> <li>Diet: I, G</li> <li>Site: near or on the ground</li> <li>Material: plant material</li> <li>Season: July-Nov</li> </ul>	<ul style="list-style-type: none"> <li>Shrub layers of woodlands, on which Heathwrens rely upon, are particularly susceptible to alteration or even elimination as a result of fires</li> </ul>	<ul style="list-style-type: none"> <li>Avoid 2 or more successive fires less than 10 years apart</li> </ul>
<i>Climacteris picumnus</i>	Brown Treecreeper	8 9	MB MR NA	<ul style="list-style-type: none"> <li>Sites: tree hollows</li> <li>Material: grass, feathers &amp; loose bark</li> <li>Season: June-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Higher abundance in burnt (8 yrs post-fire) than unburnt vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Corcorax melanorhamphos</i>	White-winged Chough	4	MR NA AL	<ul style="list-style-type: none"> <li>Sites: horizontal branches</li> <li>Material: mud &amp; plant fibre</li> <li>Season: Aug-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Feeds in open ground</li> <li>Generally increases in abundance post-fire</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Daphoenositta chrysoptera</i>	Varied Sitella	4 8 9	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: forks of dead tree branches</li> <li>Material: bark</li> <li>Season: Aug-Jan</li> </ul>	<ul style="list-style-type: none"> <li>More abundant in burnt areas (8 years post-fire) than unburnt areas</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Falco berigora</i>	Brown Falcon	All habitat types except closed forests	MR TG NA	<ul style="list-style-type: none"> <li>Sites: cliff edges, tree hollows &amp; disused nests of other species</li> <li>Season: Aug-Oct</li> </ul>	<ul style="list-style-type: none"> <li>Attracted to fire fronts to feed on insects</li> </ul>	#

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Falcunculus frontatus</i>	Crested Shrike-tit / Eastern Shrike-tit	4	MB MR TG NA	<ul style="list-style-type: none"> <li>NPW Act Status: R</li> <li>Diet: I</li> <li>Sites: vertical forks high in the canopy</li> <li>Material: bark</li> <li>Season: Oct-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Peels bark from large branches or tree-trunks to extract prey from underneath</li> <li>Frequency of fires prevent insects from establishing beneath the bark of gum-barked trees</li> </ul>	<ul style="list-style-type: none"> <li>Avoid 2 or more successive fires less than 10 years apart</li> </ul>
<i>Gliciphila melanops</i>	Tawny Crowned Honeyeater	4 8 9 29 33	DS MB MR TG NA	<ul style="list-style-type: none"> <li>Material: sticks &amp; bark</li> <li>Season: June-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Opportunist: may become abundant 1-10 years post-fire</li> <li>More abundant in areas burnt within the last 10 years</li> <li>Some Honeyeaters become more abundant in areas with frequent fires of low intensity, due to the profuse post-fire flowering</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Haliastur sphenurus</i>	Whistling Kite		MR NA	<ul style="list-style-type: none"> <li>Sites: tree canopy</li> <li>Material: sticks</li> <li>Season: March-Oct</li> </ul>	<ul style="list-style-type: none"> <li>Attracted to fire fronts to feed on insects</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Lichenostomus chrysops</i>	Yellow-faced honeyeater	4 5 8 9 12 21 26 27 29 32	DS MB MR TG NA	<ul style="list-style-type: none"> <li>Sites: shrubs</li> <li>Material: twigs &amp; bark</li> <li>Season: July-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Reduced abundance in recently burnt (8 months post-fire) compared with unburnt vegetation</li> <li>Some Honeyeaters become more abundant in areas with frequent fires of low intensity, due to the profuse post-fire flowering</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Melanodryas cucullata</i>	Hooded Robin	55	MR TG	<ul style="list-style-type: none"> <li>Sites: low tree forks</li> <li>Material: fine vegetation</li> <li>Season: July-Nov</li> </ul>	<ul style="list-style-type: none"> <li>Opportunist: may become abundant 1-10 years post-fire</li> </ul>	#
<i>Merops ornatus</i>	Rainbow bee-eater	8 9 21 27 32	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: tunnels into flat or slightly sloping ground</li> <li>Material: unlined</li> <li>Season: Sept-Feb</li> </ul>	<ul style="list-style-type: none"> <li>Migratory in summer</li> <li>Reduced abundance in recently burnt (8 months post-fire) compared with unburnt vegetation</li> <li>Higher abundance in burnt (8 yrs post-fire) than unburnt vegetation</li> <li>Aerial foraging</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.



Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Microeca fascinans</i>	Jacky Winter	8 12 24 55	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: low tree forks</li> <li>Material: fine vegetation</li> <li>Season: July-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	#
<i>Myiagra inquieta</i>	Restless Flycatcher	8	MR NA RR	<ul style="list-style-type: none"> <li>Site: low tree forks</li> <li>Material: bark or grass</li> <li>Season: Aug-Mar</li> </ul>	<ul style="list-style-type: none"> <li>Unknown</li> </ul>	#
<i>Ninox novaeseelandiae</i>	Southern Boobook	9	MR NA DS	<ul style="list-style-type: none"> <li>Sites: hollows</li> <li>Material: wood dust or decaying wood</li> <li>Season: Sept-Nov</li> </ul>	<ul style="list-style-type: none"> <li>Forages in more open areas</li> </ul>	#
<i>Pachycephala inornata</i>	Gilbert's Whistler	4 8 27	DS MR TG	<ul style="list-style-type: none"> <li>Sites: tree forks</li> <li>Material: twigs, roots &amp; leaves</li> <li>Season: Sept-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Areas burnt within 10 years unsuitable for nesting</li> <li>More abundant in unburnt vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Some fire intervals greater than 40 years are desirable</li> </ul>
<i>Pardalotus punctatus</i>	Spotted Pardalote	4 8 9	DS MR MB TG	<ul style="list-style-type: none"> <li>Sites: hollows</li> <li>Season: Sept-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Less common in burnt areas</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Petrochelidon nigricans</i>	Tree Martin	4 8 9 12 21 26 27 29 32 33	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: tree hollows, cliffs</li> <li>Material: mud &amp; vegetation</li> <li>Season: July-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Attracted to fire fronts to feed on insects</li> </ul>	#

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices  
NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Petroica goodenovii</i>	Red-capped Robin	4 8 9 12 21 26 27 29 32 33	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: low tree forks</li> <li>Material: fine vegetation</li> <li>Season: July-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Opportunist: may become abundant 1-10 years post-fire</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Petroica multicolor</i>	Scarlet Robin	4 8 9 21 26 27 29	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: low tree forks</li> <li>Material: fine vegetation</li> <li>Season: Aug-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Ground feeding</li> <li>Colonises open burnt areas until regrowth becomes too dense (up to 3 years)</li> <li>Generally increases in abundance post-fire</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> </ul>
<i>Phaps chalcoptera</i>	Common Bronzewing	4 8 9 12 21 26 27 29 32	DS MR MB TG NA	<ul style="list-style-type: none"> <li>Sites: ground, rock ledges &amp; tree forks</li> <li>Material: sticks</li> <li>Season: Aug-Feb</li> </ul>	<ul style="list-style-type: none"> <li>Feeds on the ground</li> <li>May invade or become locally abundant in recently burnt areas</li> <li>Frequent fires can reduce shrubbiness of areas and disadvantage the Common Bronzewing</li> </ul>	<ul style="list-style-type: none"> <li>Avoid 2 or more successive fires less than 10 years apart</li> </ul>
<i>Phaps elegans</i>	Brush Bronzewing	4 8 26 32	TG	<ul style="list-style-type: none"> <li>Sites: ground, rock ledges &amp; tree forks</li> <li>Material: sticks</li> <li>Season: Sept-Feb</li> </ul>	<ul style="list-style-type: none"> <li>Dependant on denser vegetation that is generally greater than 3 years time since fire.</li> </ul>	<ul style="list-style-type: none"> <li>Avoid 2 or more successive fires less than 10 years apart</li> </ul>
<i>Podargus strigoides</i>	Tawny Frogmouth	9	DS MB MR TG	<ul style="list-style-type: none"> <li>Sites: horizontal tree forks</li> <li>Season: Aug-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Mostly feeds on the ground</li> </ul>	#

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices

NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Pomatostomus superciliosus</i>	White-Browed Babbler	4 8 9 12 21 26 27 29 32	DS MB MR TG	<ul style="list-style-type: none"> <li>Sites: hollows</li> <li>Material: sticks</li> <li>Season: July-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Prefers long unburnt (30 years) areas</li> <li>Reduced abundance in recently burnt (8 months post-fire) compared with unburnt vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Some intervals greater than 40 years are desirable</li> </ul>
<i>Psephotus haematonotus</i>	Red-Rumped Parrot	8 9 21 33	DS MB MR TG	<ul style="list-style-type: none"> <li>Sites: hollows in trees</li> <li>Material: chewed wood</li> <li>Season: Sept-Dec</li> </ul>	<ul style="list-style-type: none"> <li>Feeds on ground usually near cover</li> </ul>	#
<i>Rhipidura albiscapa</i>	Grey Fantail	4 8 9 12 21 26 27 29 32	DS MB MR TG NA	<ul style="list-style-type: none"> <li>Sites: tree canopy</li> <li>Material: fine material, bark &amp; cobwebs</li> <li>Season: July-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Less abundant for 2 years after high intensity fire</li> <li>Higher abundance in burnt (8 yrs post-fire) than unburnt vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire.</li> <li>Avoid burning more than 30% of a particular MVS within a 5 year period</li> </ul>
<i>Stagonopleura guttata</i>	Diamond Firetail	4 8 9 21	DS MB MR TG	<ul style="list-style-type: none"> <li>NPW Act Status: V</li> <li>Diet: G, I</li> <li>Sites: shrubs, tree canopy</li> <li>Material: grass</li> <li>Season: Oct-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Feeds exclusively on the ground</li> </ul>	#
<i>Strepera versicolor</i>	Grey Currawong	4 8 12 26 33	DS MB MR TG NA	<ul style="list-style-type: none"> <li>Sites: hollows &amp; tree forks</li> <li>Material: fine twigs</li> <li>Season: Sept-Nov</li> </ul>	<ul style="list-style-type: none"> <li>Returns within a few weeks to burnt sites</li> </ul>	#

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices  
NOTE: List includes species known or likely to occur within the plan area.

Species	Common Name	MVS No	Block/s	Breeding	Species Ecology & Fire Response	Fire Management Guidelines
<i>Turnix varia</i>	Painted Button-quail	4 8	MR TG MB	<ul style="list-style-type: none"> <li>NPW Act Status: R</li> <li>Diet: G</li> <li>Sites: ground</li> <li>Material: grass</li> <li>Season: Aug-March</li> </ul>	<ul style="list-style-type: none"> <li>Will enter farmlands for food</li> <li>May invade or become abundant in recently burnt areas</li> <li>Ground feeding species which generally increases in abundance post-fire</li> </ul>	<ul style="list-style-type: none"> <li>Maintain a mosaic of different times since last fire</li> <li>Avoid burning more than 30% of a particular MVS within a 5 year period</li> </ul>
<i>Tyto alba</i>	Barn Owl		MR	<ul style="list-style-type: none"> <li>Sites: tree hollows &amp; sometimes caves.</li> <li>Material: none</li> <li>Seasons: May-Aug</li> </ul>	<ul style="list-style-type: none"> <li>Hunts in open areas</li> <li>Adversely affected by fires that destroy hollow trees</li> </ul>	<ul style="list-style-type: none"> <li>Avoid burning more than 30% of a particular MVS within a 5 year period</li> </ul>
<i>Zoothera lunulata</i>	Bassian Thrush	8	MR TG	<ul style="list-style-type: none"> <li>NPW Act Status: R</li> <li>Diet: I</li> <li>Material: grass, bark &amp; rootlets. Camouflaged with moss</li> <li>Season: July-Jan</li> </ul>	<ul style="list-style-type: none"> <li>Frequent fires can be detrimental to the species</li> <li>Forages for insects on the ground</li> </ul>	<ul style="list-style-type: none"> <li>Avoid 2 or more successive fires less than 10 years apart</li> </ul>

Refer to Table 1 (Section 3.4) for MVS Names and to Section 15 of this plan for a description of the codes used within Appendices  
NOTE: List includes species known or likely to occur within the plan area.

## Appendix 3 – Fire Response of Ecological Communities of Conservation Significance

Ecological Community	EPBC Act Status	Occurrence	Block	MVS No	Components	Fire Response	Fire Management Guidelines	Source
Peppermint Box ( <i>Eucalyptus odorata</i> ) Grassy Woodland	Critically Endangered	<ul style="list-style-type: none"> <li>• 30 ha in Mt Brown Conservation Park</li> <li>• 30 ha in Mt Remarkable National Park</li> <li>• Usually in areas with annual rainfall of 425 mm, however may be as low as 350 mm.</li> <li>• Gently to moderately sloping slopes and footslopes of low hills</li> </ul>	MB RR	9	<p><b>Tree Layer</b></p> <ul style="list-style-type: none"> <li>• Peppermint Box (dominant)</li> <li>• Drooping Sheoak</li> <li>• White Cypress Pine</li> <li>• Southern Cypress Pine</li> <li>• Sugar Gum</li> <li>• SA Blue Gum</li> <li>• Grey Box</li> <li>• Mallee Box</li> </ul> <p><b>Shrub &amp; Ground Layer</b></p> <ul style="list-style-type: none"> <li>• Golden Wattle</li> <li>• Sweet Bursaria</li> <li>• Wallaby-grasses</li> <li>• Spear-grasses</li> <li>• Black-anther Flax Lily</li> <li>• Iron-grasses</li> </ul>	<ul style="list-style-type: none"> <li>• Grassy understorey species regenerate well following low-moderate intensity fire</li> <li>• Some shrub species regenerate following moderate-high intensity fire</li> <li>• Hollows &amp; coarse woody debris are important fauna habitat elements &amp; can be adversely affected by moderate-high intensity fire</li> </ul>	<p><b>Fire Interval</b></p> <ul style="list-style-type: none"> <li>• Inter-fire interval greater than 10 years</li> <li>• Inter-fire interval less than 40 years</li> <li>• Some intervals greater than 40 years are desirable</li> </ul> <p><b>Fire Frequency</b></p> <ul style="list-style-type: none"> <li>• Avoid 2 or more successive fires less than 15 years apart</li> </ul> <p><b>Fire Intensity</b></p> <ul style="list-style-type: none"> <li>• Avoid 3 or more successive fires of low intensity</li> <li>• Some medium – high intensity fire needed to regenerate some species</li> </ul> <p><b>Fire Season</b></p> <ul style="list-style-type: none"> <li>• Avoid 2 or more successive fires in spring (breeding season for significant species)</li> </ul> <p><b>Fire Regime Extent</b></p> <ul style="list-style-type: none"> <li>• More than 50% of Peppermint Box woodland across the plan area to meet Guidelines</li> </ul>	Aus <sup>^</sup>

## 15 SUMMARY OF CODES USED IN APPENDICES

CODE	BLOCK	RESERVE
AL	Alligator Block	Mount Remarkable NP
HI	Hillams Block	Mount Remarkable NP
RR	Remarkable Range Block	Mount Remarkable NP
MR	Includes AL, HI & RR Blocks	Mount Remarkable NP
NA	Napperby Block	Mount Remarkable NP
MB	Mount Brown Block	Mount Brown CP
TG	Telowie Gorge Block	Telowie Gorge CP
DS	The Dutchmans Stern Block	The Dutchmans Stern CP

### Other Codes Used

NPW ACT STATUS		EPBC ACT STATUS		DIET OF RATED FAUNA SPECIES	
E	Endangered	EX	Extinct	C	Carnivore or scavenger. Mainly vertebrates.
V	Vulnerable	CE	Critically Endangered	H	Herbivore. Includes folivores, grazers and browsers.
R	Rare	EN	Endangered	I	Insectivore/"arthropodivore"/omnivore
		VU	Vulnerable	G	Granivore. Typically peak in abundance after a fire event in fire-adapted vegetation, due to the stimulation of flowering and subsequent seed-set.

### MISCELLANEOUS CODES

#	Fire response is unknown or ambiguous, thus the required data is not available to propose Ecological Fire Management Guidelines. When data becomes available the table will be updated.
*	Introduced species

### FIRE RESPONSE SOURCE

R	Regional or local data
SA	South Australian data
Aus	Interstate data
^	Data/observations derived from published or unpublished literature.
E	Expert opinion (person knowledgeable in species genera)
I	Inferred from similar species (Senior Fire Ecologist - Fire Management Branch has inferred based on other species genera)

## 16 GLOSSARY OF ACRONYMS AND FIRE MANAGEMENT TERMINOLOGY

Term	Definition
<b>Backburn(ing)</b>	A fire started intentionally along the inner edge of a control line to consume the fuel in the path of a bushfire.
<b>Bushfire</b>	An unplanned fire. A generic term that includes grass fires, forest fires and scrub fires.
<b>CFS</b>	The South Australian Country Fire Service.
<b>Coarse Fuels</b>	Dead woody material, greater than 25mm in diameter, in contact with the soil surface (fallen trees and branches).
<b>Control line</b>	(fireline) A natural or constructed barrier, or treated fire edge, used in fire suppression and prescribed burning to limit the spread of fire.
<b>DEH</b>	The South Australian Department for Environment & Heritage.
<b>Direct attack</b>	A method of bushfire attack where wet or dry firefighting techniques are used. It involves suppression action right on the fire edge, which becomes the control line.
<b>Discontinuous fuels</b>	Significant gaps between clumps or patches of fuel (DEH, 2006a)
<b>DPBC</b>	District Bushfire Prevention Committee.
<b>EAT</b>	DEH Environmental Assessment Table. Completed for all prescribed burns (as part of the Prescribed Burn Plan) and other fire management works where native vegetation is being cleared and is not exempt under the <i>Native Vegetation Act 1991</i> (DEH, 2004)
<b>EPBC Act</b>	The federal <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
<b>Extreme fire behaviour</b>	A level of bushfire behaviour characteristics that ordinarily precludes methods of direct suppression action. One or more of the following is usually involved: high rates of spread; prolific crowning and/or spotting; presence of fire whirls and/or a strong convective column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.
<b>Fine fuels</b>	Grass, leaves, bark and twigs less than 6mm in diameter.
<b>Fire access track</b>	A track constructed and maintained expressly for fire management purposes.
<b>Fire behaviour</b>	The manner in which a fire reacts to the variables of fuel, weather and topography.
<b>Firebreak</b>	An area or strip of land where vegetation has been removed or modified to reduce the risk of fires starting and reduce the intensity and rate of spread of fires that may occur (GAFLC, 2005).
<b>Fire danger</b>	The combination of all factors, which determine whether fires start, spread and do damage, and whether and to what extent they can be controlled.
<b>Fire danger rating</b>	A relative number denoting an evaluation of rate of spread, or suppression difficulty for specific combinations of fuel, fuel moisture, temperature, humidity and wind speed. The rating can be <i>Low</i> , <i>Moderate</i> , <i>High</i> , <i>Very High</i> or <i>Extreme</i> .
<b>Fire</b>	All activities associated with the management of fire-prone land, including

Term	Definition
<b>management</b>	the use of fire to meet land management goals and objectives.
<b>Fire regime</b>	The history of fire in a particular vegetation type or area including the fire frequency, interval, intensity, extent and seasonality of burning (Brooks, <i>et al.</i> , 2004)
<b>Fire scar</b>	A destructive mark left on a landscape by fire.
<b>Fire season</b>	The period(s) of the year during which fires are likely to occur, spread and do sufficient damage to warrant organised fire control.
<b>Fire suppression</b>	The activities connected with restricting the spread of bushfire following its detection and making it safe.
<b>Fuel</b>	Any material such as grass, leaf litter and live vegetation, which can be ignited and sustains a fire. Fuel is usually measured in tonnes per hectare.
<b>Fuel arrangement</b>	A general term referring to the spacing and arrangement of fuel in a given area.
<b>Fuel hazard</b>	The Overall Fuel Hazard is defined as the sum of the influences of bark fuel, elevated fuel and surface fine fuel (DEH, 2006a)
<b>Fuel management</b>	Modification of fuels by prescribed burning, or other means.
<b>GAFLC</b>	South Australian Government Agencies Fire Liaison Committee.
<b>IBRA</b>	Interim Biogeographical Regionalisation for Australia.
<b>Incident Controller (IC)</b>	The individual responsible for the management of all incident operations and IMT.
<b>IMT</b>	Incident Management Team. The group of incident management personnel comprising the Incident Controller and the people he/she appoints to be responsible for the functions of Operations, Planning and Logistics.
<b>Indirect attack</b>	The use of backburning as a method of suppression to confine the fire within a defined area bounded by existing or prepared control lines. Control lines may be a considerable distance ahead of the fire.
<b>Key Fire Response Species</b>	In this fire management plan, these are the species most susceptible to decline due to inappropriate fire regimes: either too frequent or too infrequent fire, low or very high intensity fire, or fire in a particular season.
<b>MVS</b>	Major Vegetation Sub-group.
<b>NPW Act</b>	The South Australian <i>National Parks and Wildlife Act 1972</i> .
<b>NVC</b>	Native Vegetation Council. Established under the provisions of the <i>Native Vegetation Act 1991</i> , responsible for making decisions on a wide range of matters concerning native vegetation in South Australia (DWLBC, 2006)
<b>'Of conservation significance'</b>	In this plan, used to describe important or rated populations or species of flora and fauna as well as vegetation communities. These may be: <ul style="list-style-type: none"> <li>Nationally listed as Threatened (with a rating of Extinct, Critically Endangered, Endangered, Vulnerable or Conservation Dependent) under the federal EPBC Act;</li> <li>South Australian listed as Threatened (with a rating of Endangered, Vulnerable or Rare) under the NPW Act, <i>Revised Schedules 7, 8 and 9</i>.</li> <li>Provisionally listed as Threatened (with a rating of Endangered or Vulnerable) in South Australia, that is, included on the unpublished DEH</li> </ul>



Term	Definition
	Provisional List of Threatened Ecosystems of South Australia (DEH, 2005).
<b>Prescribed burn plan</b>	The plan, which is approved for the conduct of prescribed burning. It contains a map identifying the area to be burnt and incorporates the specifications and conditions under which the operation is to be conducted.
<b>Prescribed burning</b>	The controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity, and rate of spread required to attain planned resource management objectives. It is undertaken in specified environmental conditions.
<b>Response plan</b>	A plan detailing the response for a risk or an area including the type and number of resources.
<b>Retardant</b>	A chemical generally mixed with water, designed to retard combustion by chemical or physical action. It is usually applied by aircraft but may be applied from tankers at the fire edge.
<b>Risk assessment</b>	Used in DEH fire planning to assist in evaluating the threat to life, property and environmental assets posed by bushfire and also to aid in developing strategies and implementing actions and works for risk mitigation. Considers <i>Likelihood</i> and <i>Consequence</i> to determine an overall risk rating using a matrix as <i>Low, Moderate, High, Very High</i> or <i>Extreme</i> (DEH, 2008b).
<b>SA Water</b>	South Australian Water Corporation.
<b>Spotting</b>	The ignition of spot fires from sparks or embers
<b>Total Fire Ban</b>	A ban on lighting and maintaining of a fire in the open, which can be invoked at any time during the year. When invoked, the Total fire Ban is imposed for a period of 24 hours, from midnight to midnight, but may also be imposed for part of a day or days. (Country Fire Service Regulations, 2003)
<b>TPC</b>	The <i>Threshold of Potential Concern</i> (TPC) is defined as a point in time where <i>Key Fire Response Species</i> are likely to be affected by an aspect of fire regime.
<b>'Weed of national significance'</b>	20 priority weeds that pose future threats to primary industries, land management, human or animal welfare, biodiversity and conservation values at a national level. These weeds were identified and ranked through the assessment of invasiveness, impacts, potential for spread and socioeconomic and environmental aspects (Australian Weeds Committee, 1999)

Unless otherwise indicated, definitions for fire management terminology were adapted from (DEH, 2006d)

