

Fire Management Plan

Reserves of the Southern Eyre Peninsula

2009-2019



Incorporating Lincoln and Coffin Bay National Parks; Memory Cove Wilderness Protection Area; Lincoln, Sleaford Mere, Kathai, Kellidie Bay, Murrunatta, Wanilla Land Settlement, Wanilla, Tucknott Scrub and Mount Dutton Bay Conservation Parks and included Minister for Environment and Conservation Lands.

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EXECUTIVE SUMMARY

This Fire Management Plan for the Reserves of the Southern Eyre Peninsula includes: Lincoln National Park, Memory Cove Wilderness Protection Area, Lincoln Conservation Park, Sleaford Mere Conservation Park, Kathai Conservation Park, Coffin Bay National Park, Kellidie Bay Conservation Park, Murrunatta Conservation Park, Wanilla Land Settlement Conservation Park, Wanilla Conservation Park, Tucknott Scrub Conservation Park, Mount Dutton Bay Conservation Park and Crown land dedicated as a reserve to the Minister for Environment and Conservation (Sections 97, 98 and 564 Hundred of Lincoln). 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 the Southern Eyre Peninsula were identified as a priority for fire management planning within the Department for Environment and Heritage (DEH) West Region, to address the following issues.

- High visitor numbers, particularly during the Fire Danger Season (FDS), to reserves within the plan area.
- Positioning of reserves adjacent the township of Coffin Bay and the city of Port Lincoln and the protection of significant built and natural assets adjacent the reserves.
- General protection of life, property and environmental values.
- Protection of significant fauna and flora species, some of which are unique to the area.
- Pro-active management of habitats at a landscape level as well as individual fauna and flora species by using fire as a management tool. Including the recognition that fire is one of the disturbance events that is required by some species to ensure their viability and is a key part of recovery plans for several significant species.

These issues are addressed by:

- applying a risk assessment process to identify life, property and environmental values that may be threatened by bushfires
- applying DEH Fire Management Zoning Principles to manage fuel in Asset and Buffer zones and designating Conservation zones
- applying DEH Ecological Fire Management Guidelines to determine appropriate fire regimes in Conservation zones
- auditing tracks within the reserves of this plan using the Government Agencies Fire Liaison Committee's (GAFLC) guidelines for fire breaks and fire access tracks in South Australia and recommending track upgrades.

A number of actions as a result of applying the above processes are recommended, including:

- 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, specifically outlined)
 - reduce fuel in strategic areas within the Conservation zone to provide some landscape protection within the reserves and increase patchiness within the vegetation (to reduce the possibility of a block or reserve burning in a single fire event)
 - maintain or improve conservation values.
- track upgrades (in accordance with GAFLC standards)
 - identification of suppression considerations that may assist bushfire suppression operations to contribute to improved fire management.

This draft plan was released for public comment for a period of four weeks. Comments were evaluated and incorporated where considered appropriate. A major review of this plan will occur after ten years of implementation, or earlier if required.

CONTENTS

EXECUTIVE SUMMARY	I
CONTENTS.....	III
List of Tables.....	v
List of Figures.....	v
List of Attached Maps	v
1 SCOPE AND PURPOSE	1
1.1 General Objectives for Fire Management	2
2 THE PLANNING FRAMEWORK.....	3
2.1 Legislation	3
2.2 Policies and Procedures	4
2.3 Local and Regional Environmental Planning.....	6
2.4 DEH Reserve Management Planning.....	6
2.5 Consultation	7
3 BUSHFIRE ENVIRONMENT	8
3.1 Location	8
3.2 Climate.....	8
3.3 Terrain	8
3.4 Fuel.....	9
3.5 Conditions for Large Fire Events	12
4 FIRE HISTORY AND FIRE REGIMES.....	14
4.1 Mapping Fire Occurrences	14
4.2 Large Fires	14
4.3 Lightning and Fires.....	14
4.4 Human-caused Fires.....	14
4.5 Risk of Fire Ignitions	15
5 DAMAGE POTENTIAL TO LIFE AND PROPERTY	16
5.1 Land Use.....	16
5.2 Built Assets	17
5.3 Visitor Use	17
5.4 Heritage Values	18
6 SPECIES AND COMMUNITIES OF CONSERVATION SIGNIFICANCE.....	20
6.1 Major Vegetation Sub-groups (MVS).....	20
6.2 Biodiversity of the Southern Eyre Peninsula.....	20
6.3 Flora, Fauna and Ecological Communities	22
7 ECOLOGICAL FIRE MANAGEMENT.....	27
7.1 Fire Regimes for Biodiversity Conservation	27
7.2 Development of Ecological Fire Management Guidelines.....	27
7.3 Interpreting Ecological Fire Management Guidelines	28

7.4	Weeds.....	30
7.5	Pest Fauna	31
7.6	Plant Pathogens.....	32
8	FIRE MANAGEMENT ZONES.....	34
8.1	Fire Management Zones	34
8.2	Risk Assessment	34
8.3	Asset Zone (A-zone)	35
8.4	Buffer Zone (B-zone)	36
8.5	Conservation Zone (C-zone)	37
8.6	Prescribed Burn Preparation	38
9	BUSHFIRE SUPPRESSION.....	40
9.1	Legislation	40
9.2	Policies and Procedures	40
9.3	Response – Role of CFS and DEH	40
9.4	Suppression Strategies	41
9.5	Fire Access	42
9.6	Post-Fire Rehabilitation and Recovery	43
9.7	Water	43
9.8	CFS Bomber Response Zone	43
10	RESEARCH AND MONITORING	44
10.1	Monitoring.....	44
10.2	Research	44
11	FIRE MANAGEMENT BLOCKS	46
11.1	Reserve and Block Information	46
11.2	Mapping	47
12	MILLER’S HOLE BLOCK.....	48
13	WANNA BLOCK	50
14	CURTA ROCKS BLOCK.....	52
15	MEMORY COVE BLOCK	54
16	STAMFORD BLOCK	56
17	DONINGTON BLOCK.....	58
18	ISLANDS BLOCK.....	60
19	LINCOLN BLOCK.....	62
20	PROPER BAY BLOCK	64
21	KATHAI BLOCK	66
22	KELLIDIE BAY NORTH BLOCK.....	68
23	KELLIDIE BAY SOUTH BLOCK	70
24	KELLIDIE BAY WEST BLOCK.....	72
25	GUNYAH BEACH BLOCK.....	74
26	LAKE DAMASCUS BLOCK.....	76

27 POINT SIR ISAACS BLOCK	78
28 WHIDBEY BLOCK.....	80
29 MURRUNATTA BLOCK	82
30 MURRUNATTA SWAMP BLOCK	84
31 WANILLA LAND SETTLEMENT BLOCK	86
32 WANILLA BLOCK.....	88
33 TUCKNOTT SCRUB BLOCK	90
34 SUMMARY OF MANAGEMENT STRATEGIES AND RECOMMENDED WORKS.....	92
34.1 Recommended Works	94
35 REFERENCES.....	102
36 APPENDICES	105
Appendix 1 – Fire Response of Rated, Significant and Introduced Flora.....	105
Appendix 2 – Fire Response of Rated and Introduced Fauna	112
Appendix 3 – Fire Response of Rated and Significant Ecological Communities	122
37 SUMMARY OF CODES USED IN APPENDICES	124
38 GLOSSARY OF ACRONYMS AND FIRE MANAGEMENT TERMINOLOGY	125

List of Tables

Table 1 – Likely Maximum Overall Fuel Hazard for MVS	11
Table 2 – Ecological Fire Management Guidelines for MVS	29
Table 3 – Summary of Fire Management Blocks	46
Table 4 – Summary of Works from this Fire Management Plan	95

List of Figures

Figure 1– The Planning Framework.....	3
Figure 2 – Components of Fuel in Vegetation.....	9
Figure 3 – Overall Fuel Hazard.....	10
Figure 4 – Approach for Determining Ecological Fire Management Guidelines	28
Figure 5 – The Burn Planning Process.....	39

List of Attached Maps

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

1 SCOPE AND PURPOSE

The intention of this plan is to provide a strategic framework for fire management activities for Department for Environment and Heritage reserves and included Crown lands on the Southern Eyre Peninsula. This plan incorporates Lincoln National Park (NP), Memory Cove Wilderness Protection Area (WPA), Lincoln Conservation Park (CP), Sleaford Mere CP, Kathai CP, Coffin Bay NP, Kellidie Bay CP, Murrunatta CP, Wanilla Land Settlement CP, Wanilla CP, Tucknott Scrub CP, Mount Dutton Bay CP and Crown land dedicated as a reserve to the Minister for Environment and Conservation (Sections 97, 98 and 564 Hundred of Lincoln). The plan defines objectives for ecological fire management and the protection of life and property, particularly in relation to visitors and adjacent landholders. Strategies and works are suggested in order to allow those objectives to be met. Pre-suppression works and activities will increase the level of fire preparedness and guide management and suppression strategies during bushfire incidents.

Please note: While works implemented via this plan will assist to limit the impact of bushfires in the plan area, fire management activities on DEH land (fuel reduction burning / fire prevention measures) are only one part of limiting the impact of bushfire on the community. Property owner preparedness and individual awareness about how to act safely during a bushfire remain the keys to preventing life and property loss.

These reserves were identified as priorities for fire management planning due to:

- their close proximity to the city of Port Lincoln and the township of Coffin Bay
- high visitor numbers, especially during the Fire Danger Season
- the general protection of life, property and environmental assets within the plan area.

This Fire Management Plan aims to:

- assess the level of risk (particularly in relation to the above issues) and the existing fire management and reserve management objectives
- identify objectives for fire management in Lincoln NP, Memory Cove WPA, Lincoln CP, Sleaford Mere CP, Kathai CP, Coffin Bay NP, Kellidie Bay CP, Murrunatta CP, Wanilla Land Settlement CP, Wanilla CP, Tucknott Scrub CP, Mount Dutton Bay CP and Crown land dedicated as a reserve to the Minister for Environment and Conservation (Sections 97, 98 and 564 Hundred of Lincoln)
- outline strategies for risk mitigation and propose operational works and activities to increase the level of bushfire preparedness and guide suppression management during bushfire incidents.

Operational works outlined in this plan will be implemented in a staged manner depending on available resources. Adjoining lands are considered in the plan, but only in the context of works and activities required to minimise the risk to assets from fires originating in the plan area. Fire management planning for land use outside of the reserves is the responsibility of the District Council of Lower Eyre Peninsula Bushfire Prevention Committee and City of Port Lincoln, in accordance with the requirements of the *Fire and Emergency Services Act 2005*. DEH is represented on these committees, along with local government and the Country Fire Service (CFS).

In recent years DEH has reviewed and updated fire management planning to appropriately address issues such as safety, protection of life and property, ecological management and reduction of fire risk. This approach has been carefully considered to ensure that the gap is bridged between planning, on-ground actions and outcomes. Mechanisms are in place to allow the plans to evolve and improve. Consultation with the community and stakeholders is seen as critical to successful planning and has been built into the planning process.

Four maps are provided as an attachment to this plan. Map 1 illustrates terrain, tenure and infrastructure; Map 2 displays floristic vegetation and significant conservation values; Map 3 records the fire history for reserves and Map 4 shows the fire management zones, tracks, strategies and other relevant operational information.

1.1 General Objectives for Fire Management

DEH has a responsibility for fire management within the reserves incorporated into this fire management plan. Fire management objectives that apply to all the reserves in the plan area are listed below.

- To provide for the protection of human life and property during bushfire events.
- To 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).
- To provide for the strategic containment of bushfires (e.g. to minimise the likelihood of a fire entering/exiting a block).
- To complement District Bushfire Prevention Plans.
- To undertake bushfire suppression activities in a safe and professional manner.
- To establish and maintain perimeter access.
- To undertake bushfire suppression activities in a safe and professional manner.
- To manage fire regimes to ensure consistency with the fire management guidelines in conservation zones.

2 THE PLANNING FRAMEWORK

The policy and planning framework for fire management on DEH reserves 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 (as set out in Appendix 1). 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.

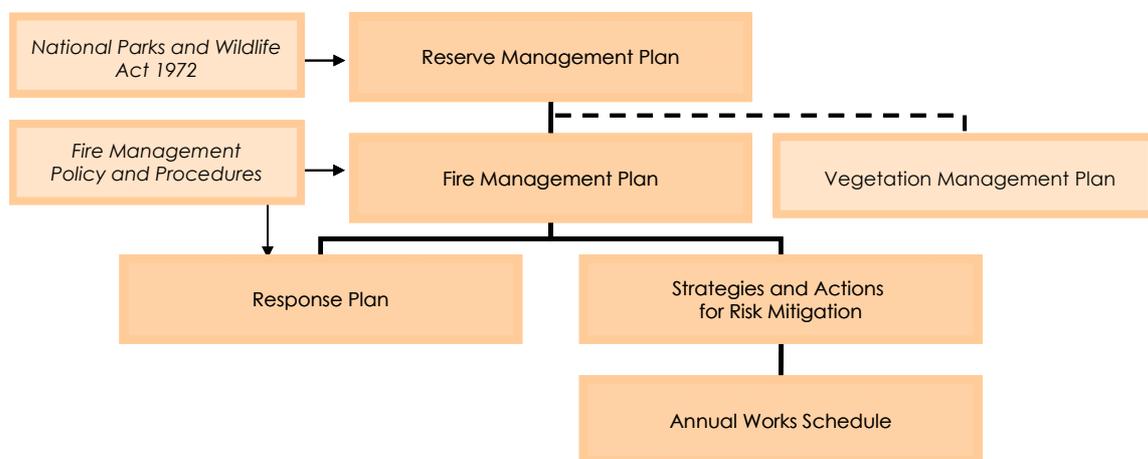


FIGURE 1– THE PLANNING FRAMEWORK

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*, DEH has responsibilities for fire management activities within reserves constituted under this Act. The preparation of Fire Management Plans is not a statutory requirement under this Act, but a Departmental Policy.

DEH has responsibilities under the *Wilderness Protection Act 1992* for fire management on lands declared Wilderness Protection Areas or Zones. DEH must comply with the Wilderness Code of Management as set out under the Act (DEH, 2004a).

DEH is required to meet the provisions under the *Native Vegetation Act 1991* when prescribing any works that involve 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).

The *Crown Lands Management Act 2009* repeals the *Crown Lands Act 1929*. Under the *Crown Lands Management Act 2009* Crown land is described as either:

- Dedicated Crown land (land that has been dedicated as a reserve for a specified purpose to a Minister, person or body (including local government or community groups)). For the purpose of this plan any dedicated Crown land will be known as a 'Crown land reserve'
- Crown leasehold land
- Crown land owned by, or under the control of the Minister for Environment and Conservation
- Unalienated Crown land (land that has not been alienated from the Crown, not including those as defined above).

DEH has responsibilities for fire management on unalienated Crown land and any Crown land dedicated to, owned by or under the care and control of the Minister for Environment and Conservation. The Minister for Environment and Conservation is not responsible for fire management on Crown leasehold land or Crown land dedicated to another government Minister, person or body.

The *Fire and Emergency Services Act 2005* outlines the responsibilities of DEH and other fire authorities in relation to fire management within proclaimed 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.

All landholders are obliged to comply with the *Fire and Emergency Services Act 2005*, which outlines responsibilities for fire preparedness. DEH will implement works for fire management on DEH managed lands within the planning area; however adjoining landholders are also required to implement works on their own property to minimise the threat of fire. Note that the *Fire and Emergency Services Act 2005* is currently under review. Changes to the Act have been recommended within the Ministerial Review of Bushfire Management in South Australia (Monterola, 2007) report.

2.2 Policies and Procedures

2.2.1 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.

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 (as defined within Section 2.1.2 of this Plan)
- 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. 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.

2.2.2 Zoning Policy

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

- the level of perceived risk, using the *Policy and Procedure for Risk Assessment in DEH Fire Planning* (DEH, 2008c)
- the Overall Fuel Hazard, which is assessed using the *Overall Fuel Hazard Guide for South Australia* (DEH, 2006e)
- 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 (DEH, 2008b). For more information on zoning, refer to Section 8 of this plan (Fire Management Zones) and the *DEH Fire Policy and Procedure for Fire Management Zoning* (DEH, 2008b).

2.2.3 Policies and Procedures for Fire Response

The following Policies and Procedures are to be used in conjunction with this Fire Management Plan during an incident.

- DEH Fire Management Policy.
- Those contained within the DEH Fire Policy and Procedure Manual (DEH, 2008d).
- CFS Chief Officer Standing Orders (COSOs).
- CFS Standard Operating Procedures (SOPs).

- CFS Operations Management Guidelines (OMGs).

Strategies implemented during an incident will be determined by the Incident Management Team (IMT), taking this plan into consideration in accordance with Section 97 of the *Fire and Emergency Services Act 2005*.

2.3 Local and Regional Environmental Planning

The Reserves of the Southern Eyre Peninsula provide important habitat for many species and communities including those of National conservation significance, such as the Vulnerable Eyre Peninsula (EP) Yellow-tailed Black-Cockatoo (*Calyptorhynchus funereus xanthanotus*), Vulnerable EP Southern Emu-wren (*Stipiturus malachurus parimeda*) Vulnerable Malleefowl (*Leipoa ocellata*), Vulnerable Western Whipbird (*Psophodes nigrogularis leucogaster*), Conservation Dependent Brush-tailed Bettong (*Bettongia penicillata ogilbyi*) and threatened orchid species, including the Endangered Metallic Sun-orchid (*Thelymitra epipactoides*). As these species are listed under the EPBC Act, the following recovery plans are either being developed or are currently in place:

- *Draft Recovery Plan for 23 Flora Taxa on Eyre Peninsula, South Australia 2007-2012* (Pobke, 2007).
- *National Recovery Plan for Malleefowl* (Benshemesh, 2000).
- *Woylie (Brush-tailed Bettong) Recovery Plan* (Start, et al., 1995).
- *National Recovery Plan for 12 Threatened Spider-orchids Caladenia R. Br. Taxa of Victoria and South Australia 2000 – 2004* (Todd, 2000).

The *Strategic Plan* of the SA Government states under *Objective Three – Attaining Sustainability*, a target of *No Species Loss* (T3.8) (DPC, 2004). As a result of this target, the *No Species Loss: A Nature Conservation Strategy for South Australia 2007-2017* has been produced (DEH, 2006a). This strategy identifies inappropriate fire regimes as a threat to biodiversity.

A *Biodiversity Plan for the Southern Eyre Peninsula* has been produced (DEH, 2002b). This plan identifies conservation priorities, including significant biodiversity assets and provides advice on management strategies and key conservation actions that can be undertaken.

The fire management planning 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 these local and regional environmental plans.

2.4 DEH Reserve Management Planning

Reserve Management Plans are a statutory requirement under the *National Parks and Wildlife Act 1972* and *Wilderness Protection Act 1992*. Reserve Management Plans provide the overarching strategy for all management activities in reserves.

In relation to fire, a Reserve Management Plan will:

- provide an overview of any fire-related issues in the reserve in question
- state DEH responsibilities for managing fire in the reserve system in accordance with DEH Fire Management Policy

- identify the requirement for a Fire Management Plan based on the nature of any fire-related issues.

Fire Management Plans will be prepared for all fire-prone reserves, consistent with the objectives of the Reserve Management Plan. This Fire Management Plan supersedes any previous Fire Management Plans or Fire Management Statements written in regard to the reserves covered by this plan. In the absence of a Reserve Management Plan, a Fire Management Plan for a reserve may still be prepared consistent with the objectives of the *National Parks and Wildlife Act 1972*.

Reserves in this Fire Management Plan are covered by the following Reserve Management Plans.

- *Lincoln NP Management Plan* (DEH, 2004c).
- *Parks of the Coffin Bay Area Management Plan* (DEH, 2004b) (including Coffin Bay NP, Kellidie Bay CP and Mt Dutton Bay CP).
- *Conservation Parks of the Lower Eyre Peninsula Management Plan* (DEH, 2007) (including Kathai CP, Lincoln CP, Moody Tanks CP, Murrunatta CP, Sleaford Mere CP, Tucknott Scrub CP, Wanilla CP and Wanilla Land Settlement CP).
- *Memory Cove WPA Management Plan* (DEH, 2005a).

2.5 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.

DEH Fire Management Plans are prepared and adopted in accordance with the *Policy and Procedure for Fire Management Planning: Project Management and Consultation* (DEH, 2008g). Consultation is not a statutory requirement for Fire Management Plans, but is a Departmental Policy. The plan was subject to DEH internal consultation for a period of four weeks and the community were invited to provide input during the planning process also for four weeks. The finalised plan was then adopted by the Executive Director, Regional Conservation Delivery and the Executive Director, Conservation Policy and Programs.

3 BUSHFIRE ENVIRONMENT

3.1 Location

The plan incorporates reserves that occur south of an area framed by Port Lincoln, Edillilie and Coffin Bay and also includes nearby offshore islands. While there is some variation in landform most of the reserves contain similar characteristics. The dominant habitat type is Mallee woodland, which occurs on shallow soils with outcropping calcrete; however Sheoak woodland and sand dune shrublands also occur. The exceptions to this are Tucknott Scrub CP, Wanilla Land Settlement CP and Wanilla CP, which conserve landforms of the southern Koppio Hills and consist largely of Sugar Gum woodlands over lateritic soils. Refer to Map 1 (Terrain, Tenure and Infrastructure) for an overview.

3.2 Climate

Southern Eyre Peninsula experiences a Mediterranean climate, with weather conditions influenced by frontal systems that typically approach from the west. The Southern Ocean and Spencer Gulf play a major role in moderating the climate of these coastal areas.

Annual rainfall at Pt Lincoln (491 mm) is only slightly lower than at Coffin Bay (500 mm). Average monthly rainfall in summer is approximately 16 mm. Soil dryness is generally greater than 100 mm from December until June, indicating dry surface fuels and low moisture content in vegetation during this period.

Summer winds on southern Eyre Peninsula predominate from the southwest to east with infrequent, strong, hot, north/northwest winds. Afternoon seas breezes occur regularly during summer, and may reach far into the centre of the Peninsula. The most stable weather patterns occur during March/April.

The Southern Eyre Peninsula may experience thunderstorms throughout summer, however these most often occur during November and February/March.

3.3 Terrain

Lincoln NP and Memory Cove WPA consist of generally low undulating limestone terrain with an extensive, mobile sand dune field adjacent the southwest coastline. The only variations to this are occasional; moderately steep granite outcrops (Stamford Hill/Memory Cove) and Sleaford Mere (Sleaford Mere CP), which almost entirely blocks the neck of the peninsula neatly defining the reserve areas. Except for these anomalies the terrain of the Jussieu Peninsula does not generally restrict access for fire management. The vegetation associated with different landforms and aspect is more likely to influence bushfire suppression strategies in these reserves.

Kathai CP conserves Northside Hill, a granite outcrop that rises 145 m above sea level. Several steep gullies exist on the slopes of the hill which limit access by fire units and equipment and may compromise the safety of ground crews.

Lincoln CP and the Crown land reserves (Sections 97, 98 and 564 Hundred of Lincoln) consist of undulating limestone terrain that is unlikely to restrict access for fire management.

Murrumbidgee CP is comprised of two vastly different landforms. The northern part is a low sandy rise that is generally accessible (excepting occasional low lying areas on the reserve perimeter). The southern section is a low lying area fed by the Merintha Creek system, commonly with water-logging clay soils which present a safety hazard for fire units and equipment.

Wanilla CP and Tucknott Scrub CP conserve areas of the southern Koppio Hills and foot slopes with occasional steep gullies and creek lines that limit access by fire units and equipment. Wanilla Land Settlement CP is generally even terrain. The vegetation in these reserves is more likely to influence fire suppression strategies due to access and safety issues caused by the Sugar-gum Woodlands.

Coffin Bay NP occupies the whole of the Coffin Bay Peninsula. The reserve is characterised by extensive dune systems except for occasional undulating limestone terrain in the Point Avoid area, sections of the northern coastline and at the western end of the peninsula. The extensive dune fields and soft, sandy tracks in Coffin Bay NP generally restrict the ability of fire units and equipment to directly access fires. Access beyond Yangie Bay is limited to 4WD vehicles.

Kellidie Bay CP is characterised by undulating limestone terrain on the south side of the Coffin Bay Road that does not restrict access for fire management. However, the northern section conserves a low lying area fed by the Merintha Creek system, commonly with water-logging clay soils which present a safety hazard for fire units and equipment.

3.4 Fuel

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

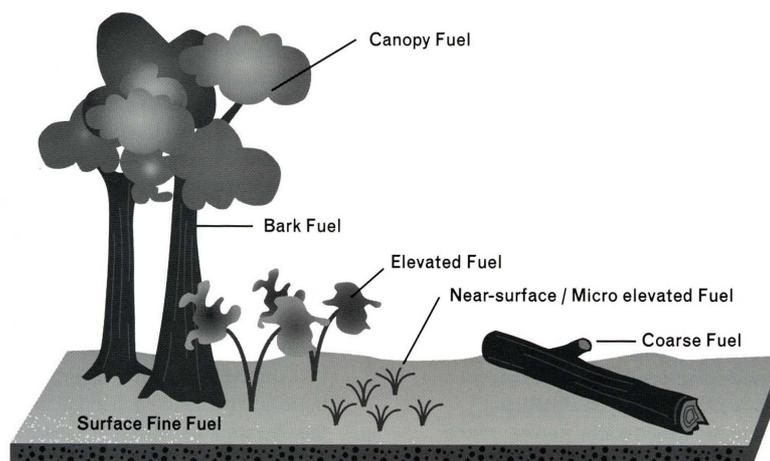
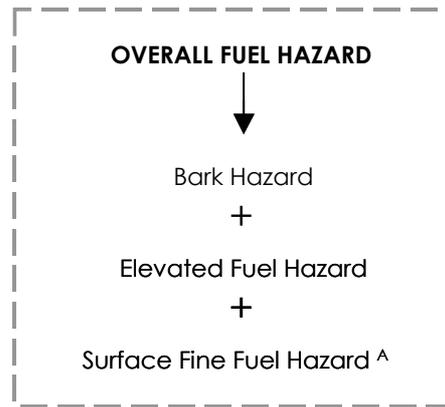


FIGURE 2 – COMPONENTS OF FUEL IN VEGETATION

Source: (Tolhurst and Cheney, 1999)

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



[^] Surface Fine Fuel Hazard adjusted to account for the presence of Near Surface Fuel

FIGURE 3 – OVERALL FUEL HAZARD

Each fuel layer contributes to different aspects of fire behaviour: flame depth and height, surface fire combustion and rate of spread, spotting and crown fire (DEH, 2006e). Each layer, as well as the Overall Fuel Hazard can be assessed as: *Low, Moderate, High, Very High or Extreme*.

The Overall Fuel Hazard was assessed by sampling across the plan area. The outcome of the assessment is explained in more detail for each reserve in the Block Prescriptions. For more information on fuel hazard assessment methodology and evaluation refer to the *Overall Fuel Hazard Guide for South Australia* (DEH, 2006e).

Research completed by McCarthy and Tolhurst (2004) investigated the effectiveness of fuel reduction burning in Victoria. It was concluded that maintaining Overall Fuel Hazard levels at High or less aids in slowing the rate of spread of a subsequent bushfire. It was determined that to achieve long-term fuel reduction effects the focus should be on the reduction of bark and elevated fuels as these fuel layers are likely to contribute to the overall fuel hazard over time. This said, it is also important to note that the more extreme the fire conditions are the less effective fuel reduced areas will be at limiting the overall impact due to extreme flame lengths jumping easily among less dense fuels and long spotting distances igniting fires ahead of the fire front. Under extreme conditions fuel reduced areas provide the benefit of limiting the intensity of the front and creating patchiness.

The likely maximum overall fuel hazard levels for vegetation communities occurring within the plan area are listed in Table 1. These communities are shown on Map 2 (Vegetation Communities). The recorded overall fuel hazard for each of the reserves in the plan area at time of assessment is explained in more detail in Sections 11 – 32 (Block Prescriptions).

The likely maximum Overall Fuel Hazard for MVS can be used for planning and incident management, management however should be supported by on-ground sampling as areas of vegetation remain unmapped and it is likely that other factors will influence the overall fuel hazard.

For more information on fuel hazard assessment methodology and evaluation refer to the *Overall Fuel Hazard Guide for South Australia* (DEH, 2006e). The process used to derive Major

Vegetation Sub-groups (MVS) is described in Section 5.1 and the extent of each MVS within the plan area is shown on Map 2 - Vegetation Communities and Significant Species.

TABLE 1 – LIKELY MAXIMUM OVERALL FUEL HAZARD FOR MVS

MVS No	MVS Description	Dominant Species Layers	Likely Maximum Overall Fuel Hazard	Significant Fuel Layers
5	<i>Eucalyptus</i> forests with a grassy understorey	<i>Eucalyptus petiolaris</i> , <i>E. odorata</i>	High	Surface
8	<i>Eucalyptus</i> woodlands with a shrubby understorey	<i>Eucalyptus cladocalyx</i>	Very High	Surface
9	<i>Eucalyptus</i> woodlands with a grassy understorey	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i> , <i>Callitris gracilis</i>	Very High	Surface
21	Other <i>Acacia</i> tall open shrublands and shrublands	<i>Acacia dodonaeifolia</i> , <i>A. calamifolia</i> , <i>A. paradoxa</i> , <i>A. pycnantha</i>	High	
26	<i>Casuarina</i> and <i>Allocasuarina</i> forests and woodlands	<i>Allocasuarina verticillata</i>	High	
27	Mallee with hummock grass	<i>Eucalyptus phenax</i> , <i>E. oleosa</i>	Extreme	Near Surface; Elevated
29	Mallee heath and shrublands	<i>Eucalyptus phenax</i> , <i>E. diversifolia</i> ssp. <i>diversifolia</i> , <i>E. brachycalyx</i> , <i>E. oleosa</i> , <i>E. albopurpurea</i> , <i>E. rugosa</i> , <i>E. angulosa</i> , <i>E. gracilis</i> , <i>E. socialis</i> , <i>E. leptophylla</i> , <i>E. conglobata</i> , <i>E. porosa</i> , <i>E. dumosa</i> , <i>Allocasuarina verticillata</i> , <i>Callitris gracilis</i>	Extreme	Near Surface; Elevated
31	Chenopod shrublands	<i>Maireana brevifolia</i> , <i>Atriplex stipitata</i> , <i>A. cinerea</i> , <i>A. paludosa</i> , <i>Rhagodia spinescens</i> , <i>Leucophyta brownii</i> , <i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Low	
32	Other shrublands	<i>Atriplex buxifolia</i> , <i>Beyeria lechenaultii</i> , <i>Lasiopetalum discolor</i> , <i>Geijera linearifolia</i> , <i>Olearia axillaris</i> , <i>Leucopogon parviflorus</i> , <i>Pimelea serpyllifolia</i> ssp. <i>serpyllifolia</i> , <i>Pultenaea tenuifolia</i> , <i>Veronica hillebrandii</i> , <i>Gahnia deusta</i> , <i>Leucophyta brownii</i> , <i>Austrostipa stipoides</i> , <i>Acrotriche patula</i> , <i>Myoporum insulare</i> , <i>Dodonaea viscosa</i> ssp. <i>spatulata</i> , <i>Oleaeria ramulosa</i> , <i>Correa reflexa</i> var. <i>scabridula</i> , <i>Westringia dampieri</i> , <i>Calytrix tetragona</i> , <i>Templetonia retusa</i> , <i>Eremophila glabra</i>	High	
33	Arid and semi-arid hummock grasslands	<i>Triodia compacta</i> , <i>T. scariosa</i> , <i>T. irritans</i> , <i>Frankenia pauciflora</i> var. <i>fruticulosa</i> , <i>Gahnia lanigera</i> , <i>Themeda triandra</i> , <i>Acacia continua</i> , <i>Lomandra multiflora</i> ssp. <i>dura</i> , <i>Senecio quadridentatus</i>	Very High	Near Surface

MVS No	MVS Description	Dominant Species Layers	Likely Maximum Overall Fuel Hazard	Significant Fuel Layers
36	Temperate tussock grasslands	<i>Austrostipa</i> sp.,	High	
37	Other tussock grasslands	<i>Poa poiformis</i> var. <i>poiformis</i> , <i>Zygophyllum apiculatum</i> , <i>Threlkeldia diffusa</i> , <i>Muehlenbeckia adpressa</i> , <i>Senecio pinnatifolius</i> , <i>Lepidium foliosum</i> , <i>Nicotiana maritima</i>	High	
38	Wet tussock grassland, herbland, sedgeland or rushland	<i>Gahnia filum</i> , <i>G. trifida</i> , <i>G. lanigera</i> , <i>Baumea juncea</i> , <i>Austrodanthonia caespitosa</i> , <i>Avena barbata</i> , <i>Bromus rubens</i> , <i>Goodenia willisiana</i> , <i>Gramineae</i> sp., <i>Lomandra</i> sp., <i>Lepidosperma viscidum</i>	High	
39	Mixed chenopod, samphire or forblands	<i>Tetrorchonia pergranulata</i> spp. <i>pergranulata</i> , <i>T. halocnemoides</i> , <i>Parapholis incurva</i> , <i>Medicago truncatula</i> , <i>Asteridea athrixoides</i> , <i>Frankenia pauciflora</i> var. <i>fruticulosa</i> , <i>Scarcocornia quinqueflora</i> , <i>Suaeda australis</i> , <i>Lycium ferocissimum</i> , <i>Myoporum insulare</i> , <i>Olearia axillaris</i> , <i>Maireana oppositifolia</i> , <i>Atriplex paludosa</i> ssp. <i>cordata</i> , <i>Lycium australe</i> , <i>Nitraria billardierei</i> , <i>Pelargonium australe</i> , <i>Disphyma crassifolium</i> ssp. <i>clavellatum</i>	Low	
49	Melaleuca shrublands and open shrublands	<i>Melaleuca halmaturorum</i> , <i>M. lanceolata</i> , <i>M. uncinata</i> , <i>M. brevifolia</i> , <i>M. decussata</i> , <i>Olearia axillaris</i> , <i>Leucopogon parviflorus</i>	Very High	Elevated

3.5 Conditions for Large Fire Events

Strong winds, combined with high temperatures and low humidity encourages very high to extreme fire intensity and behaviour. There is a dramatic increase in the likelihood of large bushfire events when the following conditions are experienced.

- Very High to Extreme 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.

Under these conditions, suppression will be difficult and may need to be implemented in surrounding areas where the Overall Fuel Hazard is Low and suitable access is available. The potential impacts of these events are discussed in following sections.

The Bureau of Meteorology determines fire danger using the MacArthur Forest Fire Danger meter. A Fire Danger Index (FDI) of 50 or above is classified as extreme and is the trigger at which the Country Fire Service (CFS) implements a Total Fire Ban. A bushfire alight in extreme fire danger conditions is considered to be uncontrollable until weather conditions abate. Port Lincoln can expect an average eight days per year where the Fire Danger Index is 50 or

above, up to five days of 80 FDI and above and at least one day of 120 FDI and above (Smith, 2005). Fire records from Southern Eyre Peninsula indicate that a significant fire has occurred approximately every 30 years.

Mallee woodlands and shrublands of southern Eyre Peninsula do not generally exceed a canopy height of 4 metres. The vegetation layers within these habitats are relatively dense and continuous. During a bushfire, flame heights from elevated and near surface fuels commonly exceed 3 metres, quickly involving the canopy. The difference between a low intensity fire and a crown fire may be influenced by a small change in weather conditions – particularly wind strength.

These vegetation types generally exceed high fuel loads in mature habitats and have low fuel moisture content during summer, providing a ready source of fire fuel. If fire occurs in these habitat types the area burnt is generally determined by the wind direction, speed and duration with fire intensity quickly dropping as conditions abate.

Experience during fires on the Eyre Peninsula indicates that firebreaks have very limited effectiveness at halting a fire front in conditions exceeding an FDI of High. Firebreaks are not generally effective control measures in contiguous vegetation or rural landscapes, due to spotting distances associated with fire conditions that exceed an FDI of High and the fact that fire fronts rarely abate in intensity at a location which coincides with a firebreak. Firebreaks are very effective in reducing the impact of a fire front if they are implemented immediately adjacent built assets. Appropriately located access tracks of a suitable standard for the terrain and vegetation type are of greater assistance to fire crews. These are used to provide access when conditions have abated so that the fire edge can be put out. For these reasons, fire access tracks within the reserves of Southern Eyre Peninsula are generally a Minor or Standard GAFLC classification – not exceeding 5 metres in width. DEH will use suppression techniques that are appropriate for a range of fire situations and locations. To achieve this, DEH has a variety of heavy machinery and equipment, including A-frames, scrub chains, long hose lays with water thieves, floating collar dams, backpack pumps, blowers and the development of remote area firefighting teams.

4 FIRE HISTORY AND FIRE REGIMES

DEH has written records of fire incidents dating back to 1956 and these have been reviewed during the compilation of this plan. A total of 20 records exist pertaining to fires that have occurred within or in close proximity to the reserves within the plan area since 1956.

4.1 Mapping Fire Occurrences

Map 3 (Fire History) has been compiled from the latest DEH fire incident reports. Fire history includes the most recent, complete fire scar by year (mapped fires only). The quality of the fire scar 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.

4.2 Large Fires

Large fires have occurred reasonably frequently in the area. The Wangary fire of 2005 burnt approximately 83 000 ha and the Tulka fire of 2001 burnt approximately 11 000 ha. Reports of earlier fires include:

- Pillie Lake to Memory Cove in 1912
- Pillie Lake to Thorny Passage in the 1960's
- Wanna to Memory Cove in early 1986
- Yangie Bay to Coffin Bay Golf Course in 1991.

4.3 Lightning and Fires

Lightning strikes occur during electrical storms in early and late summer, and are often accompanied by rain. Eyre Peninsula has a significant history of fires started by lightning strikes.

4.4 Human-caused Fires

Historically the incidence of fires resulting from human activity in the area is low, however this does not necessarily reflect the potential risk associated with visitor use in reserves of southern Eyre Peninsula. Each summer a number of reserve users are reported for illegal fires. Vehicles are a potential cause of fire (access is permitted during days of total fire ban); as are off-road motorbike riding and other causes (including a garbage bag hot air balloon).

Historical records indicate that the vegetation of Coffin Bay NP, Memory Cove WPA and Lincoln NP has been altered since the area was settled. Burning to clear vegetation for grazing and cropping land is likely to have been partly responsible for this change. The majority of these fires occurred between the late 1800's to early 1900's.

Historical records at the time of early European occupation document that widespread mature Sheoak woodlands dominated the landscape – a habitat which is maintained via fire exclusion or frequent low-intensity fires. The role and extent that the Barngala and Nauo people played in using fire to manage or maintain this landscape is unknown. What is clear is

that the landscape changed with the arrival of Europeans through land clearing, early suppression of bushfires and introduced herbivores.

It is likely that the frequency of naturally occurring fires has remained relatively stable but the removal of burning by Aboriginal people, change of land use and change in structure of native habitats has altered the size, interval, intensity and impact of bushfires.

4.5 Risk of Fire Ignitions

Lightning has been the major cause of bushfires in recent years, however human caused fires have had the largest impact (Tulka 2001 and Wangary 2005). Early suppression of fires may have contributed to fuel loads reaching high levels across a broader area of the landscape than those that occurred prior to European settlement.

The effect of climate change on fire frequency and intensity is the subject of much speculation however, estimates indicate that the incidence of extreme bushfires may increase 25% by the year 2050 (Lucas, *et al.*, 2007). The potential impact of increased fire frequency and intensity as a result of climate change may require more active measures to be adopted in the future to limit the impact of fire on the community.

5 DAMAGE POTENTIAL TO LIFE AND PROPERTY

5.1 Land Use

Areas adjoining the reserves have a variety of land uses including cropping, agriculture, grazing farmland, rural residential, industrial, conservation as well as higher density residential living in the township of Coffin Bay. Land use has significantly changed the landscape of the Southern Eyre Peninsula during the last century.

The landscape south of the Flinders Highway is largely covered by native vegetation interspersed with areas of farm/grazing land and rural living areas.

Land adjacent Lincoln NP and Sleaford Mere CP includes the Tulka shack sites to the north, Sleaford Mere shack sites to the south and a mixture of native vegetation and agricultural cropping land with infrequent farm houses to the west.

Lincoln CP, Wanilla Land Settlement CP, Kathai CP and Sections 97, 98 and 564 Hundred of Lincoln are largely surrounded by native vegetation with short distances to farmland. Several residences exist in rural living areas north of Kathai CP with industrial development and significant rural living areas to the east.

Murrunatta CP, Wanilla CP and Tucknott Scrub CP share boundaries with farmland and native vegetation.

Coffin Bay NP and Kellidie Bay CP share boundaries with farmland, native vegetation and significant assets in the town of Coffin Bay. Coffin Bay has a resident population of approximately 500, which increases to 3 000 during the summer holidays. Kellidie Bay CP also includes two shack site leases on the coast north of the Coffin Bay lookout.

Refer to Map 1 - Terrain, Tenure and Infrastructure for an overview of land tenure.

All landholders are obliged to comply with the *Fire and Emergency Services Act 2005*, which outlines responsibilities for fire preparedness. DEH will implement works for fire management on DEH managed lands within the plan area in order to minimise risks, however adjoining landholders are also required to implement works on their own property to minimise the threat of fire.

Management Strategies

Land Use	<ol style="list-style-type: none"> 1. Implement fuel management strategies on DEH managed lands to minimise the risk to life, property and the environment (refer to the block prescriptions and Map 4 for further information). 2. Liaise with the relevant local Bushfire Prevention Committee and adjacent landholders to promote the implementation of appropriate fuel reduction works on private properties to complement the fuel management strategies employed within DEH reserves.
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5.2 Built Assets

There are relatively few built assets in the Reserves of Southern Eyre Peninsula (Map 1). However, there are significant assets in Coffin Bay, Tulka, adjacent shack sites and rural living areas. Assets at risk from bushfire in the plan area include:

- DEH infrastructure such as shelters, barriers, signs, campsites, toilet blocks, lookout platforms, water tanks and fencing
- Tulka residences, Sleaford Mere residences, Cape Donington lighthouse and power line, Donington cottage, SA Water infrastructure, Stella and Pillie Huts and several ruins within and adjacent to Lincoln NP
- City of Port Lincoln urban fringe, Northside Hill radio tower infrastructure, rural living residences and industrial infrastructure within and adjacent to Kathai CP, Lincoln CP and Sections 97, 98 and 564 Hundred of Lincoln
- Wanilla residences adjacent to Wanilla Land Settlement CP
- Coffin Bay residences, rural living residences, town water supply, communications infrastructure, power sub-station, ranger's residence, Old Dairy Site, Whaler's Well, Burgess Hut and workshop within and adjacent to Coffin Bay NP and Kellidie Bay NP.

A risk assessment has been completed for the Reserves of the Southern Eyre Peninsula. Actions to manage risks are detailed in the block prescriptions (Sections 12-33).

Where water supply infrastructure occurs on DEH managed land, DEH will allow adequate fire prevention measures to be implemented using minimum impact techniques. The following standards have been developed.

- Production bores and tanks managed to an overall fuel hazard of *Moderate* a minimum of 5 m around the compound perimeter, or where no compound exists, a minimum of 10 m around bores/tanks.
- Pipelines managed to an overall fuel hazard of *Moderate* a minimum of 5 m from the asset.

Management Strategies

Built	3. Undertake fire management works and activities on DEH reserves to minimise the impact that fire may pose to adjacent public assets.
	4. 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. Implement fuel management strategies appropriate to asset protection (refer to the block prescriptions and Map 4 for further information).

5.3 Visitor Use

The main tourist season occurs during the summer months. Visitor use is predominantly based along the coastlines of Lincoln and Coffin Bay National Parks, which provide a variety of picturesque landforms from rugged southern ocean coastlines to protected bays and beaches.

Visitor numbers have been increasing annually since records began in 1997/98.

While information is provided at the reserve entrance and in brochures, it is likely that few visitors familiarise themselves with how to respond in the event of a bushfire. Depending on the location and direction of a fire, roads and tracks in the reserves may not be safe to use as escape routes and/or may have adjacent vegetation with *Very High* fuel loads. Hence it is not possible to identify safe areas prior to an incident. During fire events in these reserves the safety of the public should be the highest priority with early action taken. Management of the public during emergency incidents is the responsibility of the South Australian Police (SAPOL).

Management Strategies

Visitor Use	6. Implement fuel management strategies appropriate to visitor safety (refer to block prescriptions and Map 4 for further information).
	7. Consider reserve closures on extreme fire weather days to ensure visitor safety (at the discretion of the Director National Parks).

5.4 Heritage Values

5.4.1 Aboriginal Heritage

In carrying out this plan DEH will comply with the *Aboriginal Heritage Act 1988* and the *Aboriginal Heritage Handbook and Strategy* (DEH, 2006c).

The Barngala and Nauo people are recognised as the traditional inhabitants of Southern Eyre Peninsula with much of the Peninsula subject to the Nauo-Barngala Native Title Claim. The area is rich in Aboriginal cultural heritage with a number of significant sites described in reserves of the area.

5.4.2 European Heritage

Colonial history in the Port Lincoln area is first recorded in Matthew Flinders Voyage of Discovery aboard the Investigator in 1802. Farming and grazing began in the areas now occupied by Lincoln NP and Coffin Bay NP in the mid to late 1800's and continued until the mid 1900's (evidence of farming activities can still be seen today). Other areas were left relatively untouched and dedicated for other purposes such as a Flora and Fauna Reserve and water extraction. Significant European heritage sites in these reserves include: Flinders Monument at Stamford Hill, Donington Cottage, Memory Cove, Point Sir Isaac Whaling Station, Spalding Cove Whaling Station, Oystertown, Old Tulka Homestead, Stella and Pillie Huts, Old Dairy Site, Whaler's Well, Burgess Hut, Surfleet Tanks, old farm machinery and Shepherd's Hut (Follett's Flat).

Management Strategies

Heritage Values	8. Implement fuel management strategies appropriate to asset protection and visitor safety (refer to Section 12-33 (block prescriptions) and Map 4 (Fire Management and Access) for further information).
	9. Advocate for liaison at bushfires to identify reserve values, where time allows. Once the fire has passed evaluate sites to establish if any damage has occurred.
	10. Ensure suppression strategies take into account significant historical sites in order to minimise impacts from these activities; and undertake post-fire rehabilitation.

6 SPECIES AND COMMUNITIES OF CONSERVATION SIGNIFICANCE

Dominant vegetation communities for the plan area are outlined in the following section, followed by the flora and fauna of conservation significance.

6.1 Major Vegetation Sub-groups (MVS)

Floristic mapping for this plan uses a compilation of regional vegetation mapping data that has been reclassified to comply with National Vegetation Information System (NVIS) classification 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 15 MVS within the reserves in the plan area (Map 2). Ecological Fire Management Guidelines for these MVS are outlined in Section 7.

The vegetation communities represented in the plan area are:

- | | |
|---|------------|
| • <i>Eucalyptus</i> forests with a grassy understorey | MVS No. 5 |
| • <i>Eucalyptus</i> woodlands with a shrubby understorey | MVS No. 8 |
| • <i>Eucalyptus</i> woodlands with a grassy understorey | MVS No. 9 |
| • Other <i>Acacia</i> tall open shrublands and shrublands | MVS No. 21 |
| • <i>Casuarina</i> and <i>Allocasuarina</i> 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 |
| • Other tussock grasslands | MVS No. 37 |
| • Wet tussock grassland, herbland, sedgeland or rushland | MVS No. 38 |
| • Mixed chenopod, samphire or forblands | MVS No. 39 |
| • <i>Melaleuca</i> shrublands and open shrublands | MVS No. 49 |

6.2 Biodiversity of the Southern Eyre Peninsula

Ecological influences from both south-eastern and south-western Australia helped shape the diverse fauna and flora of Eyre Peninsula. Subsequent geographic isolation has resulted in many unique species evolving, including 40 endemic flora species and several fauna species. Much of the threatened flora and fauna of Eyre Peninsula survives in reserves, heritage agreements on private land and roadside vegetation.

With 88% of remnant vegetation blocks on the Eyre Peninsula smaller than 20 ha, large reserves are essential for protecting sustainable areas of high quality and diverse habitats.

6.2.1 The Influence of Fire on the Biodiversity of the Southern Eyre Peninsula

The effect of fire on native vegetation requires ongoing monitoring and research to determine the spatial and temporal effects on habitats and species. The post-2005 Wangary fire *Threatened Flora Threat Assessment* (Ecological Associates Pty Ltd, 2006a) identified that “at least three of the threatened flora species in the Southern Eyre Peninsula may be disturbance dependant or may be promoted by fire” with “lack of appropriate disturbance regimes probably the most significant threat to these species.” Fire records from reserves of the Southern Eyre Peninsula indicate that fire has been largely absent from many areas resulting in homogenous older age classes.

Mallee woodlands are the dominant vegetation formation on Eyre Peninsula and provide habitat for many species of conservation significance. Overviews of the management of mallee birds have recommended fire regimes which maintain a mosaic of vegetation ages, but with a bias towards retention of older age classes (Woinarski, 1989). Inappropriate fire regime (spatial/temporal/intensity) is considered one of the most serious threatening processes for threatened mallee birds and has the potential to cause significant impacts in the fragmented landscape of the Southern Eyre Peninsula. It should also be noted that maintaining a mosaic of age classes is unlikely to be achieved by unplanned, natural, random burns alone (Woinarski, 1989).

However, a survey of woodland birds of the Wangary 2005 fire scar found that “Sugar Gum (*Eucalyptus cladocalyx*) woodland was the most important vegetation type for birds on the Southern Eyre Peninsula, supporting the greatest number of positively associated species and having a high species richness” (Carpenter, 2007). It is interesting to note the response of birds in the study area to the fire, the survey “established that most species present immediately before the fire re-established to varying degrees by the end of 2006. Seventy-five percent of pre-2005 species (60% at survey sites) were recorded in 2006, and most were recorded in the 2005 burn area. Most species recorded in 2006 (90%) are now equally or more abundant (% of sites and numbers of individuals) at burnt than unburnt sites, and have possibly re-established their pre-fire abundance. The survey also found that most bird species of conservation concern have also re-established. The retention and re-establishment of linking vegetation, both along watercourses and woodland along roadsides, is therefore a management priority” (Carpenter, 2007)

Successful conservation of flora and fauna populations is likely to be best addressed by managing habitats in a healthy state, this may generally be achieved through maintaining a mosaic of habitat age classes at a landscape scale. However, it should be noted that several fauna species recorded from the Southern Eyre Peninsula demonstrate a bias toward long unburnt habitat (see Appendix 2) and species with specialised habitat needs such as the EP Southern Emu-wren require habitat scale fire management.

Post-Wangary fire surveys have been conducted to determine the fire response, status and critical management actions for several threatened flora and fauna species on Southern EP including the Brushtail Possum, EP Southern Emu-wren, as well as threatened woodland birds and species of threatened flora and these findings are described in the following section.

6.3 Flora, Fauna and Ecological Communities

The Environmental Database of South Australia contains records from several data sources, including the Threatened Plant Population Database, the Biological Survey of South Australia and opportunistic sightings of significant flora and fauna.

Fire response information, where known, is included for species and communities of conservation significance listed in Appendix 1, 2 and 3. In most cases their distributions are poorly defined, because the database only contains point locations from site visits or observations. Many of the records are several years old and require verification.

Any gaps in fire response information for species and communities of conservation significance will be addressed through the prescribed burn planning process. The response to fire will be investigated as part of the associated environmental assessment, with the prescribed burn plan modified, if necessary, and/or monitoring proposed to fill gaps.

In this plan 'of conservation significance' is used to describe important or rated species of flora and fauna and vegetation communities. These 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*
- Provisionally listed as Threatened (with a rating of Endangered or Vulnerable) in South Australia, that is, included on the unpublished DEH *Provisional List of Threatened Ecosystems of South Australia* (DEH, 2005b).

There are a number of flora and fauna species considered to be of conservation significance within the plan area.

- EP Southern Emu-wren, rated as Vulnerable at the National level.
- Brushtail Possum (*Trichosurus vulpecula*), rated as Rare at the State level and subpopulation is regionally significant.
- EP Yellow-tailed Black-Cockatoo rated as Vulnerable at the State level and Critically Endangered Regionally.
- Malleefowl rated as Vulnerable at the National level.
- Western Whipbird rated as Vulnerable at the National level.
- Brush-tailed Bettong rated as Conservation Dependent at the National level.
- Diamond Firetail (*Stagonopleura guttata*) rated as Vulnerable at the State level.
- Blue-breasted Fairy-wren (*Malurus pulcherrimus*) rated as Vulnerable at the State level.
- West Coast Mintbush (*Prostanthera calycina*) rated as Vulnerable at the National level.
- Metallic Sun-orchid rated as Endangered at the National level.

Other species of conservation significance are included in block prescriptions and Appendix 1 and 2. Some species are less at risk from fire than others, for example, while shorebirds of conservation significance have been included in the block prescriptions it should be noted that they are unlikely to be affected by fire. The exception to this may be mainland nesting

sites for large coastal raptors. Sleaford Mere CP is important for migratory birds (2007b) protected under China-Australia Migratory Birds Agreement (CAMBA) and Japan-Australia Migratory Birds Agreement (JAMBA) through provisions of the EPBC Act but are also unlikely to be affected by fire.

There is a commitment to increase our capacity to incorporate species' requirements into improved ecological fire management. However, how each or all of a site's unique attributes (in terms of vegetation, soil, lithology, aspect, terrain, fire regimes, post-fire age of vegetation) contribute to the survival of a particular species is a complex question. It is beyond the scope of this plan to extrapolate site records for species across a landscape or to determine what the critical habitat requirements are for all species. The following sections describe the ecology of selected threatened species and ecological communities considered significant in terms of this plan.

In addition to these threatened fauna and flora a number of ecological communities of conservation significance are found in the Reserves of the Southern Eyre Peninsula including:

- Drooping Sheoak (*Allocasuarina verticillata*) Grassy Low Woodland on clay loams of low hills, provisionally listed as Vulnerable in SA (DEH, 2005b)
- Drooping Sheoak Low Woodland on calcareous soils of coastal plains, no rating (DEH, 2005b) but considered regionally significant
- Peppermint Box (*Eucalyptus odorata*) Grassy Low Woodland, provisionally listed as Endangered in SA (DEH, 2005b)
- Smooth Cutting-grass (*Gahnia filum*) Sedgeland, provisionally listed as Vulnerable in SA (DEH, 2005b)
- Cutting-grass (*G. trifida*) Sedgeland, provisionally listed as Endangered in SA (DEH, 2005b).

6.3.1 Eyre Peninsula Southern Emu-wren

The EP Southern Emu-wren is a subspecies confined to the Southern Eyre Peninsula and has been recorded at approximately 50 sites. Habitat management guidelines have been prepared for this species (Pickett, 2006). The key habitat areas supporting significant populations are Kellidie Bay and Lincoln NP. Tucknott Scrub CP, Wanilla CP, Wanilla Land Settlement CP, Murrnatta CP, Kellidie Bay CP and Coffin Bay NP are identified as high priorities for management purposes (Pickett, 2005). Bushfire is a major potential threat to the species as it may cause widespread habitat loss. The 2005 Wangary fire "extirpated the EP Southern Emu-wren from five to six sites at which it was previously recorded, causing the loss of three to four known populations" (Pickett, 2005). The EP Southern Emu-wren is a poor flyer and unlikely to relocate post-fire due to the fragmented state of suitable habitat. One isolated Koppio Hills sub-population was lost as a result of the 2005 Wangary fire (Pickett, 2005). Recovery priorities for the EP Southern Emu-wren include maintaining the integrity of current habitat and to expand and connect habitats and populations. Major fire events have had a negative impact on these priorities and the habitat management guidelines recommend that bushfire mitigation activities be aimed at preventing loss of habitat and individual birds at any given locality. "Such risk management will necessitate explicit consideration of EP Southern Emu-wrens in fire management planning and operations, and bushfire prevention activities" (Pickett, 2006). Prescribed burning may be applied to maintain habitat diversity and limit the impact of bushfires in key habitat.

Management Strategies

Eyre Peninsula Southern Emu-wren	11. Conduct prescribed burning to provide refuge areas in the event of a large bushfire encroaching on preferred habitat, or the reserve/s.
	12. Conduct prescribed burning to maintain habitat diversity.
	13. Conduct prescribed burning to monitor how fire influences EP Southern Emu-wren populations and preferred habitat. Use this information to update the Ecological Fire Management Guidelines (Appendix 2).
	14. Consult with the EP Southern Emu-wren Recovery Team during the planning of any prescribed burn to be conducted within the known habitat of the EP Southern Emu-wren.

6.3.2 Brushtail Possum

Over the past 30 years Brushtail Possums on Southern Eyre Peninsula are likely to have been reduced to the southern Koppio Hills and Yallunda Flat. The impact of the 2005 Wangary fire was significant, burning the entire Koppio Hills subpopulation. Post-fire surveys indicate that Brushtail Possums are restricted to subpopulations in the northern and southern Koppio Hills (near Tucknott Scrub CP) and a new subpopulation record near Chapman Road. Large hollow bearing trees are important as preferred habitat with home ranges based around den hollows. As habitats regenerate these subpopulations may disperse and eventually occupy a broader area.

It is interesting to note that surveys of the Brushtail Possum subpopulation undertaken by Ecological Associates (2006b) found that “the distribution of Brushtail Possums in the southern Koppio Hills did not seem to have undergone a major change as a result of the 2005 bushfire”.

Management Strategies

Brushtail Possum	15. Conduct prescribed burning to minimise the risk of large contiguous areas of Brushtail Possum habitat burning in one fire event.
	16. Monitor the influence of fire on Brushtail Possum populations and preferred habitat and use this information to update the ecological fire management guidelines (Appendix 2).
	17. Attempt to provide refuge areas through prescribed burning to avoid bushfires encroaching on preferred habitat. Fire suppression activities should also attempt to retain some unburnt patches as refuge areas.
	18. Consult with the DEH Threatened Species Unit when planning prescribed burns in known or potential habitat of the Brushtail Possum.

6.3.3 Eyre Peninsula Yellow-tailed Black-Cockatoo

The EP Yellow-tailed Black-Cockatoo population is isolated from other South Australian mainland and island populations and has undergone dramatic decline since European settlement. Consequently the population is now recognised as Critically Endangered

regionally by the Recovery Team and Vulnerable at the State level. Sugar Gum woodland and certain Aleppo Pine (*Pinus halepensis*) stands have been identified as the habitat critical for EP Yellow-tailed Black-Cockatoo survival, with the core breeding range in the Koppio Hills on Southern Eyre Peninsula estimated to be less than 20km². Recovery actions prior to 2005 saw EP Yellow-tailed Black-Cockatoo numbers increase to an estimated 30 to 34 individuals in 2004. However, the January 2005 Wangary fire burnt the entire breeding area and most of the southern habitat range. It is unclear how many individuals were lost as a result of the fire but current confirmed observations for the population are of approximately 12 individuals during the 2006/2007 breeding season. The EP Yellow-tailed Black-Cockatoo displays habitual feeding behaviour and has strong site fidelity for key habitat components such as watering points, food resources, nest trees and roosting sites. It is interesting to note that though adjacent Sugar Gum woodland was not burnt, the flock kept using traditional nesting habitat in the burnt area.

The main threats to this population are a lack of food resources (native and Aleppo Pine) and nesting hollows due to habitat loss, degradation and fragmentation. A regional recovery plan for the Eyre Peninsula Yellow-tailed Black-Cockatoo is currently in preparation.

Management Strategies

Eyre Peninsula Yellow-tailed Black-Cockatoo	19. Conduct prescribed burning to minimise the risk of large contiguous areas of habitat burning in one fire event.
	20. Monitor the influence of fire on EP Yellow-tailed Black-Cockatoo populations and preferred habitat and use this information to update the ecological fire management guidelines (Appendix 2).
	21. Attempt to provide refuge areas through prescribed burning to avoid fires encroaching on preferred habitat. Fire suppression activities should also attempt to retain some unburnt patches as refuge areas.
	22. Consult with the EP Yellow-tailed Black-Cockatoo Recovery Team when planning burns in known or potential habitat of the EP Yellow-tailed Black-Cockatoo.

6.3.4 Drooping Sheoak Grassy Woodland

The decline of Drooping Sheoak Grassy Woodlands on the Eyre Peninsula is largely due to widespread clearance for farm land and grazing (Peeters, *et al.*, 2006). Land was cleared using burning techniques then recruitment was grazed out by sheep. Grazing by herbivores remains a significant threatening process to Drooping Sheoak regeneration, particularly from kangaroos and rabbits. Remaining areas of Drooping Sheoak Grassy Low Woodlands occurring on clay loams of low hills on the Eyre Peninsula are listed as Vulnerable in the *DEH Provisional List of Threatened Ecosystems of South Australia* (DEH, 2005b). The provisionally listed community occurs within Tucknott Scrub CP. A nomination has been made under the EPBC Act for the listing of Calcarenite Dune Woodland of south-eastern Australia as Endangered. This nomination encompasses particular areas of Drooping Sheoak Grassy Woodlands on the Southern Eyre Peninsula. Areas of Drooping Sheoak Low Woodland on calcareous soils on coastal plains with a low shrubby understorey are not provisionally listed

(DEH, 2005b), however are considered regionally significant. Regionally significant Drooping Sheoak woodlands occur within Lincoln NP and Coffin Bay NP.

Drooping Sheoak Woodlands are known to provide habitat for the Brush-tailed Bettong (recently reintroduced to Lincoln NP), Brushtail Possum, EP Yellow-tailed Black-Cockatoo, Bush Stone-curlew (*Burhinus grallarius*) and Diamond Firetail (*Stagonopleura guttata*). Management of fire intensity and frequency is considered a significant issue for successful re-establishment of this habitat. Refer to Appendix 3 for further information.

Management Strategies

Drooping Sheoak Grassy Woodland	23. Refer to ecological fire management guidelines for ecological communities of conservation significance when implementing prescribed burns and aim to manage within these guidelines (Appendix 3).
	24. Avoid burning large continuous remnants of Drooping Sheoak Woodland in their entirety during a single fire event, instead aim to increase patchiness within the remnants.
	25. Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns.

6.3.5 Peppermint Box Woodland

Few examples of Peppermint Box woodland remain on the Eyre Peninsula. Peppermint Box Grassy Low Woodland on loamy soils of low hills has been provisionally listed as a Endangered in SA by DEH (DEH, 2005b). Peppermint Box woodland has been highly modified and much reduced in distribution due to clearance, grazing, salinisation and weed invasion. Refer to Appendix 3 for further information.

Management Strategies

Peppermint Box Woodland	26. Refer to ecological fire management guidelines for ecological communities of conservation significance when implementing prescribed burns and aim to manage within these guidelines (Appendix 3).
	27. Avoid burning large continuous remnants of Peppermint Box woodland in their entirety during a single fire event, instead aim to increase patchiness within the remnants.
	28. 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 *DEH Guidelines for Ecological Fire Management* (DEH, 2008h). This approach is being used as a sound basis for the management of fire for biodiversity across Australia (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

7.2.1 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).

7.2.2 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.

7.2.3 Methodology

Ecological Fire Management Guidelines have been developed from research and analysis of available data relating to the *Key Fire Response Species* within the Reserves of the Southern Eyre Peninsula. 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).

Figure 4(below) illustrates this process.

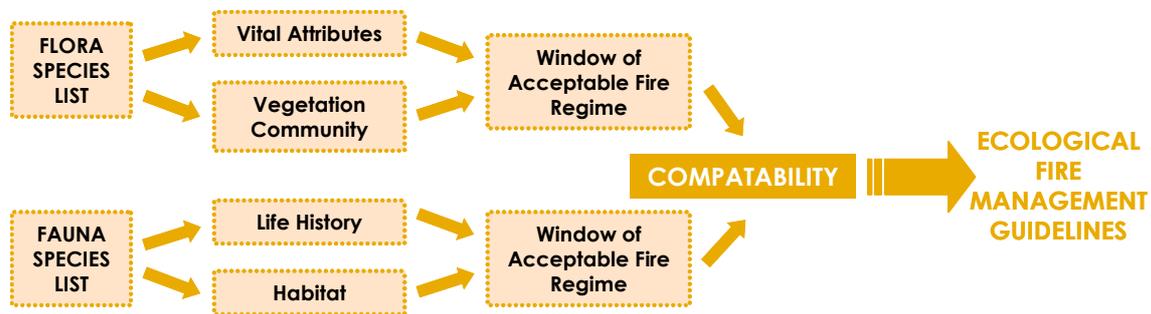


FIGURE 4 – APPROACH FOR DETERMINING ECOLOGICAL FIRE MANAGEMENT GUIDELINES

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 Eyre Peninsula 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.

7.3.1 Thresholds of Potential Concern

Thresholds of Potential Concern (TPC) are defined as ‘the limits of tolerance to a particular fire regime’ (Kenny, *et al.*, 2003).

- TPC1 demonstrates the lower threshold for fire interval (in years) 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 upper threshold for fire interval (in years) 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.

If either of the thresholds are breached, species of sensitive functional types are likely to significantly decline. Fire intervals between the upper and the lower threshold (Table 2) are predicted to maintain the species complement, whereas intervals shorter than the lower threshold or longer than the upper threshold are predicted to lead to the decline of the Key Fire Response Species (Kenny, et al., 2003).

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 & 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 ¹
5	<i>Eucalyptus</i> forests with a grassy understorey	5	25	50%	35	Y	Y	Spring
8	<i>Eucalyptus</i> woodlands with a shrubby understorey	20*	70*	50%*	50*	Y*	Y*	Spring*
9	<i>Eucalyptus</i> woodlands with a grassy understorey	5	25	50%	35	Y	Y	Spring
21	Other <i>Acacia</i> tall open shrublands and shrublands	10	50	50%	40	Y	Y	Dry
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	50%	40	Y	Y	Dry
29	Mallee heath and shrublands	20	50	50%	40	Y	Y	Spring
31	Chenopod shrublands	14	#	50%	30	#	#	Spring

		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 & 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 ¹
32	Other shrublands	20	40	50%	40	Y	Y	Spring
33	Arid and semi-arid hummock grasslands	10	34	50%	20	Y	Y	Dry
36	Temperate tussock grasslands	10	20	50%	20	#	#	Autumn
37	Other tussock grasslands	10	20	50%	20	#	#	#
38	Wet tussock grassland, herbland, sedgeland or rushland	15	#	50%	20	#	#	Spring
39	Mixed chenopod, samphire or forblands	20	35	50%	40	#	#	Spring
49	<i>Melaleuca</i> shrublands and open shrublands	10	35	50%	20	#	#	Spring

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.

¹ Note that this is not restricted to the same year, but may relate to fires occurring in the same season over a number of years.

* Denotes the inclusion of statewide guidelines. When more regional data becomes available these will be refined

7.4 Weeds

The incidence of weeds in the reserves of Southern Eyre Peninsula is generally linked to disturbance from previous land use and invasion by aggressive species, however inappropriate fire control methods, including bare earth breaks, may also contribute to the establishment and spread of weeds.

Significant weed species that occur on the Southern Eyre Peninsula include Myrtle-leaf Milkwort/Polygala (*Polygala myrtifolia*), South African Daisy (*Senecio pterophorus*), Bridal Creeper (*Asparagus asparagoides*), Aleppo Pine (*Pinus halepensis*), Boneseed (*Chrysanthemoides monilifera*), Olive (*Olea europaea*), Boxthorn (*Lycium ferocissimum*), Black Wattle (*Acacia mearnsii*) and Perennial Veldt Grass (*Ehrharta calycina*).

Several other significant weed species occur in the region and may be of future concern for reserve fire management. Some native species can behave as environmental weeds which include:

- Golden Wreath Wattle (*Acacia saligna*) in Coffin Bay and Lincoln National Parks
- Western Coastal Wattle (*Acacia cyclops*) in Kellidie Bay CP and Coffin Bay NP
- Black Wattle (*Acacia mearnsii*) in Wanilla and Tucknott Scrub Conservation Parks.

The Lower Eyre Peninsula Pest Management Group provides guidelines for environmental weed identification and management on Eyre Peninsula.

Fire may stimulate some weed species but is also a useful control method, especially if applied as part of an integrated approach to weed management. The potential impacts of weeds are considered prior to prescribed burning as part of the DEH Prescribed Burn environmental assessment. Post-fire monitoring is an important element of the adaptive management process.

The use of heavy machinery in reserves is recommended, with minimum impact techniques such as rolling or A-framing that leave the root zone of native vegetation undisturbed so that it can quickly regenerate.

Management Strategies

Weeds	29. Refer to Ecological Fire Management Guidelines (Table 2) and fire management guidelines for introduced flora species (Appendix 1) during prescribed burn planning.
	30. Consider the use of fire as part of an integrated weed management strategy.
	31. Prior to any prescribed burn, the potential impact of weed species is identified through the DEH Environmental Assessment process during prescribed burn planning. This will identify any priority weed species and recommend post-fire actions to mitigate the impact of weeds.
	32. Monitoring of weeds pre and post-fire to determine what post-fire weed control is required and its effectiveness.
	33. Conduct post-fire weed control subject to regional priorities.

7.5 Pest Fauna

The conditions that result following a fire can be favourable to some fauna species, but for other species these conditions may result in population decline. There is evidence that some pest fauna can flourish in the conditions existing after a fire. Herbivores, such as the introduced Rabbit (*Oryctolagus cuniculus*) and native Kangaroos (*Macropus* sp.), 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 (such as the Southern Brown Bandicoot) 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 introduced 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).

Within the Reserves of the Southern Eyre Peninsula, a number of introduced species have been observed. These include the Rabbit, House Mouse (*Mus musculus*), Black Rat (*Rattus rattus*) and Fox. Feral cats (*Felis catus*) and introduced birds are commonly observed within the reserves.

It is important that the information collected on pest animals and plants pre-fire is used to determine appropriate management post-fire. There may be 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.

The potential impacts of introduced and abundant species are considered prior to prescribed burning as part of the DEH Prescribed Burn Environmental Assessment Table (EAT) and post-fire as part of impact assessment. Post-fire monitoring is an important element of adaptive management.

Management Strategies

Pest Fauna

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

7.6 Plant Pathogens

The EPBC Act has identified Phytophthora (*Phytophthora cinnamomi*) as a key threatening process, which means that it is a major threat to native vegetation and associated fauna. Phytophthora is a soil and waterborne fungus that causes disease and death to a variety of native plant species (as well as introduced species). It occurs in areas of high rainfall and because of this the Southern Eyre Peninsula has been identified as being particularly at risk. At the time of writing, Phytophthora has not been confirmed within the plan area – however several locations which demonstrate classic symptoms of the disease have been identified. Suspect areas include Tucknott Scrub, Wanilla and Wanilla Land Settlement Conservation Parks and testing will continue. The fungus can spread with mud carried on vehicle tyres, walking boots and equipment, so there is significant risk of Phytophthora infestation.

DEH has a Standard Operating Procedure, which addresses Phytophthora threat management (DEH, 2002a). This outlines hygiene procedures and guidelines to protect the integrity of natural areas by minimising the risk of Phytophthora infestation and spread in DEH reserves.

Management Strategies

Plant Pathogens	35. Ensure the <i>Standard Operating Procedure – Phytophthora Threat Management (SOP-002)</i> (DEH, 2002a) is adhered to in Phytophthora risk areas, which includes all the reserves in the plan area.
	36. Ensure hygiene practices are implemented to reduce the spread of Phytophthora. Refer to the <i>DEH Operating Procedure - Phytophthora Vehicle Disinfection Units</i> (DEH, 2003).

8 FIRE MANAGEMENT ZONES

8.1 Fire Management Zones

Fire management zones as detailed in the *Policy and Procedure for Fire Management Zoning in DEH Fire Planning* (DEH, 2008b) 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 on DEH reserves and DEH managed land
- clarify the areas where different fire management activities will be undertaken on DEH reserves and DEH managed land
- ensure a standard approach to the application of fire management zones on DEH reserves and DEH managed land across South Australia
- assist in the development of fire management plans and programs for DEH reserves and DEH managed land.

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 fuel hazard levels in different habitat types and the level of risk to assets including life, property and cultural heritage and biodiversity assets (DEH, 2008b). The zones allocated to the planning area are described in Sections 12-33 (Block Prescriptions) and also displayed on Map 4 - Fire Management and Access.

Details on fuel reduction methods within A- and B-zones are provided within the EAT (as part of prescribed burn planning), which is prepared before the implementation of each prescribed burn and also before fire management works are undertaken within DEH managed land where native vegetation is being cleared and is not exempt under the *Native Vegetation Act 1991*. Refer to the *Interim Environmental Assessment Table Guidelines* (DEH, 2004d) and the *Policy and Procedure for Prescribed Burning* (DEH, 2008i) for more information.

8.2 Risk Assessment

A risk assessment was conducted in line with the *Policy and Procedures for Risk Assessment in DEH Fire Planning* (DEH, 2008c), 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. Risk assessment is a function of likelihood and consequence.

- Likelihood considers the possibility that a fire related risk will occur and is assessed on a basis of *Rare to Almost Certain (Rare, Unlikely, Possible, Likely, Almost Certain)*.
- Consequence considers bushfire risk based on impacts to life, property and environmental values and is ranked from *Insignificant to Critical (Insignificant, Minor, Moderate, Major, Critical)*.
- Based on the derived likelihood and consequence ratings, the overall risk is determined and ranked from *Low to Extreme (Low, Moderate, High, Extreme)*.

Refer to the *Policy and Procedures for Risk Assessment in DEH Fire Planning* for further information (DEH, 2008c). Risk assessment is ongoing and continually reviewed to reflect the changing landscape. The application of fire management zones, as well as the recommendations in this plan are derived from the risk assessment process.

8.3 Asset Zone (A-zone)

A-zone Description

An Asset Zone, or A-zone, as explained by DEH (2008b), aims to provide the highest level of protection to human life and property by implementing the most intensive fuel management strategies. An A-zone will mainly be used in reserve areas immediately adjacent to high value assets requiring protection from bushfires (e.g. residential areas, leased areas, public utilities, historical features, visitor areas). It is likely that the asset will also fall within the zone.

The depth of an A-zone will range from 40 to 100 metres, however under some circumstances, as described in the Policy, the depth may be reduced to less than 40 metres (DEH, 2008b). Justification for the reduction in depth must be included within this fire management plan.

The only area designated as an A-zone is located within Kellidie Bay CP. The A-zone is positioned adjacent to built assets for risk mitigation. Built assets in the plan area associated with the A-zone include residences adjoining reserves. The application of the A-zones within the reserves was derived through the risk assessment process, as these built assets were regarded as being subject to *High* to *Very High* bushfire risk. It should be noted that a large number of properties adjacent the reserve have made minimal provision for fire prevention within their property. To complement the zoning strategies employed within Kellidie Bay CP, it is recommended that adjacent landholders implement appropriate fuel reduction works on their own properties (see Section 5.1).

A-zone Objectives

-
- To provide a low fuel buffer of at least 40 m to protect life (owners, occupiers and firefighters) and property/built assets (including lease buildings, homes, historical values and neighbouring assets) from radiant heat damage, flame contact and short distance ember attack.
 - To provide a suppression advantage should a fire ignite in the zone.
 - To modify the fire intensity and provide a control line for the suppression of bushfires as safely and efficiently as possible.
 - To provide a control line for the suppression of bushfires as safely and efficiently as possible.
 - To provide access between properties and the bushland interface.

Prescriptions for Fuels in A-zones

The Overall Fuel Hazard as described within DEH (2008b), should not exceed *Moderate* for the areas designated as A-zones. There should be *Low* to *Moderate* fine fuel at ground or near surface levels and fuels should also be discontinuous. This will minimise the risk of a fire

carrying across the zone at, or close to ground level and to reduce the path for transfer of fire into adjacent property.

Fuel Management Strategies in A-zones

Slashing, mowing, selective fine fuel removal, trail or fire break construction and prescribed burning are acceptable methods of fuel management in A-zones. Fuel reduction by prescribed burning or other techniques should be undertaken, as appropriate when fuel levels exceed prescribed limits (DEH, 2008b). Within bushland in this zone, selective shrub removal, thinning and clearing of woody weeds may be possible, as part of an approved fire management plan (DEH, 2008b).

8.4 Buffer Zone (B-zone)

B-zone Description

A Buffer Zone, or B-zone, as explained within DEH (2008b), aims to provide a buffer area to assist in reducing the speed, intensity and spotting potential of a fire. This zone is usually 40 to 1000 metres wide and may apply in bushland areas in close proximity to assets requiring protection from bushfire, in the urban interface or urban fringe. It may also be used to provide strategic fuel reduction for a landscape, which would otherwise carry *High* to *Extreme* fuel hazard levels. This includes firebreaks in or around a reserve.

Fuel reduction in a B-zone is not as intensive as in an A-zone. Fuel reduction is applied to reflect the levels of bushfire incidence, fuel hazard and risk, which are assessed and documented as part of the fire management planning process.

In this plan, B-zones have not been placed along reserve boundaries where the neighbouring property is predominantly grazing/cleared land up to the boundary, nor where built assets are located more than 40 metres from the reserve boundary. In these instances, suppression activities would take place from the track or adjacent to the landholder's fuel-reduced area (e.g. grazing land). Where practical, access would be maintained on the perimeter boundary in most cases.

B-zones have been allocated to parts of all of the reserves in the plan area. Refer to Map 4 for an overview.

B-zone Objectives

- To minimise the risk to property and ecological asset losses due to bushfire.
- To assist in reducing fire intensity, ember attack and spotting that is likely to impact on the assets within the surrounding urban areas or assets within the reserves.
- To provide a suppression advantage to assist in containing bushfires within defined areas, that is to minimise the likelihood of fires entering blocks from adjacent blocks, entering the reserve from the greater landscape or exiting the reserve.
- To enhance safe access for firefighters.
- To provide strategic fuel reduction in contiguous vegetation.

Prescriptions for Fuels in B-zones

The Overall Fuel Hazard as described within DEH (2008b), should not exceed *High* for the areas designated as B-zones.

Fuel Management Strategies in B-zones

Fuel management will primarily be undertaken by prescribed burning to achieve the desired level of fuel, once the available fuels exceed the prescribed limit (DEH, 2008b).

8.5 Conservation Zone (C-zone)

C-zone Description

The Conservation zone, or C-zone, as explained within DEH (2008b), is the default zone for all areas within a reserve that are not otherwise zoned as Asset or Buffer zones. The C-zone allows for fire management activities to meet ecological and conservation management objectives.

C-zone Objectives

- 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.

Strategies for Achieving Objectives in C-zones

Fire management for areas within the C-zone should aim to meet fire management guidelines for that vegetation community, as set out in Table 2.

As per the *Policy and Procedures for Ecological Burning* (DEH, 2008a) prescribed burning for ecological management (i.e. an *Ecological Burn*) within C-zones must:

- aim to meet Ecological Fire Management Guidelines for the vegetation communities that occur within the plan 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 also 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 vegetation communities (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 EAT developed for the proposed prescribed burn. Priority should be given to burns that link existing areas of low fuel hazard (e.g. recent fires) to create strategic corridors that will assist in restricting the extent of bushfires.

8.6 Prescribed Burn Preparation

All prescribed burning (regardless of the objective, tenure or zoning) will adhere to the planning process utilising the EAT, as detailed in Figure 5 and within *the Policy and Procedures for Prescribed Burning* (DEH, 2008i). 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. Refer to Figure 5 for more information on the burn planning process.

Prescribed burns will be programmed at appropriate times of the year to achieve the desired outcomes. Most often this is during Autumn, late Spring and the early weeks of the Fire Danger Season. Prescribed burns are conducted during this period as moderate summer conditions are required to achieve an effective burn in habitats of Southern Eyre Peninsula. The perception that “cool winter burns” can be implemented is unsubstantiated by practical experience. Prescribed burns are planned to include an appropriate “window of opportunity” to implement and mop-up the burn area. This “window of opportunity” will vary based on annual conditions.

Prescribed burning lessens the impact of fire by:

- lowering the overall fuel hazard
- changing the structure, or arrangement of the fuel layers which creates a break in the fuels
- removing bark hazard which is a major cause of embers
- removing surface fuels which may sustain fires overnight.

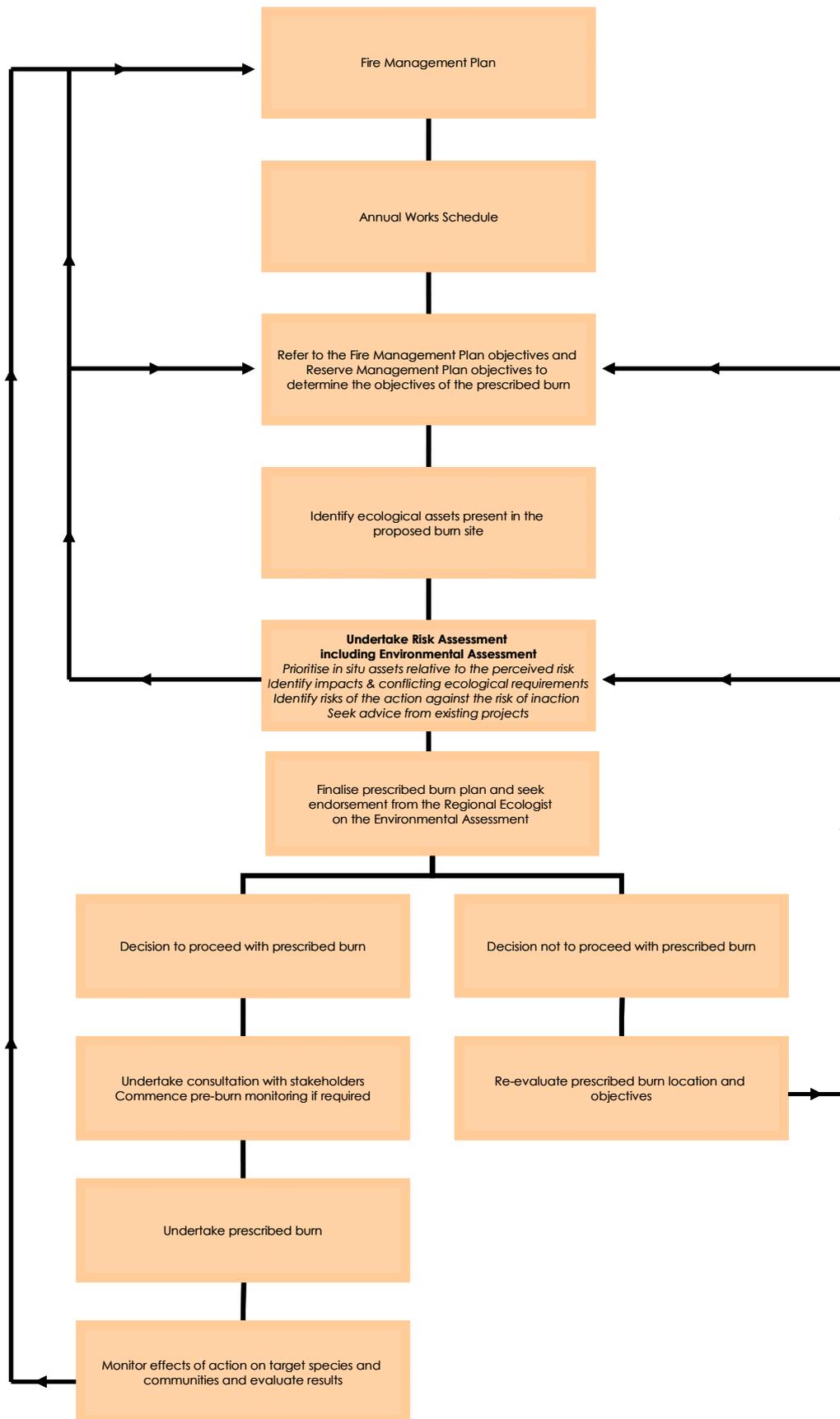


FIGURE 5 – THE BURN PLANNING PROCESS

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 Fire Management Policy and Procedures (covering all aspects of fire management).
- CFS Chief Officer Standing Orders (COSOs).
- CFS Standard Operating Procedures (SOPs).
- CFS Operations Management Guidelines (OMGs).

Strategies implemented during an incident will be determined by the Incident Management Team (IMT), taking this plan into consideration, in accordance with Section 97 of the *Fire and Emergency Services Act 2005*.

9.3 Response – Role of CFS and DEH

The CFS has overall responsibility for fire suppression activities in SA country areas (that is areas outside Metropolitan Fire Service (MFS) fire districts). Responding to a bushfire in reserves of Southern Eyre Peninsula is undertaken jointly by CFS and DEH who form the Lower Eyre Peninsula CFS Group. No reserves lie within the City of Port Lincoln MFS response area. DEH also responds to off-reserve bushfires as CFS resources, in conjunction with CFS brigades. The minimum DEH response for reserve fires or fires threatening reserves is set out in a *Response Plan for the West Region* (DEH, 2008i) and is determined according to the fire danger rating of the day. As a fire escalates DEH responds according to a staged District, Region and Statewide response.

The CFS has a role in Community Education Programs. DEH bushfire mitigation works are one part of addressing the bushfire issue, however the public has a responsibility to be prepared and Community Education Programs by CFS such as those at Tulka and Coffin Bay assist with this awareness.

SA Water and DEH have developed a *Memorandum of Understanding (MOU)* for bushfire suppression operations on SA Water managed land. This arrangement is critical in complementing fire management works undertaken on DEH reserves, particularly where they are adjacent SA Water lands.

Local CFS brigades are relied upon for fire suppression activities, particularly in the early stages of an incident. The cooperation, support and understanding between CFS, DEH brigades, MFS and the local community have been vital to successful fire suppression both on and off reserves 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 by 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.

Strategies that may be considered during bushfire suppression operations are listed below.

- During appropriate weather conditions and depending on the location, a fire may be left to burn out if it does not pose any significant threat and the risk and forecast conditions are acceptable.
- Use of aerial suppression techniques where appropriate and when conditions permit, however it should be noted that this includes appropriate use of bombers to lessen the intensity of a fire as it reaches a control line, assets or where supported by ground crews. Bombers which are not supported by ground crews are generally ineffective once a fire is established. This is because bombers are unable to completely extinguish a fire in one drop and the short period of time it takes for fuels to dry out and reignite.
- Direct attack when fire intensities are below safe/acceptable levels.
- Direct attack where weather conditions, fuel hazard and access is suitable.
- Indirect attack when conditions are unsafe for firefighters to engage in the head of the fire.
- During High to Very High fire danger days consider backburning from control lines or access tracks (taking into account specific management objectives for each block).
- 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.
 - When stood down, all vehicles are to leave the staging area in a clean state.
- The use of retardant should be restricted to critical situations, such as the protection of built assets, both within the reserve and off reserve. It is imperative that:
 - The use of retardant in catchment areas should be in accordance with the *Memorandum of Understanding on Aerial Application of Chemical Fire Retardants between SA Water and CFS (CFS, 2006)*.
 - Retardant should only be used where ground crews are available to back up. Retardants are generally not used due to costs and logistics, however where they are used it is to mitigate the impact on significant conservation values and assets.
- The use of foams should be minimised in catchment areas and creek lines.
- DEH only approve the use of United States Department of Agriculture (USDA) endorsed foams and retardants.
- Coastal/sea breezes may influence fire behaviour.

Block specific suppression information is provided within Sections 12 – 33 (Block Prescriptions).

9.4.1 Use of Control Lines During Fire Incidents

The use of control lines should be determined by the IMT, based on fire severity and weather conditions, giving due consideration to safety and strategic advantage.

Where the maintenance schedule shows that the control lines are not up to the recognised standard, they may be fuel reduced (achieve a low cover of vegetation) to a single chain width (10 m) during a fire incident by any means deemed appropriate or achievable by the IMT. Where bulldozers or graders are used, they are to be used blade up.

9.4.2 Justifications

DEH have an obligation to maximise safety for fire suppression activities. For this plan, standards for control lines are in accordance with the Policy and Procedures. Where the combination of vegetation, fuel loads and terrain is likely to reduce the effectiveness of these control lines, they may be widened, or perimeter burns may be undertaken in their immediate vicinity. This will minimise the likelihood of bushfires crossing control lines.

By utilising control lines and through the strategic use of previous fire scars and fuel patterns, the need to undertake other high impact suppression measures, such as chaining or mineral earth breaks during a running fire will be reduced.

9.5 Fire Access

Guidelines on the use of fire access tracks and fire breaks in South Australia have been approved by the Government Agencies Fire Liaison Committee (GAFLC, 2005). The guidelines include prescriptions and standards for various fire access tracks and firebreaks. They also provide guidelines for adjacent fuel management, positioning and maintenance, mapping, signage and safety. All track classifications in the plan area were recorded using GAFLC standards during the preparation of this plan. It should be noted that the track classification as shown on Map 4 (Fire Management and Access), may vary depending on what works have been completed and whether there has been any degradation of tracks since the assessment was conducted.

Gates providing access to DEH managed lands that have been audited are also presented on Map 4. Gates providing access to the reserves in the plan area were not numbered at time of writing.

Fire access points and tracks have been reviewed as part of this plan and proposed changes are outlined within Sections 12-33 (block prescriptions) and summarised in Section 34 (Recommendations). These changes are aimed 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.

Additional fire access points and tracks will only be established for the purpose of fire suppression, where provided for in planning, or where approved by the IMT in liaison with DEH staff.

9.5.1 Heavy Machinery

Use of heavy machinery will be in accordance with the *Policy and Procedure for Earthmoving Equipment* (DEH, 2008f), 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, the likelihood of success and likely positive and negative impacts on environmental and cultural values. Minimal disturbance suppression techniques and specialised equipment that reduces impacts to the landscape shall be used wherever possible (DEH, 2008f).

9.6 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 may 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 in the policy and procedure (DEH, 2008e).

9.7 Water

The DEH West Region Fire Response Plan (DEH, 2008j) provides the most current information on available utilities and facilities. The plan is updated annually.

9.8 CFS Bomber Response Zone

All reserves included in this plan fall within the lower Eyre Peninsula primary response zone for aerial suppression.

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 relevant threatened species Project Officers and/ or Recovery Teams (where they exist):

- EP Yellow-tailed Black-Cockatoo Recovery Team.

In the absence of a Recovery Team consultation will be undertaken with the appropriate DEH staff.

10.1 Monitoring

Monitoring will be established in conjunction with any prescribed burns within the plan area, in accordance with the DEH *Policy and Procedure for Prescribed Burning* (DEH, 2008i) Refer to Section 8.6 of this plan for general information on burning and the planning requirements.

It is recommended that monitoring be undertaken to:

Monitoring	37. Assess the suitability of the proposed fire interval guidelines for EP Southern Emu-wrens with expert ornithological advice;
	38. Examine the most appropriate fire regime for establishing and maintaining Sheoak Grassy Woodlands;
	39. Evaluate the suitability of the proposed Ecological Fire Management Guidelines for Peppermint Box Woodland;

10.2 Research

Currently there are two research projects being undertaken on the Eyre Peninsula:

Since 2004 DEH and Flinders University have been investigating the response of flora and fauna species to fire and fire frequency in agricultural remnants as part of a joint project. This project focuses on determining how species recover after a fire, whether this is achieved *in-situ* or whether species depend on unburnt remnants to facilitate recolonisation.

A joint project that has recently been instigated by DEH and Flinders University was set up to undertake spatial dynamic modelling using demographic, dispersal and fire response data collected for flora and fauna in order to determine optimal fire mosaics.

Any fire-related research that is proposed within the plan area should be discussed with the Senior Fire Research Scientist (Bioknowledge SA).

It is recommended that research should be undertaken to:

Research	40. 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).
	41. Determine the habitat area of EP Southern Emu-wrens within their known locations to assist with prescribed burn planning.
	42. Examine the effects of fire regime, fire intensity and fire interval on populations of the EP Yellow-tailed Black-Cockatoo, Brush-tailed Possum, Brush-tailed Bettong, EP Southern Emu-wren, Bush Stone-curlew and Western Whipbird.
	43. Research the succession of vegetation communities in Point Sir Isaac's Block as part of the Drooping Sheoak Grassy Woodland restoration project.

11 FIRE MANAGEMENT BLOCKS

11.1 Reserve and Block Information

The plan area has been divided into 22 fire management blocks to ensure that information and issues unique to a particular area have been addressed (Table 3 and Map 4). Block boundaries are also based on access and the practicalities of implementing the fire management objectives of a particular area.

Summaries of relevant information such as land use, vegetation, fuel hazard, fire risk, fire access, assets, zoning, recommended works and guidelines for suppression for each reserve are detailed in Sections 12-33 (block prescriptions). Known species and communities of conservation significance are listed in Appendices 1, 2 and 3 along with the block name and the associated vegetation community. Objectives, (in addition to those in Section 2.7) and actions that only apply to a specific block are included in the following sections.

TABLE 3 – SUMMARY OF FIRE MANAGEMENT BLOCKS

Reserve Name	Block Name	Block Size (ha)
Coffin Bay National Park	Gunyah Beach	13 145
	Lake Damascus	8 645
	Point Sir Isaac	3 775
	Whidbey	3 960
Kathai Conservation Park	Kathai	81
Kellidie Bay Conservation Park	Kellidie Bay North	638
	Kellidie Bay South	817
	Kellidie Bay West	330
Lincoln Conservation Park	Lincoln	1 050
Lincoln National Park	Curta Rocks	1 795
	Donington	1 248
	Islands	540
	Memory Cove	8 259
	Miller's Hole	7 244
	Stamford	9 242
	Wanna	1 730
Memory Cove Wilderness Protection Area	Curta Rocks	1 794
	Islands	540
	Memory Cove	8 259
Crown land reserves dedicated to the Minister for Environment and Conservation (Sections 97, 98 and 564 Hundred of Lincoln)	Proper Bay	321
Mount Dutton Bay Conservation Park	Islands	540
Murrunatta Conservation Park	Murrunatta	423
	Murrunatta Swamp	92

Reserve Name	Block Name	Block Size (ha)
Sleaford Mere Conservation Park	Miller's Hole	7 244
Tucknott Scrub Conservation Park	Tucknott Scrub	363
Vanilla Conservation Park	Vanilla	283
Vanilla Land Settlement Conservation Park	Vanilla Land Settlement	16

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.

- The 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 (orchards, vineyards and 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) provides a snap shot in time of the fire history for the plan area.

- The last fire scar is shown by year.

Map 4 (Fire Management and Access) shows the plan area in terms of the management strategies presented in Sections 11 - 33 (block prescriptions).

- Proposed zoning is displayed in a context of fire management block boundaries.
- 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.

12 MILLER'S HOLE BLOCK

Tenure, Size and Land use

Lincoln NP and Sleaford Mere CP (7 244 ha). The Uley basin aquifer underlies this block; SA Water manages the conservation and utilisation of groundwater supplies under an ongoing agreement.

Vegetation

MVS No. 26, 27, 29, 32, 33, 36, 38, 39, 49

Typically *Eucalyptus* mallee heath and open woodlands (regenerating post 2001 fire) and shrublands (MVS No. 27 and 29). *Allocasuarina* forest and woodland (MVS No. 26). The immediate fringe of Sleaford Mere is characteristically mixed chenopod and samphire (MVS No. 39).

Fire History

Approximately 75% of this block burnt during the Tulka fire of 2001.

Fuel Hazard

Regrowth since the 2001 Tulka fire is vigorous and diverse. The overall fuel hazard is generally *Very High*; this is consistent across the block for areas burnt during the Tulka fire and mature unburnt areas. The significant difference between burnt and unburnt sites is the lack of surface fine fuels (leaf litter and fine dead material) and bark hazard present in the burnt area.

Coastal heath makes up less than 10% of the block area. Fuel loads in coastal heath are *Low* at burnt sites and *High* at long unburnt sites. Shrubland to a height of 1 m in the dune areas are generally a *Moderate* fuel hazard.

Natural Values

Fauna and flora of conservation significance recorded from the area include: Western Three-lined Skink (*Bassiana trilineata*), Hooded Plover (*Thinornis rubricollis*), EP Southern Emu-wren (*Stipiturus malachurus parimeda*), Musk Duck (*Biziura lobata*), Fairy Tern (*Sterna nereis*), Limestone Leek-orchid (*Prasophyllum calcicola*), Port Lincoln Mallee (*Eucalyptus conglobata* ssp. *conglobata*), Rock Parrot (*Neophema chrysostoma*), Heath Goanna (*Varanus rosenbergii*) and Annual Candles (*Stackhousia annua*).

This block contains the State Endangered Cutting Grass (*Gahnia trifida*) sedgeland community in Sleaford Mere CP, critical habitat for the EP Southern Emu-wren.

Heritage Values

Tulka homestead ruins, sheep yards and dip.

Built Assets

SA Water pipeline and infrastructure including water tanks and minor infrastructure. Residential housing on the south-west shoreline of Sleaford Mere. Tulka 'shack site' residences north of the Lincoln NP entrance.

Fire Risk

The likelihood of a fire starting due to lightning strike or human-caused ignitions in this block is considered *Low to Moderate*. Historically there has been a low occurrence of human caused fires, however this does not necessarily reflect the potential for ignition on roads and at popular recreation sites. Several expiation notices are issued annually to reserve users who contravene fire regulations.

In recently burnt areas (less than 10 years), fires during high fire danger conditions are likely to carry with the wind until conditions abate, but are then likely to burn out due to low surface fuels. Fires in older age habitats are likely to be sustained overnight due to high surface fuel loads.

Fire Access (GAFLC classifications refer to Map 4)

Major	Park Entrance Road, Wanna Road, Sleaford Bay Road,
Standard	Sleaford Mere N Track
Minor	Jussieu Peninsula Neck Track, Investigator Trail – Wanna Road to Sleaford Bay.

Proposed Zoning (refer to Map 4)

- C-zone
- B-zone (1 000 m minimum) to reduce the likelihood of fire moving through the landscape.

Specific Management Objectives for Miller's Hole Block

- Maintain a fuel reduced buffer zone at the neck of the Jussieu Peninsula to limit the spread of fire into or out of the reserve.
- Manage the block area using prescribed burning to limit the extent of naturally occurring fires and maintain or improve conservation values.
- Conserve the EP Southern Emu-wren population as a high priority.

Recommendations

- Limit the spread of bushfire into or from the reserve by prescribed burning between the reserve entrance road and Sleaford Bay dunes. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that TPC1 is not compromised. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic of time since last fire so that conservation values are maintained.
- Upgrade the Jussieu Peninsula Neck Track to a Standard Track.
- Maintain the Sleaford Mere N Track as a Standard Track.
- Reduce the likelihood of more than 50% of EP Southern Emu-wren habitat burning in a single fire event.
- Prescribed burning adjacent EP Southern Emu-wren habitat to reduce the likelihood of fire impacting the habitat. Use prescribed burning to maintain the ecological integrity of EP Southern Emu-wren habitat.
- Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure.

Suppression Considerations

- Use minimum impact suppression techniques in EP Southern Emu-wren habitat.

13 WANNA BLOCK

Tenure, Size and Land use

Lincoln NP (1 730 ha).

Vegetation

MVS No. 26, 27, 29, 32, 33, 36, 39, 49

The north-east section of this block supports temperate tussock grasslands (MVS No. 36). The south-west section consists of coastal shrublands, *Allocasuarina* forest and woodlands and mallee heath. Low lying areas are characteristically mixed chenopod and samphire (MVS No. 39).

Fire History

In December 1980 a campfire in the Wanna Flat area burnt approximately 30 ha of the block.

Fuel Hazard

The overall fuel hazard is variable across the block. The open grasslands are generally a *Low* overall fuel hazard due to grazing by Kangaroos. The mature Drooping Sheoak woodland is typically a *High* overall fuel hazard.

Note: Kangaroo control may be required post-fire to ensure successful regeneration of vegetation.

Natural Values

Fauna and flora of conservation significance recorded from the area include: Alcock's Wattle (*Acacia alcockii*), Western Three-lined Skink, Bush Stone-curlew, White-bellied Sea-eagle (*Haliaeetus leucogaster*), Osprey (*Pandion haliaetus*), Rock Parrot, Plains-wanderer (*Pedionomus torquatus*), Bight Coast-skink (*Pseudemoia baudini*), Heath Goanna (*Varanus rosenbergi*), Diamond Firetail and Western Whipbird. This block contains a record for the Plains-wanderer, listed as Vulnerable under the EPBC Act and Vulnerable in South Australia. This is a vagrant sighting. This block contains the regionally significant Drooping Sheoak woodland community on coastal sandy plains.

Built Assets

None

Fire Risk

The likelihood of fire starting from natural causes has been assessed as *Low*. Historically there has been a low occurrence of human caused fires, however this does not necessarily reflect the potential for ignition – as the area receives a high number of visitors. Several expiation notices are issued annually to reserve users who contravene fire regulations.

Fire Access (GAFLC classifications refer to Map 4)

Major	Wanna Road
Standard	Memory Cove Road
Minor	Memory Cove Gate to Curta Rocks Track, Curta Rocks to Wanna Track.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Wanna Block

- Manage the block using prescribed burning to limit the extent of naturally occurring bushfires and maintain or improve conservation values.

Recommendations

- Protect remnant Drooping Sheoak woodland habitat as a priority objective during fire suppression.
- Aim to manage within the Ecological Fire Management Guidelines proposed for the remnant community as described within Appendix 3.
- Minimise the likelihood of fire impacting upon the remnant Drooping Sheoak woodland community through:
 - high intensity fuel load reduction adjacent the community
 - low intensity fuel reduction within the community
 - Restricting the extent of Drooping Sheoak woodland burnt by bushfire to less than 50% of the habitat area in the block, where it is possible.
- Reduce the likelihood of coastal heath being burnt by bushfire to less than 50% of the habitat area in the block.
- This area has no recorded fire history. Undertake ecological burning to increase heterogeneity, particularly in MVS No. 32 (*Leucopogon* and *Acrotriche* shrublands) communities in the southern section of the block.
- Upgrade Memory Cove Gate to Curta Rocks Track to a Minor Track.

Suppression Considerations

- Use minimum impact suppression techniques to extinguish the fire edge (primarily wet lines, burning from control lines, rake hoe control lines and A-frame) or burn out fuels from existing control lines.
- A Drooping Sheoak monitoring site is located at Grid Reference (GR) 818 371. Damage by heavy machinery should be avoided.

14 CURTA ROCKS BLOCK

Tenure, Size & Land use

Lincoln NP and Memory Cove WPA (1 795 ha).

Vegetation

MVS No. 26, 27, 29, 32

The predominant vegetation association of this block is sand dune shrubland to a height of less than 1 m (MVS No. 32). Small areas of mallee heath, mallee with hummock grass, coastal shrublands and *Allocasuarina* forest and woodlands also occur within the block (MVS No. 26, 27, 29 and 32).

Fire History

In April 1981 a large fire burnt approximately 3 500 ha of the Memory Cove Block with approximately 100 ha of the east side of the Curta Rocks Block burning during this fire event.

Fuel Hazard

The overall fuel hazard is variable across the block. The dune slopes are *Moderate* with discontinuous fuels while the dune swales are dense supporting an *Extreme* overall fuel hazard. The limited areas of mature Drooping Sheoak woodland and coastal heath are typically a *High* overall fuel hazard.

Natural Values

Fauna and flora of conservation significance recorded from the area include EP Southern Emu-wren, White-bellied Sea-eagle, Osprey, Western Three-lined Skink, Bush Stone-curlew, Western Whipbird, Rock Parrot, Heath Goanna, Plains-wanderer and Annual Candles.

This block contains the regionally significant Drooping Sheoak woodland community on coastal sandy plains.

Built Assets

None

Fire Risk

The potential for ignition in this block is *Low*.

Fire Access (GAFLC classifications refer to Map 4)

Standard Memory Cove Road.

Minor Memory Cove Gate to Curta Rocks Track.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Curta Rocks Block

- Manage the block area using prescribed burning to limit the extent of naturally occurring fires and maintain or improve conservation values.
- Manage fire in the Memory Cove WPA section of the block consistent with the DEH *Policy and Procedure for Wilderness Fire Management* (DEH, 2008k) and the *South Australian Code of Practice for Wilderness Protection Areas and Zones* (DEH, 2004a).

Recommendations

- Upgrade Memory Cove Gate to Curta Rocks Track to a Minor Track.
- Minimise the likelihood of more than 50% of coastal heath burning in a single fire event to conserve an important association for diverse fauna.
- Minimise the likelihood of more than 50% of Drooping Sheoak woodland burning in a single fire event to conserve a significant habitat.
- Minimise the likelihood of more than 50% of EP Southern Emu-wren habitat burning in a single fire event.
- Prescribed burn adjacent EP Southern Emu-wren habitat to reduce the likelihood of spread of fire into the habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.
- This area has no recorded fire history. Undertake ecological burning to increase heterogeneity, particularly in MVS No. 32 (*Leucopogon* and *Acrotriche* shrublands) communities in the southern section of the block.
- Minimum Impact Suppression Techniques (MIST) should be used in accordance with the South Australian Code of Practice for Wilderness Protection Areas and Zones (2004a) for fires in the WPA areas of the block.

Suppression Considerations

- Steep sand dunes prevent safe access to the block by heavy machinery.
- Dense dune swale vegetation may hinder access by ground crews and present a tripping / falling hazard.
- Minimum impact suppression techniques should be used in accordance with the SA Code of Practice for Wilderness Protection Areas and Zones (DEH, 2004a). For example, use MIST (techniques) to extinguish the fire edge (primarily wet lines, burning from control lines, rake hoe control lines and A-frame) or burn out fuels from existing control lines.
- A Drooping Sheoak monitoring site is located at GR 851 348. Damage by heavy machinery should be avoided.

15 MEMORY COVE BLOCK

Tenure, Size and Land use

Memory Cove WPA and Lincoln NP (8 259 ha).

Vegetation

MVS No. 26, 27, 29, 32, 39, 49

The dominant vegetation of this block is *Eucalyptus* mallee woodland, mallee with hummock grass, heath and shrublands with coastal shrubland to a height of less than 1 m. Areas of *Allocasuarina* forest and woodland occur adjacent the Curta Rocks Block (MVS No. 26).

Fire History

The northern boundary of this block was burnt in 1967 and in April 1986 an intense fire burnt from Shag Cove to Memory Cove.

Fuel Hazard

Since the 1986 fire the vegetation has regenerated to a mature habitat with a corresponding *Very High* to *Extreme* fuel load. Coastal shrubland fuel loads vary but are generally a *Moderate* overall fuel hazard.

Natural Values

This is an area of magnificent coastal scenery with relatively high wilderness qualities. The south coast of this block contains an 'important population area' for the EP Southern Emu-wren (Pickett, 2005). Fauna and flora of conservation significance recorded from the area include: EP Southern Emu-Wren, Malleefowl, Heath Goanna, Western Three Lined Skink, Western Whipbird, Bush Stone-curlew, White-bellied Sea-Eagle, Osprey, Port Lincoln Mallee, Alcock's Wattle, Western Daddy-long-legs (*Caladenia bicalliata* ssp. *bicalliata*), Hidden Leek-orchid (*Prasophyllum occultans*) and Annual Candles. This block also contains old growth mallee, which is potential habitat for the Brushtail Possum.

Built Assets

Camping area, minor infrastructure.

Fire Risk

The likelihood of a fire starting in this block is *Low*.

Fire Access (GAFLC classifications refer to Map 4)

Major Memory Cove Road.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Memory Cove Block

- Early response to and management of visitor safety by SAPOL.
- Manage the block area using prescribed burning to limit the area of naturally occurring fires, maintain or improve conservation values and maintain a diversity of habitat age classes. Manage habitat age classes with a bias toward old growth mallee to conserve an important habitat for diverse fauna.

- Manage fire in the Memory Cove WPA section of the block consistent with DEH Policy and Procedure for Wilderness Fire Management (DEH, 2008k) and the South Australian Code of Practice for Wilderness Protection Areas and Zones (DEH, 2004a).
- Maintain the Wilderness values of the area.
- Conserve EP Southern Emu-wren and Malleefowl populations as a high priority.

Recommendations

- Create an area of reduced fuel hazard by prescribed burning between the Pillie Hut to Taylor's Landing area and the Memory Cove Road to Shag Cove area. This should aid to minimise the likelihood of fire moving through the block from the north. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the area to create a mosaic so that conservation values are maintained.
- Minimise the extent of coastal heath burnt by bushfire to less than 50% of the habitat in the block to conserve an important association for diverse fauna.
- Where possible minimise the extent of EP Southern Emu-wren habitat burnt during bushfire to less than 50% of the habitat.
- Undertake ecological burning to increase heterogeneity in the block by burning approximately 25% of MVS No. 29 (*Eucalyptus* mallee woodland and shrubland) east of the Memory Cove Road and MVS No. 32 (Ridge-fruited Mallee (*Eucalyptus angulosa*) and Port Lincoln Mallee woodland) in the south.
- Prescribed burn adjacent EP Southern Emu-wren habitat to limit the spread of fire into the habitat. Use prescribed burning to maintain the ecological integrity of EP Southern Emu-wren habitat.
- Minimum impact suppression techniques should be used in accordance with the SA Code of Practice for Wilderness Protection Areas and Zones (DEH, 2004a).
- Realign the dangerous corner located half way along the Memory Cove Road.

Suppression Considerations

- Minimum impact suppression techniques should be used in accordance with the SA Code of Practice for Wilderness Protection Areas and Zones (DEH, 2004a). For example, use MIST (techniques) to extinguish the fire edge (primarily wet lines, burning from control lines, rake hoe control lines and A-frame) or burn out fuels from existing control lines.
- Steep, rough terrain on the north side of this block will prevent safe access by heavy machinery.
- There is no fire water within Memory Cove Block. The nearest water supply is from the SA Water pipeline on the Wanna Road or at the Wanna bore tank.
- A Drooping Sheoak monitoring site is located at GR 859 313. Damage by heavy machinery should be avoided.

16 STAMFORD BLOCK

Tenure, Size and Land use

Lincoln NP (9 242 ha).

Vegetation

MVS No. 21, 26, 27, 29, 31, 32, 33, 38, 39, 49

This block is dominated by mallee woodland, mallee with hummock grass, heath and shrublands interspersed with *Acacia* tall open shrublands (MVS No. 21), *Melaleuca* shrublands (MVS No. 49) and occasional areas of *Allocasuarina* forest and woodland (MVS No. 26). The Pillie Lake area includes wet tussock grassland, herbland and sedgeland (MVS No. 38). A small woodland of *Callitris* is located in the Spalding Cove area.

Fire History

In November 1967 approximately 75% of the block burnt. In February 2001 approximately 60% of the block burnt and in 1997 a garbage bag 'hot air balloon' caused a small fire of less than 2 ha in the Woodcutter's area.

Fuel Hazard

Overall fuel hazard is variable across the block area. Habitats on surface outcropping limestone burnt during the Tulka fire are generally a *Moderate* overall fuel hazard. Habitats in better developed soil profiles and mature long unburnt habitats are generally *Very High* overall fuel hazard. The low shrubland habitat on Stamford Hill is a *Moderate* overall fuel hazard.

Natural Values

Fauna and flora of conservation significance recorded from the area include: Eastern Reef Egret (*Egretta sacra*), Southern Emu-wren, Rock Parrot, Hooded Plover, White-bellied Sea-eagle, Osprey, Diamond Firetail, Shining Bronze-Cuckoo (*Chrysococcyx lucidus*), Bush Stone-curlew, Malleefowl, Brush-tailed Bettong (reintroduced population), Fairy Tern, Blue-breasted Fairy-wren (*Malurus pulcherrimus*), Western Whipbird, Heath Goanna, Alcock's Wattle, Hop-bush Wattle (*Acacia dodonaeifolia*), Port Lincoln Ray-flower (*Anthocercis anisantha* ssp. *anisantha*), Western Daddy-long-legs, Port Lincoln Mallee, Sticky Haeckeria (*Haeckeria punctulata*), Creeping Boobialla (*Myoporum parvifolium*), Scaly Poa (*Poa fax*), Limestone Leek-orchid, Hidden Leek-orchid, Silvery Spyridium (*Spyridium leucopogon*), Annual Candles, *Halosarcia lepidosperma* and *Lobelia heterophylla*.

This block contains old growth mallee, which is potential habitat for the Brushtail Possum.

Built Assets

Flinders Monument, campsite infrastructure, minor infrastructure

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically there has been a low incidence of human caused fires, however this does not necessarily reflect the potential for ignition – as the area receives a high number of visitors. Several expiation notices are issued annually to reserve users who contravene fire regulations.

Fire Access (GAFLC classifications refer to Map 4)

Major Entrance Road, Stamford Hill Road, Surfleet Point Road.
Minor Spalding Cove Track, Woodcutter's Track.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Stamford Hill Block

- Early response to and management of visitor safety by SAPOL.
- Manage the block area using prescribed burning to limit the area of naturally occurring fires, maintain or improve conservation values and maintain a diversity of habitat age classes. Manage habitat age classes with a bias toward old growth mallee to conserve an important habitat for diverse fauna.
- Conserve EP Southern Emu-wren and Malleefowl populations as a high priority.

Recommendations

- Where possible limit the amount of EP Southern Emu-wren habitat burnt during bushfire to less than 50% of the habitat area.
- Prescribed burn adjacent EP Southern Emu-wren habitat to limit the spread of fire into the habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.
- Create a reduced fuel hazard area by prescribed burning between the MacLaren Point Track and Taylor's Landing Track to limit the spread of fire into or from the Donington Peninsula. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic of habitat age classes so that conservation values are maintained.
- Undertake ecological burning in the block to increase heterogeneity in MVS No. 29 (*Eucalyptus* mallee woodland and shrubland) communities in the east and north-east.
- Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure.

Suppression Considerations

- Steep, rough terrain on Stamford Hill will prevent safe access by heavy machinery. Avoid the construction of control lines on the slopes of Stamford Hill.

17 DONINGTON BLOCK

Tenure, Size and Land use

Lincoln NP (1 248 ha).

Vegetation

MVS No. 29, 32, 49

This block supports mallee woodland, heath and shrubland as well as *Melaleuca* shrublands and open shrublands. Approximately 75% of this block was cleared for farming. The block contains areas of open grassland, regenerating mallee woodland and natural mallee woodland. A small area of Drooping Sheoak woodland exists on the tip of the Donington Peninsula, adjacent Donington Cottage.

Fire History

In 1997 a lightning strike caused fire adjacent engine point burnt an area of less than 1 ha. In 1967 a large fire occurred south of Fisherman's Point burning approximately 25% of the block.

Fuel Hazard

The overall fuel hazard is generally *High*, which is consistent across the block area for natural areas as well as those which were cleared by chaining but have regenerated. Fuels in the open grasslands are typically *Low* due to kangaroo grazing pressure. Previous land use has altered the landscape and fuel loads within this block.

Natural Values

Fauna and flora of conservation significance recorded from the area include Malleefowl, Brush-tailed Bettong (reintroduced population), Rock Parrot, White-bellied Sea-eagle, Osprey, Bush Stone-curlew, EP Southern Emu-wren, Western Whipbird, Brush-tailed Bettong (reintroduced population), Alcock's Wattle and Port Lincoln Mallee. This block contains the regionally significant Drooping Sheoak woodland community on coastal sandy plains.

Built Assets

Powerline, Donington Cottage, Lighthouse, camping areas and minor infrastructure.

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically there has been a low incidence of human caused fires, however this does not necessarily reflect the potential for ignition – as the area receives a high number of visitors. Several expiation notices are issued annually to reserve users who contravene fire regulations.

Fire Access (GAFLC classifications refer to Map 4)

Major	Donington Road, September Beach Road.
Minor	Powerline Track
Service	Carcase Rock Track, The Granites Track, MacLaren Point Track.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Donington Block

- Early response to and management of visitor safety by SAPOL.
- Manage the block area using prescribed burning to limit the extent of naturally occurring fires, maintain or improve conservation values and maintain a diversity of habitat age classes. Manage habitat age classes with a bias toward old growth Mallee to conserve an important habitat for diverse fauna.

Recommendations

- Identify the protection of Donington Cottage and Lighthouse assets as a priority objective during fire suppression.
- Investigate the use of prescribed burning as part of an integrated weed management strategy for introduced species including South African Daisy.
- Reform Carcase Rock Track surface near coast. Construct adequate surface drains to divert water from the track.
- Upgrade Carcase Rock, The Granites and MacLaren Point Tracks to Minor Tracks.

Suppression Considerations

Due to the narrow peninsula landform, vegetation types and significant old growth mallee habitat, use ground crews to minimise suppression impacts.

18 ISLANDS BLOCK

Tenure, Size and Land Use

Thirty islands or groups of islands (540 ha) incorporated into the following DEH reserves.

- Coffin Bay NP – Yangie Island.
- Lincoln NP – Owen, Albatross, Liguanea, Rabbit, Donington and Bicker Islands, Carcase, Horse and Curta Rocks, and Wanna Stacks.
- Memory Cove WPA – Hopkins, Lewis, Little, Smith and Williams Islands.
- Mount Dutton Bay CP – Rabbit and Goat Islands, The Brothers and six other unnamed islands in Mount Dutton Bay.

Note that Avoid Bay Islands and Whidbey Isles Conservation Parks are not included because it was identified within the plan of management that a fire management plan would not be required (DEH, 2006b). Also there are five islands surrounding the reserves in the plan area that are not part of the protected area system. These are Boston, Grantham, Taylor, Grindall and Thistle Islands.

Vegetation

MVS No. 31, 32, 37, 39

Vegetation occurring on the various islands depends upon the degree of exposure to prevailing winds and subsequent level of salt tolerance (DEH, 2004b). Inshore islands, such as those comprising Mt Dutton Bay CP are dominated by Nitre Bush (*Nitraria billardierei*) and the introduced African Boxthorn (*Lycium ferocissimum*). Offshore islands support a variety of heathland and grassland vegetation, depending on the size and topography of the island. Nitre Bush, Cushion Bush (*Leucophyta brownii*) and Coast Tussock-grass (*Poa poiformis*) are prevalent on most islands. Other species include Marsh Saltbush (*Atriplex paludosa*), Salt Bluebush (*Maireana oppositifolia*), Coast Saltbush (*Atriplex cinerea*) and Austral Storks Bill (*Pelargonium australe*). Of the group of islands associated with Lincoln NP, none are large enough to have developed vegetation different to that found on the mainland coastline (DEH, 2004c).

Fire History

The fire history of the islands allocated to this block is unknown.

Fuel Hazards

On-ground fuel sampling was not carried out during the planning process. Likely maximum overall fuel hazards for MVS are included in Table 2.

Natural Values

Most islands support breeding populations of seabirds such as Osprey and White-bellied Sea-eagle as well as marine mammals. Colonies of the Australian Sea-lion (*Neophoca cinerea*) and New Zealand Fur-seal (*Arctocephalus forsteri*) occur on many of these islands. Other rated species occurring on the islands include Rock Parrot, Cape Barren Goose (*Cereopsis novaehollandiae*), Fleishy-footed Shearwater (*Puffinus carneipes*), Hooded Plover, Eastern Reef Egret, Fairy Tern, Long-legged Slider (*Lerista microtis*) and Alcock's Wattle. Other regionally significant colonies of Crested and Caspian Terns (*Sterna bergii* and *S. caspia*, respectively) occur on the off-shore islands.

Built Assets

On Williams Island there is a beacon on 0.3 ha of land owned by the Australian Maritime Safety Authority.

Fire Risk

The risk of fire on offshore islands is *Low*.

Fire Access

There are no fire access tracks on any of the islands included in this block.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Islands Block

- Where possible manage fire to ensure the maintenance of biodiversity and the protection of natural and cultural values.

Recommendations

- If a need is identified, prescribed burning for ecological or protection purposes should be addressed via the DEH Prescribed Burn Plan and Environmental Assessment process.

Suppression Considerations

- Given the relative remoteness and logistical problems associated with fighting fires in these locations it is likely that most fires will burn out naturally.
- Any response to limit the impact of fire on offshore islands will be determined after consideration of the potential impact, prevailing weather conditions, access and resources.

19 LINCOLN BLOCK

Tenure, Size and Land use

Lincoln CP (1 050 ha).

Vegetation

MVS No. 26, 29, 32

This block supports *Eucalyptus* mallee woodlands and heath (MVS No. 29) mixed with *Allocasuarina* woodlands (MVS No. 26) and some shrublands (MVS No. 32). A small area of the mallee woodland in the southeast corner is regenerating post-fire.

Fire History

In 2001 a small area in the south-east corner was burnt in the Tulka fire.

Fuel Hazard

This block is predominantly long unburnt mallee woodland. Due to the structure and accumulation of surface fine fuels and bark hazard over time the overall fuel hazard is generally *Very High*.

Natural Values

Fauna and flora of conservation significance recorded from the area include Inland Green-comb Spider-orchid (*Caladenia tensa*), *Thysanotus nudicaulis*, Snowdrop Spurge (*Phyllanthus calycinus*), Self-pollinating Leek-orchid (*Prasophyllum fecundum*), Leafless Globe-pea (*Sphaerolobium minus*), Trailing Nancy (*Wurmbea decumbens*), Tate's Grass-tree (*Xanthorrhoea semiplana* ssp. *tateana*), West Coast Mintbush, Shining Bronze-Cuckoo, Koala (*Phascolarctos cinereus*) (introduced) and Blue-breasted Fairy-wren.

This block contains the regionally significant Drooping Sheoak woodland community on coastal sandy plains.

This block has a large number of opportunistic weed species including large South African Daisy, Polygala and Aleppo Pine infestations.

This area is also potential habitat for the EP Yellow-tailed Black-Cockatoo, Bush Stone-curlew and Heath Goanna. The reserve is currently being surveyed for populations of Western Whipbird.

Built Assets

Graphite Mine adjacent western boundary of the reserve

Fire Risk

The likelihood of a fire starting due to lightning strike or human caused ignitions in this block is *Moderate*. Historically fires have occurred on the Southern Eyre Peninsula at regular intervals burning large areas between the Uley Basin and Memory Cove.

Fire Access (GAFLC classifications refer to Map 4)

Major	Graphite Road, SA Water Pipeline Track, Proper Bay Road.
Standard	Tramway Track
Minor	western boundary fire break, northern boundary fire break.

Proposed Zoning (refer to map 4)

- C-zone.

Specific Management Objectives for Lincoln Block

- Manage the block area using prescribed burning to limit the area of naturally occurring fires and maintain or improve conservation values.
- Work cooperatively with SA Water to ensure that a fuel reduced area exists in the area formed by Lincoln CP and SA water Lincoln Basin land to reduce the risk of bushfire impacting Tulka.

Recommendations

- Investigate the use of prescribed burning as a method of weed control for threatening species including Polygala and Aleppo pine.
- Create a reduced fuel hazard west of Tulka by prescribed burning in the Lincoln CP and SA Water Lincoln Basin area. Manage the area so that a reduced fuel hazard exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic to maintain conservation values.
- Where possible limit the extent of Drooping Sheoak woodland burnt by bushfire to < 50% of the habitat area in the block.
- Limit the spread of fire into, and impact on remnant Drooping Sheoak woodland habitat via low-intensity fuel reduction within this habitat type. Manage fuel load reduction with regard for habitat vital attributes.
- Increase heterogeneity in the block by ecological burning approximately 25% of MVS No. 29 (*Eucalyptus mallee* woodland and shrubland) in the north and east.

Suppression Considerations

- The experience of the Tulka fire indicates that unless the fire perimeter can be blocked out under abating conditions it is more effective to burn out a larger area using established control lines.
- Steep drop offs next to the Tramway Track should be identified as a hazard for fire crews.

20 PROPER BAY BLOCK

Tenure, Size and Land use

Crown land reserves dedicated to the Minister for Environment and Conservation, Sections 97, 98 and 564: Hundred of Lincoln (319 ha).

Vegetation

MVS No. 9, 29

This block is dominated by *Eucalyptus* mallee heath and shrublands (MVS No. 29) with a small area of *Eucalyptus* woodlands (MVS No. 9).

Fire History

An area immediately southwest of this block was burnt during the 2001 Tulka fire.

Fuel Hazard

This block is characterised by long unburnt mallee woodland. Due to the structure and accumulation of surface fine fuels and bark fuel hazard over time the overall fuel hazard is *Very High to Extreme*.

The adjacent District Council of Lower Eyre Peninsula quarry is used as a dumping site for vegetation.

Natural Values

Fauna and flora of conservation significance recorded from the area include: Port Lincoln Mallee, Spoon-leaved *Spyridium* (*Spyridium spathulatum*), Leafless Globe-pea, Painted Button-quail (*Turnix varia*) and Blue-breasted Fairy-wren.

Built Assets

SA Water pumping station, infrastructure and pipelines.

Fire Risk

The likelihood of a fire starting due to lightning strike or human-caused ignitions in this block is *Moderate*. Historically, fires have occurred in the area at regular intervals, burning large areas between Uley Basin and Memory Cove.

Fire Access (GAFLC classifications refer to Map 4)

Major Proper Bay Road, SA Water pipeline road, Lincoln Basin access road.

Proposed Zoning (refer to Map 4)

- C-zone.
- B-zone (100 m minimum) along the two Major Tracks that dissect the block to reduce the likelihood of fire burning the block in its entirety during a single fire event; and to limit the spread of fire across the landscape.

Specific Management Objectives for Proper Bay Block

- Manage the block area using prescribed burning to limit the area of naturally occurring fires and maintain or improve conservation values.

- Create a reduced fuel hazard area by prescribed burning in the block to limit the spread of fire into or from the reserve. Manage the area so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic to maintain conservation values.
- Work cooperatively with the District Council of Lower Eyre Peninsula to maintain a buffer zone across land tenures adjacent the Lincoln Basin entrance road.

Recommendations

- Maintain the Lincoln Basin entrance road as a Major Track with a 15 m break.
- Maintain fuel reduced B-zones adjacent Major Tracks to limit the spread of fire into or out of DEH managed land.
- Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure.

Suppression Considerations

- The experience of the Tulka fire indicates that unless the fire perimeter can be blacked out under abating conditions it is more effective to burn out a larger area using established control lines.

21 KATHAI BLOCK

Tenure, Size and Land use

Kathai CP (81 ha).

Vegetation

MVS No. 29

Eucalyptus mallee woodlands.

Fire History

The northern area of Kathai block was burnt in 1958. A prescribed burn for asset protection of approximately 9 ha was implemented adjacent the northern boundary in 2004. In 2009 the north and eastern sections of the reserve burnt as part of a 231 ha fire that impacted the Port Lincoln township and surrounds.

Fuel Hazard

This block is characterised by long unburnt mallee woodland. Excepting the prescribed burn area of 2004 the structure and accumulation of surface fine fuels and bark fuel hazard over time has resulted in a *Very High* to *Extreme* overall fuel hazard.

Natural Values

Fauna and flora of conservation significance recorded from the area include Port Lincoln Mallee, Painted Button-quail, Hop-bush Wattle and Spoon-leaved Spyridium. EP Yellow-tailed Black-Cockatoos have been observed in the area since the Wangary fire. At the time of writing Kathai CP was currently being surveyed for Western Whipbird. The regionally rare Purple-flowered Mallee (*Eucalyptus albopurpurea*) +/- Coastal White Mallee (*E. diversifolia*) open Mallee forest community occurs in Kathai CP.

Built Assets

Radio Tower, SA Water tanks, ETSA powerline runs through Kathai Conservation Park

Fire Risk

The likelihood of a fire starting due to lightning strike in this block is *Low* to *Moderate*. Historically, human caused ignitions in the region are low, however this does not necessarily reflect the risk posed in this area by high visitor use. Fires that occur in Kathai CP pose a high risk to adjacent rural living areas and commercial businesses and residential housing to the west.

Fire Access (GAFLC classifications refer to Map 4)

Major Kathai Road, Bluefin Road, SA Water pipeline road.
Minor Nil

Proposed Zoning (refer to Map 4)

- B-zone (100 m minimum) to reduce the likelihood of fire moving through the landscape.
- C-zone

Specific Management Objectives for Kathai Block

- Maintain a B-zone on the north side of the reserve to assist in limiting the spread of fire through the area.
- Manage the block area using prescribed burning to limit the extent of naturally occurring fires and maintain or improve conservation values.
- Investigate strategic prescribed burning opportunities on neighbouring private land via the DBPC.

Recommendations

- Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure (water tanks, radio shed and tower).
- Maintain a reduced fuel hazard area by prescribed burning in the block to limit the spread of fire into or from the reserve. Manage the area so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic so that conservation values are maintained.
- Maintain a 15 m wide firebreak (including the road surface) on the north side of the reserve, adjacent Blue Fin Road.
- Encourage landscape fire management in the area by identifying prescribed burning issues and opportunities via the DBPC. Encourage neighbours to consider fuel reduction via the DBPC.

Suppression Considerations

- Aboriginal heritage sites occur in Kathai CP. The use of heavy machinery should be avoided in the reserve.
- Steep, rough terrain on Northside Hill will prevent safe access by heavy machinery. Where possible, avoid the construction of control lines on the slopes of Northside Hill.
- Suppression should focus on blacking out the fire edge when conditions abate or burning out a larger area using established control lines.
- Early warning should be provided to adjacent residents if fire occurs in the block.

22 KELLIDIE BAY NORTH BLOCK

Tenure, Size and Land use

Kellidie Bay CP (638 ha).

Vegetation

MVS No. 9, 26, 29, 32, 36, 38, 39, 49

Swamp Paperbark (*Melaleuca halmaturorum*) shrublands dominate this block with patches of *Eucalyptus* woodlands, Drooping Sheoak forests and woodlands and shrubland. Low lying areas are typically mixed chenopod and samphire. Aleppo Pine also occurs within the block.

Fire History

In 2002 a small fire occurred in the west of this block adjacent airport lane and in 2006 a vehicle accident fire was quickly contained by CFS.

Fuel Hazard

The block is fed by the Merintha Creek system. The long unburnt shrubland is dominated by dense Swamp Paperbark resulting in an *Extreme* overall fuel hazard over the majority of the area.

Natural Values

Fauna and flora of conservation significance recorded from the area include: Rock Parrot, EP Southern Emu-Wren, White-breasted Sea-eagle, Osprey, Blue-breasted Fairy-wren, Eastern Reef Egret, Peregrine Falcon (*Falco peregrinus*), Cape Barren Goose, Leafless Globe-pea, Spoon-leaved Spyridium, Silver Candles (*Pleuropappus phyllocalymmeus*), Salt Isotome (*Isotoma scapigera*), Port Lincoln Mallee, Western Daddy Long-legs, Hop-bush Wattle, Cutting-grass. The south-western area of this block contains key habitat area for the EP Southern Emu-wren (Pickett, 2005). The north-west area of this block may be used as a dispersal corridor for EP Southern Emu-wren.

Built Assets

Several rural living properties adjacent the north boundary.

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically human caused fires are low, however this does not necessarily reflect the risk posed in this area by high visitor use on the rural roads. A vehicle accident in 2005 ignited a fire that was quickly suppressed by fire crews. Escapes or rekindles from farmers burning off stubble may also pose a risk.

Fire Access (GAFLC classifications refer to Map 4)

Major Coffin Bay Road, Airport Lane.
Minor eastern boundary firebreak.

Proposed Zoning (refer to Map 4)

- C-zone.

Specific Management Objectives for Kellidie Bay North Block

- Manage the block area using prescribed burning to limit the extent of naturally occurring fires and maintain a diversity of habitat age classes.

- Conserve the EP Southern Emu-wren population as a high priority.

Recommendations

- Reduce the likelihood of EP Southern Emu-wren habitat burning during bushfire to less than 50% of the habitat area
- Prescribed burn immediately adjacent EP Southern Emu-wren key habitat to reduce fuel loads with the intent of limiting the spread of fire into key habitat areas. Where possible offset burn areas to retain dispersal corridors. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat in MVS No. 32 (*Melaleuca* and *Leucopogon* shrublands). Manage the area so that minimum time since fire thresholds are not compromised.
- Encourage off-reserve firebreaks in existing fuel reduced areas. Where possible work cooperatively with neighbours.

Suppression Considerations

- Unstable boggy ground characterises the block. Access by fire units and heavy machinery should be avoided.
- *Extreme* fuel loads in this area may make direct attack hazardous.
- Spotting hazard from Swamp Paperbark is likely to be extreme.

23 KELLIDIE BAY SOUTH BLOCK

Tenure, Size, Land use

Kellidie Bay CP (817 ha).

Vegetation

MVS No. 29, 32, 49

The vegetation in this block is a patchy distribution of *Eucalyptus* mallee woodland with occasional *Allocasuarina* (MVS No. 29) and *Melaleuca* shrubland (MVS No. 49). There is a small area of coastal shrubland in the north western corner (MVS No. 42).

Fire History

There is no recorded fire history for this block.

Fuel Hazard

Although this area is long unburnt the impact of grazing/previous land use has resulted in a diversity of fuel loads. Where the vegetation is relatively intact accumulation of surface fine fuels and bark fuel hazard over time the overall fuel hazard is *Very High* to *Extreme*.

Natural Values

Fauna and flora of conservation significance recorded from the area include Silver Candles and Salt Isotome.

Built Assets

Powerline to Coffin Bay.

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically, human caused ignitions have been low, however this does not necessarily reflect the risk posed in this area by high visitor use on the rural roads and by off-road motorbike riders. Escapes or rekindles from neighbouring properties burning off stubble may also pose a risk.

Fire Tracks (GAFLC classifications refer to Map 4)

Major Coffin Bay Road.

Minor East boundary firebreak, South boundary firebreak, Centre Track firebreak.

Proposed Zoning (refer to Map 4)

- C-zone.

Specific Management Objectives for Kellidie Bay South Block

- Manage the block using prescribed burning to limit the extent of naturally occurring fires and maintain or improve conservation values.

Recommendations

- Upgrade Centre Track to a Major Track.
- Improve vehicle access over the boundary track hill in the south-eastern corner of the block.

- This area has no recorded fire history. Create a mosaic in the block through prescribed burning MVS No. 29 (*Eucalyptus* mallee woodlands) and MVS No. 49 (*Melaleuca* shrublands) in the central area of the block.
- Inform the Coffin Bay Pony Society of the risk assessment for this block. Encourage the society to implement prevention measures and prepare an action plan for safe and appropriate response to a fire.
- Investigate the use of prescribed burning as a method of weed control for threatening species including *Polygala* and Aleppo Pine.

Suppression Considerations

There are no suppression considerations for Kellidie Bay South Block

24 KELLIDIE BAY WEST BLOCK

Tenure, Size and Land use

Kellidie Bay CP (331 ha).

Vegetation

MVS No. 29, 32, 49

The vegetation in this block includes *Eucalyptus* mallee woodland with occasional *Allocasuarina* (MVS No. 29) and *Melaleuca* shrubland (MVS No. 49). Boneseed (*Chrysanthemoides monilifera*) also occurs in this block.

Note: Kangaroo control may be required post-fire to ensure successful regeneration of vegetation.

Fire History

Prescribed burns were conducted in November 2004 and in April 2007 on the western boundary to lower fuel loads adjacent assets.

Fuel Hazard

Although this area is long unburnt the impact of grazing has resulted in a variety of fuel loads. Where the vegetation is relatively intact accumulation of surface fine fuels and bark fuel hazard over time, the overall fuel hazard is *Very High to Extreme*.

Natural Values

Fauna and flora of conservation significance recorded from the area include Salt Isotome, Silver Candles, Musk Duck, Osprey, Diamond Firetail, Blue-breasted Fairy-wren, Painted Button-quail and Fairy Tern. Adjacent EP Southern Emu-wren populations may use this area as a dispersal corridor (Pickett, 2006).

Built Assets

SA Water tank and pump station, shacks on north facing coastline and powerline to Coffin Bay. Residential housing (high density housing) and a power sub-station is located adjacent the western boundary.

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically human caused ignitions in the area are low, however this does not necessarily reflect the risk posed by high visitor use on the rural roads, adjacent residences and by off-road motorbike riders.

Fire Access (GAFLC classifications refer to Map 4)

Major Coffin Bay Road, town lookout access road, western boundary firebreak.
Minor Southern boundary firebreak, SA Water tank access track, shack site access tracks.

Proposed Zoning (refer to Map 4)

- A-zone (20 m minimum) along the western boundary to reduce the likelihood of fire impacting assets to the west of the block.
- B-zone (500 m minimum) along the western boundary to reduce the likelihood of fire exiting the block and impacting assets to the west.

Specific Management Objectives for Kellidie Bay West Block

- Limit the impact of bushfire on the town of Coffin Bay by reducing fuel loads adjacent the west boundary of the reserve.
- Manage the block area using prescribed burning to limit the area of naturally occurring fires and maintain or improve conservation values.
- Manage the block so that a significant vegetated corridor exists for dispersal of EP Southern Emu-wren between the town and Merintha Creek at any given time.

Recommendations

- Fuel reduce the B-zone to the required level. Create a mosaic of habitat age classes so that an area of reduced fuel load exists at any given time between the centre track fire break and the West boundary fire break to limit the spread of fire to Coffin Bay. Manage the mosaic so that no area is burnt so frequently that minimum habitat burn thresholds are not compromised at one location.
- Upgrade the SA Water tank access track to a Major Track.
- Upgrade the southern boundary firebreak between the south-western corner and the SA Water tank access track to 15 m fire break.
- Inform the owners of the Kellidie Bay east shacks of the risk assessment for this block. Encourage the owners to implement prevention measures and prepare an action plan for safe and appropriate response to a fire.
- Upgrade access track to Coffin Bay shack sites to 15 m wide firebreak.
- Maintain the western boundary firebreak A-zone to 20 m. Note this is less than the A-zone standard due to low mallee habitats and the fuel reduced zone.
- Maintain the western boundary firebreak access track to a Standard Track.
- Maintain screens of unburnt vegetation immediately prior to the Coffin Bay entrance to preserve the aesthetics of the entrance to the town.
- This area has no recorded fire history. Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 29 (*Eucalyptus* mallee woodlands) and MVS No. 49 (*Melaleuca* shrublands) in the central section of the block.
- Work cooperatively with SA Water to maintain 5 m breaks around the Coffin Bay water tanks and pumping cubicle.

Suppression Considerations

- Areas that have been burnt adjacent to the west boundary may limit the impact of a fire front, however ember attack causing spot fires within the town boundary will be a significant issue for fire management.
- Early response to and management of public safety at Kellidie Bay east shacks by SAPOL.

25 GUNYAH BEACH BLOCK

Tenure, Size and Land use

Coffin Bay NP (13 145 ha).

Vegetation

MVS No. 21, 26, 29, 31, 32, 39, 49

The southern area of this block consists of a large shifting sand dune system. Vegetation in the rest of the block is dominated by Coastal White Mallee open woodland (MVS No. 29) but also includes patches of *Acacia* shrubland (MVS No. 21), Swamp Paperbark shrubland (MVS No. 49), Drooping Sheoak woodland (MVS No. 26) and other shrublands (MVS No. 32). Much of the vegetation is regenerating post fire.

Fire History

In 1985 a section of the north-western corner of the block burnt, which was a result of a burn-off escaping from the golf club, burning approximately 310 ha. In 1991 a large fire burnt most of the block. In May 2004 a prescribed burn was conducted on the northern boundary between the golf club and reserve entrance to reduce fuel loads.

Fuel Hazard

Fuel hazard is variable across the block. The overall fuel hazard on the dune slopes is generally *Moderate* with discontinuous fuels, while the dune swales are dense with *Extreme* fuel loads. Coastal shrublands and mature Drooping Sheoak woodland over limestone and coastal heath are *Moderate* to *High* fuel hazard.

Natural Values

Fauna and flora of conservation significance recorded from the area include Hooded Plover, EP Southern Emu-wren, Fairy Tern, White-breasted Sea-eagle, Osprey, Heath Goanna, Silver Candles (historical record but high likelihood of occurrence) and Western Daddy-long-legs (*Caladenia bicalliata* ssp. *bicalliata*).

Built Assets

Ranger's House, Workshop and storage area, Golf club, rural-living properties and residential living in Coffin Bay adjacent north boundary, BHP Sand Mine.

Fire Risk

The likelihood of fire starting from lightning strike is moderate. Historically human caused ignitions in the area are low, however this does not necessarily reflect the potential ignition sources due to high visitor use on the rural roads, adjacent residences and off-road motorcyclists. Several expiation notices are issued annually to reserve users who contravene fire regulations. Two fires have entered the block as a result of burning off at the golf club.

Fire Access (GAFLC classifications refer to Map 4)

Major	Park Entrance Road, Point Avoid Road, Yangie Bay Road.
Standard	north boundary (reserve entrance to golf club)
Minor	Gunyah Beach Track, north boundary (golf club to sand mine).

Proposed zoning (refer to Map 4)

- B-zone (500 m minimum) adjacent northern boundary to reduce the likelihood of fire exiting the reserve and impacting on Coffin Bay.
- C-zone

Specific Management Objectives for Gunyah Beach Block

- Reduce the likelihood of fire impacting the town of Coffin Bay by reducing fuel loads adjacent the north boundary.
- Manage the block using prescribed burning to limit the extent of naturally occurring fires and maintain or improve conservation values.

Recommendations

- Create a reduced fuel load area by prescribed burning adjacent the north boundary to limit the spread of fire into or from the reserve. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel load area within the block area to create a mosaic so that conservation values are maintained.
- Where possible limit the amount of coastal heath burnt by bushfire to <50% of the habitat area in the block to conserve an important habitat for diverse fauna.
- Minimise the likelihood of EP Southern Emu-wren habitat burning during bushfire to less than 50% of the habitat area.
- Prescribed burn adjacent EP Southern Emu-wren habitat to limit the spread of fire into the habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.
- Maintain firebreaks and fuel reduced zones around the Coffin Bay ranger's residence and workshops.
- Upgrade Gunyah Beach Tack to a Minor Track.
- Create a mosaic in the block by prescribed burning approximately 25% of the following: MVS No. 32 (*Lasiopetalum*, *Olearia* and *Leucopogon* shrublands) in the west, MVS No. 49 (*Melaleuca* shrubland) in the north and MVS No. 32 (*Acrotriche* shrubland) and MVS No. 29 (*Eucalyptus* woodland) in the southeast.

Suppression Considerations

- Steep sand dunes prevent safe access to the block by heavy machinery.
- Dense dune swale vegetation may hinder access by ground crews and present a tripping/falling hazard.
- In the event of fire in the sand dunes, control efforts should focus on working from tracks on the edge of the block to prevent fire from leaving the area or by burning out dune swales under abating overnight conditions.
- Due to the adjacent town the potential impact of fires should be considered as early as possible. Prescribed burn areas adjacent the north boundary may limit the impact of a fire front and provide opportunities to burn out fuels ahead of a bushfire. Ember attack causing spot fires within the town boundary will be a significant issue for fire management.
- Drooping Sheoak monitoring sites are located at GR 409 676, GR 330 663 and GR 392 643. Damage by heavy machinery should be avoided.

26 LAKE DAMASCUS BLOCK

Tenure, Size and Land use

Coffin Bay NP (8 645 ha).

Vegetation

MVS No. 26, 29, 32, 33, 38, 39, 49

The vegetation in this block is varied and includes *Eucalyptus* mallee woodland and heath, *Allocasuarina* woodland, *Melaleuca* and *Acacia* shrublands and low lying areas of mixed chenopods and samphire.

Fire History

In 2004 a small fire burnt the part of the Lake Damascus fringe.

Fuel Hazard

Fuel hazard is variable across the block. Coastal heath has an overall fuel hazard of *Moderate* occurs along the south-west coastline, the rest of the south-western section of the block consists of dune slopes with discontinuous fuels and dense dune swales with *Extreme* fuel loads. Coastal shrubland and mature *Allocasuarina* woodland over limestone in the east of the block are typically a *Moderate* to *High* overall fuel hazard.

Natural Values

Fauna and flora of conservation significance recorded from the area include Osprey, White-bellied Sea-eagle, Rock Parrot, Scaly Poa and Western Daddy Long-legs. Breeding Fairy Terns use Seven Mile Beach during the summer months. The reserve is currently being surveyed for Western Whipbird. This block contains the regionally significant Drooping Sheoak woodland community on coastal sandy plains.

Built Assets

Camping areas with minor infrastructure at Little Yangie Bay and Black Springs.

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically, human caused ignitions are low, however this does not necessarily reflect the potential for ignition as the block is subject to high visitor use. Several expiation notices are issued annually to reserve users who contravene fire regulations.

The risk of a significant fire escaping from this area is *Low* due to the peninsula landform and landscape fragmented by sand dunes.

Fire Access (GAFLC classifications refer to Map 4)

Major Yangie Bay to Avoid Bay Road (bitumen).
Minor Coffin Bay Peninsula 4WD Track.

Proposed Zoning (refer to Map 4)

- C-zone.

Specific Management Objectives for Lake Damascus Block

- Early response to and management of visitor safety by SAPOL.

- Manage the block area using prescribed burning to limit the extent of naturally occurring fires and maintain or improve conservation values.

Recommendations

- Install a 22 000 litre tank at Big Turf waterhole.
- Create a reduced fuel load area by prescribed burning in the Lake Jesse area to limit the spread of fire into or from the peninsula. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel load area within the block to create a mosaic so that conservation values are maintained.
- Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 49 (*Melaleuca* shrublands) in the centre and MVS No. 32 (*Leucopogon* shrublands) in the east (Eely Point area).

Suppression Considerations

- Soft, sandy, narrow tracks limit access for large fire units beyond Lake Jesse.
- High tides may limit access to and egress from the end of Coffin Bay Peninsula.
- Steep sand dunes prevent safe access and effective fire control by heavy machinery.
- Dense dune swale vegetation may hinder access by ground crews and present a tripping/falling hazard.
- In the event of fire in the sand dunes, control efforts should focus on working from tracks on the edge of the block to prevent fire from leaving the area or by burning out dune swales under abating/overnight conditions.
- Unstable boggy ground characterises the Lake Damascus fringe. Access by fire units, and heavy machinery should be avoided.
- During early summer, fire vehicles should avoid breeding Fairy Tern nest sites on Seven Mile Beach.
- Two Drooping Sheoak monitoring sites are located at GR 251 811. Damage by heavy machinery should be avoided.

27 POINT SIR ISAACS BLOCK

Tenure, Size and Land use

Coffin Bay NP (3 775 ha).

Vegetation

MVS No. 26, 29, 31, 32, 33, 38, 39, 49

The vegetation in this block is varied and includes patches of *Eucalyptus* mallee woodland and heath, *Melaleuca* shrublands and open shrublands, *Allocasuarina* woodland, semi-arid hummock grasslands and low lying areas of mixed chenopod and samphire. Prior to the inclusion of this block into the reserve system it was partly cleared (approximately 40%) and grazed. Large dead trees are littered through the block indicating the extent of the old growth *Allocasuarina* woodlands, which once dominated this area.

Fire History

No fire history is recorded for this block.

Fuel Hazard

The overall fuel hazard is generally *High* in woodlands and *Moderate* in other habitat types.

Natural Values

Fauna and flora of conservation significance recorded from the area include Rock Parrot, Alcock's Wattle, White-bellied Sea-eagle, Osprey, Knotted Poa (*Poa drummondiana*) and Creeping Boobiolla (*Myoporum parvifolium*). This block contains the regionally significant Drooping Sheoak woodland community on coastal sandy plains.

Built Assets

This block contains Service Hut, vegetation exclosures, camping infrastructure and other minor infrastructure. Two heritage sites are also found within the block these are a whaling station, Whaler's Hut.

Fire Risk

The likelihood of fire starting from lightning strike is *Low*. Historically human caused ignitions have been low, however this does not necessarily reflect the potential sources of ignition in the area due to high visitor presence.

The risk of a significant fire escaping from this area is *Low* due to the peninsula landform and the fragmentation of the landscape by sand dunes, however a fire starting in this block may burn out a large portion of the block and the adjacent Whidbey Block.

Fire access (GAFLC classifications refer to Map 4)

Access beyond Yangie Bay is limited to medium 4WD vehicles. Large fire units and equipment may not be able to traverse the soft sandy tracks and beach.

Minor Point Sir Isaac's Track, Reef Point Track, Misery Bay Track.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Pt Sir Isaac's Block

- Early response to and management of visitor safety by SAPOL.
- Allow naturally occurring fires to burn until weather conditions abate then use minimum impact techniques to contain the fire (primarily wet lines, burning from control lines, rake hoe control lines and A-frame).
- Manage the block area using prescribed burning to limit the area of naturally occurring fires and maintain a diversity of habitat age classes. Manage habitat age classes with a bias toward old growth *Eucalyptus* mallee and Drooping Sheoak woodland to conserve an important habitat for diverse fauna.

Recommendations

- Investigate the use of prescribed burning to restore Drooping Sheoak woodland habitat.
- Reduce the likelihood of coastal heath burning by bushfire to less than 50% of its extent within the block to conserve an important association for diverse fauna.
- Reduce the likelihood of Swamp Paperbark tall shrubland burning by bushfire to less than 50% of its extent within the block.
- Install a 22 000 litre tank at Trap Yards waterhole.
- This area has no recorded fire history. Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 29 (*Eucalyptus* mallee woodlands), MVS No. 32 (*Leucopogon* shrublands) and MVS No. 49 (*Melaleuca* shrublands) in the south-west as well as MVS No. 32 (*Olearia* shrubland) and MVS No. 32 (*Meleleuca* shrubland) in the north.

Suppression Considerations

- Minimum impact suppression techniques should be used.
- There is limited water available for suppression in this block.
- Drooping Sheoak monitoring sites are located at GR 178 841 and GR 179 825. Damage by heavy machinery should be avoided.

28 WHIDBEY BLOCK

Tenure, Size and Land use

Coffin Bay NP (3 960 ha).

Vegetation

MVS No. 26, 29, 32, 38, 39, 49

The south-west of this block is dominated by coastal heath. The vegetation in the rest of the block is varied and includes patches of *Eucalyptus* mallee woodland and heath, *Melaleuca* shrublands and open shrublands, *Allocasuarina* woodland, semi-arid hummock grasslands and low lying areas of mixed chenopod and samphire. Maintaining the relative wilderness values of this area a high priority for management.

Fire History

No fire history is recorded for this block.

Fuel Hazard

The overall fuel hazard is generally *High* in woodlands and *Moderate* in other habitat types.

Natural Values

This is an area of magnificent coastal scenery managed to conserve its conservation values and relative Wilderness values. Fauna and flora of conservation significance recorded from the area include Hooded Plover, Rock Parrot, White-Bellied Sea-eagle, Osprey and Alcock's Wattle.

Built Assets

Only fencing and minor infrastructure.

Fire Risk

The likelihood of fire starting from lightning strike or human activity is *Low*. The risk of a significant fire escaping from this area is low due to the peninsula landform and the fragmentation of the landscape by sand dunes.

Fire Tracks (GAFLC classifications refer to Map 4)

Access to the Coffin Bay Peninsula beyond Yangie Bay is limited to 4WD vehicles. Large fire units and equipment may not be able to traverse the soft sandy tracks and beach.

Minor Misery Track, Reef Point Track.
Service South Coast Track, Boarding House Bay Track.

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Whidbey Block

- Maintain the relative wilderness values of the area. Minimum impact suppression techniques should be used in accordance with the *South Australian Code of Practice for Wilderness Protection Areas and Zones* (DEH, 2004a).

- Allow naturally occurring fires to burn until weather conditions abate then use minimum impact suppression techniques to contain the fire (primarily wet lines, burning from control lines, rake hoe control lines and A-frame).
- Manage the block area using prescribed burning to limit the extent of naturally occurring fires and maintain a diversity of habitat age classes. Manage habitat age classes with a bias toward old growth Mallee to conserve an important habitat for diverse fauna.

Recommendations

- Reduce the likelihood of coastal heath burning by bushfire to less than 50% of the habitat area in the block to conserve an important association for diverse fauna.
- Reduce the likelihood of Mallee Honey-myrtle (*Melaleuca brevifolia*) tall shrubland burning by bushfire to less than 50% of the habitat area.
- This area has no recorded fire history. Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 29 (*Eucalyptus* mallee woodland), MVS No. 32 (*Lasiopetalum* shrubland) and MVS No. 49 (*Melaleuca* shrublands) in the south-west as well as MVS No. 32 (*Leucopogon* shrubland) and MVS No. 49 (*Melaleuca* shrubland) in the east and MVS No. 49 (Mallee Honey-myrtle tall shrubland) in the north-east.

Suppression Considerations

- Minimum impact suppression techniques should be used.
- Water is only available from the Service Hut and Trap Yards waterhole in Point Sir Isaac's Block.
- In the event of fire, control efforts should focus on working from tracks on the edge of the block to prevent fire from leaving the area or by burning from control lines under abating overnight conditions.

29 MURRUNATTA BLOCK

Tenure, Size and Land use

Murrunatta CP (423 ha).

Vegetation

MVS No. 29

Ridge-fruited Mallee woodland over a broad variety of shrub species including *Acacia*, *Melaleuca*, *Xanthorrhoea* and *Banksia*. This reserve conserves a sandy rise with several low lying areas around the boundary.

Fire History

In 2005 the Wangary fire burnt the reserve in its entirety at high intensity.

Fuel Hazard

The overall fuel hazard for this block is currently *Low*. It is likely increase to *Very High* to *Extreme* as vegetation matures due to the mallee woodland association.

Natural Values

Fauna and flora of conservation significance recorded from the area include *Levenhookia stipitata*, Ironstone Mulla Mulla (*Ptilopus beckerianus*), Tate's Grass-tree, Malleefowl (historical record only, the species is likely to be extinct in this block), Blue-breasted Fairy-wren, Diamond Firetail, Painted Button-quail, Western Three-lined Skink. This area is also potential habitat for the EP Yellow-tailed Black-Cockatoo. The provisionally listed *Endangered* Cutting-grass sedgeland occurs within this block (DEH, 2005b).

Built Assets

Fencing and minor infrastructure.

Fire Risk

The likelihood of a fire starting in this block is *Low*.

Fire Tracks (GAFLC classifications refer to Map 4)

Major Service	Settlers Road northern, western and southern boundaries
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Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Murrunatta Block

- Manage the block using prescribed burning to limit the extent of naturally occurring fires and maintain a diversity of habitat age classes. Manage habitat age classes with a bias toward old growth mallee to conserve an important habitat for diverse fauna.
- Manage Ironstone Mulla Mulla populations by prescribed burning consistent with minimum and maximum fire interval thresholds for the species (Appendix 1).

Recommendations

- When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic of habitat age classes within the reserve.

Suppression Considerations

- Minimum impact suppression techniques should be used. PC hygiene practices should be implemented due to the high risk in this area.
- In the event of fire, control efforts should focus on working from tracks on the edge of the block to prevent fire from leaving the reserve.

30 MURRUNATTA SWAMP BLOCK

Tenure, Size and Land Use

Murrunatta CP (92 ha). Adjoins Heritage Agreement No. 413.

Vegetation

MVS No. 38, 49

This block supports *Melaleuca* tall shrubland as well as an area of Cutting-grass sedgeland. This block conserves a swamp section of the Merintha Creek system.

Fire History

In 2005 the Wangary fire burnt the reserve in its entirety at high intensity.

Fuel Hazard

The overall fuel hazard is currently *Moderate*, however it is likely to increase to *Extreme* as the vegetation matures.

Natural Values

Fauna and flora of conservation significance recorded from the area includes *Levenhookia stipitata*, Tate's Grass-tree, Blue-breasted Fairy-wren, Diamond Firetail, Painted Button-quail and EP Southern Emu-wren. The provisionally listed *Endangered* Cutting-grass sedgeland occurs within this block (DEH, 2005b).

Built Assets

Fencing and minor infrastructure.

Fire Risk

The likelihood of fire starting in this block is *Low*.

Fire Tracks (GAFLC classifications refer to Map 4)

Major	Settlers Road
Service	northern boundary adjacent fence

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Murrunatta Swamp Block

- Reduce the likelihood of EP Southern Emu-wren habitat burning during bushfire to less than 50% of the habitat area.
- Prescribed burn strategic areas of the reserve to create fuel reduced zones to reduce the likelihood of fire impacting EP Southern Emu-wren habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.

Recommendations

- Prescribed burn immediately adjacent EP Southern Emu-wren key habitat to reduce fuel loads with the intent of reducing the likelihood of fire spreading into key habitat areas. Where possible, offset burn areas to retain dispersal corridors. Use prescribed burning to

maintain the health of EP Southern Emu-wren habitat in MVS No. 49 (*Melaleuca* shrublands). Manage the area so that minimum habitat burn thresholds are not compromised.

- When minimum fire interval thresholds are reached, consider prescribed burning less than 25% of the block to create a mosaic within the block.

Suppression Considerations

- Unstable boggy ground characterises the block. Access by fire units and heavy machinery should be avoided.
- Use of heavy machinery is not permitted within the reserve to conserve EP Southern Emu-wren habitat. Minimum impact suppression techniques and existing control lines should be used.
- PC hygiene practices should be implemented due to the high risk in this area.
- Reduce the likelihood of fire impacting EP Southern Emu-wren habitat.

31 WANILLA LAND SETTLEMENT BLOCK

Tenure, Size and Land Use

Vanilla Land Settlement CP (16 ha). Adjoins Heritage Agreement No. 405.

Vegetation

MVS No. 8

Sugar Gum mixed woodland over *Acacia* and *Xanthorrhoea* mixed shrubland.

Fire History

In 2005 the Wangary fire burnt Vanilla Land Settlement CP in its entirety at high intensity.

Fuel Hazard

The overall fuel hazard is currently *Low*; however this is likely to increase to *Very High* as woodland habitats reach maturity.

Natural Values

Fauna and flora of conservation significance recorded from the area includes *Levenhookia stipitata*, Ironstone Mulla Mulla, Leafless Globe-pea, Metallic Sun-orchid, Winter Spider-orchid (*Caladenia brumalis*), Twisted Sun-orchid (*Thelymitra flexuosa*), Tate's Grass-tree, Western Gerygone (*Gerygone fusca*), Blue-breasted Fairy-wren, Diamond Firetail, EP Yellow-tailed Black-Cockatoo, Silver Daisy Bush (*Olearia pannosa* ssp. *pannosa*) and the Sugar gum woodland. This block contains a high number and density of threatened flora species of southern Eyre Peninsula.

Built Assets

Fencing and minor infrastructure

Fire Risk

The likelihood of fire starting in this block is *Low*.

Fire Tracks (GAFLC classifications refer to Map 4)

Major Service Charlton Gully Road, Tod Highway.
railway line access track

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Vanilla Land Settlement Block

- Manage threatened flora populations by prescribed burning consistent with minimum and maximum fire interval thresholds for the species.
- Manage prescribed burning and fire suppression operations consistent with minimum impact suppression techniques. No heavy machinery should be used in this block.
- Where possible limit the impact of fire on breeding hollows which may have potential for use by the EP Yellow-tailed Black-Cockatoo.

Recommendations

- When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.
- Use of heavy machinery is not permitted within the reserve in order to reduce the likelihood of impact to significant threatened flora populations. Minimum impact suppression techniques and existing control lines should be used.

Suppression Considerations

- Due to the significance of this block as a refuge for nationally threatened flora minimum impact suppression techniques should be used. No heavy machinery should be used in this block.
- Minimum impact suppression techniques should be used. PC is suspected in this block and hygiene practices to prevent spread should be implemented in this area.

Note: Nationally threatened flora populations occur in remnant vegetation in a several kilometre radius of this block.

32 WANILLA BLOCK

Tenure, Size and Land use

Wanilla CP (283 ha).

Vegetation

MVS No. 8, 49

Sugar Gum mixed woodland over *Acacia* shrubland and Broombush tall open shrubland. This block conserves the southern Koppio Hills and footslopes.

Fire History

In 2005 the Wangary fire burnt Wanilla CP in its entirety at high intensity.

Fuel Hazard

The overall fuel hazard is currently *Low*; however it is likely to increase to *Very High* as woodland habitats reach maturity.

Natural Values

Fauna and flora of conservation significance recorded from the area include *Levenhookia stipitata*, Ironstone Mulla Mulla, Silver Daisy-bush (*Olearia pannosa* ssp. *pannosa*), Leafless Globe-pea, Metallic Sun-orchid, Twisted Sun-orchid, Tate's Grass-tree, Western Gerygone, Blue-breasted Fairy-wren, Diamond Firetail, EP Yellow-tailed Black-Cockatoo, and Tufted Bush-pea (*Pultenaea trichophylla*).

Built Assets

Fencing and minor infrastructure

Fire Risk

The likelihood of fire starting in this area is *Low*.

Fire Tracks (GAFLC classifications refer to Map 4)

Major	Charlton Gully road
Service	NW boundary fence track. NE boundary fence track

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Wanilla Block

- Manage the block using prescribed burning to reduce the likelihood of large scale fires and maintain conservation values.
- Where possible limit the impact of fire on breeding hollows which may have potential for use by the EP Yellow-tailed Black-Cockatoo.

Recommendations

- When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.

- Minimum impact suppression techniques should be used. PC hygiene practices should be implemented due to the high risk in this area.

Suppression Considerations

- Due to the presence of nationally threatened flora minimum impact suppression techniques should be used.
- In the event of fire, control efforts should focus on working from tracks on the edge of the block to prevent fire from leaving the area or by burning from control lines under abating overnight conditions.
- PC is suspected in nearby forested land and hygiene practices to prevent spread into this block.

33 TUCKNOTT SCRUB BLOCK

Tenure, Size and Land use

Tucknott Scrub CP (363 ha). Adjoins Heritage Agreement No. 776.

Vegetation

MVS No. 5, 8, 26, 29, 49

Sugar Gum mixed woodland over *Acacia* shrubland and Broombush tall open shrubland, Drooping Sheoak woodland and *Xanthorrhoea* shrubland. A small area of EP Blue Gum (*Eucalyptus petiolaris*) and Peppermint Box grassy woodland occurs on the northern boundary. This block conserves the southern Koppio Hills and footslopes.

Fire History

The majority of Tucknott Scrub CP burnt in the 2005 Wangary fire at high intensity. A small patch of vegetation was unburnt during that fire.

Fuel Hazard

The overall fuel hazard is currently *Low*; however this is likely to increase to *Very High* as the woodland habitats reach maturity.

Natural Values

Fauna and flora of conservation significance recorded from the area includes EP Yellow-tailed Black-Cockatoo, EP Southern Emu-wren, Ironstone Mulla Mulla, Western Gerygone, Diamond Firetail, Heath Goanna, Scarlet Robin (*Petroica multicolor*), Peppermint Box and Tufted Bush-pea. Brushtail Possums have been recorded near Tucknott Scrub (Ecological Associates Pty Ltd, 2006b). Feral Black Wattles (*Acacia mearnsii*) in the area may require post-fire control.

This block contains Drooping Sheoak Woodland, provisionally listed by DEH as a State threatened community (DEH, 2005b). This community is represented by MVS No. 26 and occurs in the south-western corner of the block. Refer to Appendix 3 for more information.

The regionally threatened Mallee Honey-myrtle (*Melaleuca brevifolia*) +/- Scarlet Bottlebrush (*Callistemon rugulosus* var.) shrubland is recorded for Tucknott CP and has habitat value for the EP Southern Emu-wren.

Note: Phytophthora is likely to be present in the reserve.

Built Assets

Fencing and minor infrastructure.

Fire Risk

The likelihood of fire starting in this block is *Low*.

Fire Tracks (GAFLC classifications refer to Map 4)

Standard Reservoir Drive

Proposed Zoning (refer to Map 4)

- C-zone

Specific Management Objectives for Tucknott Scrub Block

- Manage the block using prescribed burning to reduce the likelihood of large scale bushfires and maintain conservation values.
- Manage threatened flora populations by prescribed burning consistent with minimum and maximum fire interval thresholds for the species.

Recommendations

- When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.
- Reduce the likelihood of Peppermint Box woodland burning by bushfire to less than 50% of the habitat area.
- Manage post-fire runoff into Todd Reservoir.

Suppression Considerations

- Reduce the likelihood of fire impacting breeding hollows.
- Minimum impact suppression techniques should be used due the high risk of Phytophthora infestation and hygiene protocols should be observed.
- Reduce the likelihood of fire burning the remnant threatened Drooping Sheoak woodland in its entirety in a single fire event. Avoid the use of heavy machinery and equipment in this area.

34 SUMMARY OF MANAGEMENT STRATEGIES AND RECOMMENDED WORKS

Land Use

1. Implement fuel management strategies on DEH managed lands to minimise the risk to life, property and the environment (refer to the block prescriptions and Map 4 for further information).
2. Liaise with the relevant local Bushfire Prevention Committee and adjacent landholders to promote the implementation of appropriate fuel reduction works on private properties to complement the fuel management strategies employed within DEH reserves.

Built Assets

3. Undertake fire management works and activities on DEH reserves to minimise the impact that fire may pose to adjacent public assets.
4. 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.
5. Implement fuel management strategies appropriate to asset protection (refer to the block prescriptions and Map 4 for further information).

Visitor Use

6. Implement fuel management strategies appropriate to visitor safety (refer to block prescriptions and Map 4 for further information).
7. Consider reserve closures on extreme fire weather days to ensure visitor safety (at the discretion of the Director National Parks).

Heritage Values

8. Implement fuel management strategies appropriate to asset protection and visitor safety (refer to Section 12-33 (block prescriptions) and Map 4 (Fire Management and Access) for further information).
9. Advocate for liaison at bushfires to identify reserve values, where time allows. Once the fire has passed evaluate sites to establish if any damage has occurred.
10. Ensure suppression strategies take into account significant historical sites in order to minimise impacts from these activities; and undertake post-fire rehabilitation.

Eyre Peninsula Southern Emu-wren

11. Conduct prescribed burning to provide refuge areas in the event of a large bushfire encroaching on preferred habitat, or the reserve/s.
12. Conduct prescribed burning to maintain habitat diversity.
13. Conduct prescribed burning to monitor how fire influences EP Southern Emu-wren populations and preferred habitat. Use this information to update the Ecological Fire Management Guidelines (Appendix 2).
14. Consult with the EP Southern Emu-wren Recovery Team during the planning of any prescribed burn to be conducted within the known habitat of the EP Southern Emu-wren.

Brushtail Possum

15. Conduct prescribed burning to minimise the risk of large contiguous areas of Brushtail Possum habitat burning in one fire event.
16. Monitor the influence of fire on Brushtail Possum populations and preferred habitat and use this information to update the ecological fire management guidelines (Appendix 2).

17. Attempt to provide refuge areas through prescribed burning to avoid bushfires encroaching on preferred habitat. Fire suppression activities should also attempt to retain some unburnt patches as refuge areas.
18. Consult with the DEH Threatened Species Unit when planning prescribed burns in known or potential habitat of the Brushtail Possum.

Eyre Peninsula Yellow-tailed Black-Cockatoo

19. Conduct prescribed burning to minimise the risk of large contiguous areas of habitat burning in one fire event.
20. Monitor the influence of fire on EP Yellow-tailed Black-Cockatoo populations and preferred habitat and use this information to update the ecological fire management guidelines (Appendix 2).
21. Attempt to provide refuge areas through prescribed burning to avoid fires encroaching on preferred habitat. Fire suppression activities should also attempt to retain some unburnt patches as refuge areas.
22. Consult with the EP Yellow-tailed Black-Cockatoo Recovery Team when planning burns in known or potential habitat of the EP Yellow-tailed Black-Cockatoo.

Drooping Sheoak Grassy Woodland

23. Refer to ecological fire management guidelines for ecological communities of conservation significance when implementing prescribed burns and aim to manage within these guidelines (Appendix 3).
24. Avoid burning large continuous remnants of Drooping Sheoak Woodland in their entirety during a single fire event, instead aim to increase patchiness within the remnants.
25. Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns.

Peppermint Box Woodland

26. Refer to ecological fire management guidelines for ecological communities of conservation significance when implementing prescribed burns and aim to manage within these guidelines (Appendix 3).
27. Avoid burning large continuous remnants of Peppermint Box woodland in their entirety during a single fire event, instead aim to increase patchiness within the remnants.
28. Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns.

Weeds

29. Refer to Ecological Fire Management Guidelines (Table 2) and fire management guidelines for introduced flora species (Appendix 1) during prescribed burn planning.
30. Consider the use of fire as part of an integrated weed management strategy.
31. Prior to any prescribed burn, the potential impact of weed species is identified through the DEH Environmental Assessment process during prescribed burn planning. This will identify any priority weed species and recommend post-fire actions to mitigate the impact of weeds.
32. Monitoring of weeds pre and post-fire to determine what post-fire weed control is required and its effectiveness.
33. Conduct post-fire weed control subject to regional priorities.

Pest Fauna

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

Plant Pathogens

35. Ensure the *Standard Operating Procedure – Phytophthora Threat Management (SOP-002)* (DEH, 2002a) is adhered to in Phytophthora risk areas, which includes all the reserves in the plan area.
36. Ensure hygiene practices are implemented to reduce the spread of Phytophthora. Refer to the *DEH Operating Procedure - Phytophthora Vehicle Disinfection Units* (DEH, 2003).

Monitoring

37. Assess the suitability of the proposed fire interval guidelines for EP Southern Emu-wrens with expert ornithological advice;
38. Examine the most appropriate fire regime for establishing and maintaining Sheoak Grassy Woodlands;
39. Evaluate the suitability of the proposed Ecological Fire Management Guidelines for Peppermint Box Woodland;

Research

40. 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).
41. Determine the habitat area of EP Southern Emu-wrens within their known locations to assist with prescribed burn planning.
42. Examine the effects of fire regime, fire intensity and fire interval on populations of the EP Yellow-tailed Black-Cockatoo, Brush-tailed Possum, Brush-tailed Bettong, EP Southern Emu-wren, Bush Stone-curlew and Western Whipbird.
43. Research the succession of vegetation communities in Point Sir Isaac's Block as part of the Drooping Sheoak Grassy Woodland restoration project.

34.1 Recommended Works

A works schedule is being developed in tandem with this plan, to include the recommendations that were derived from the planning process. Table 4 (below) provides a summary of the recommendations, itemised by block, along with a priority rating for each activity. The priority rating provides an indication only of the recommendations that should be implemented in the coming years. It is important to note that the rating is not intended to restrict the timing or dictate the order of implementation. This level of detail will be defined during the works schedule prepared by the West Region. Works are dependent on a number of variables including regional priorities, staff, resources, bushfire events (that have occurred since time of writing) and prescribed burning opportunities. There must be flexibility to reschedule as variables change and impact on the ability to implement works.

The works schedule incorporates the suggested priority ratings and provides more detail regarding the specifics of track upgrades, fuel reduction works and prescribed burns. From the proposed works schedule, an annual works program will be developed and implemented by the West Region. Individual burn plans, incorporating the EAT will be produced prior to the

implementation of any prescribed burn. Post-fire assessments will be conducted and used as a basis for performance reporting against objectives.

Note: Works and activities off reserve should be developed through liaison with the DBPC.

TABLE 4 – SUMMARY OF WORKS FROM THIS FIRE MANAGEMENT PLAN

Recommended Works	
Miller's Hole Block	Limit the spread of fire into or from the reserve by prescribed burning between the reserve entrance road and Sleaford Bay dunes. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that TPC1 is not compromised. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic of time since last fire so that conservation values are maintained.
	Upgrade the Jussieu Peninsula Neck Track to a Standard Track.
	Maintain the Sleaford Mere N Track as a Standard Track.
	Reduce the likelihood of more than 50% of EP Southern Emu-wren habitat burning in a single fire event.
	Prescribed burning adjacent EP Southern Emu-wren habitat to reduce the likelihood of fire impacting the habitat. Use prescribed burning to maintain the ecological integrity of EP Southern Emu-wren habitat.
	Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure.
Wanna Block	Protect remnant Drooping Sheoak woodland habitat as a priority objective during fire suppression.
	Aim to manage within the Ecological Fire Management Guidelines proposed for the remnant community as described within Appendix 3.
	Minimise the likelihood of fire impacting upon the remnant Drooping Sheoak woodland community through: <ul style="list-style-type: none"> • high intensity fuel load reduction adjacent the community; • low intensity fuel reduction within the community; • Restricting the extent of Drooping Sheoak woodland burnt by bushfire to less than 50% of the habitat area in the block, where it is possible.
	Reduce the likelihood of coastal heath being burnt by bushfire to less than 50% of the habitat area in the block.
	This area has no recorded fire history. Undertake ecological burning to increase heterogeneity, particularly in MVS No. 32 (<i>Leucopogon</i> and <i>Acrotiche</i> shrublands) communities in the southern section of the block.
	Upgrade Memory Cove Gate to Curta Rocks Track to a Minor Track.

Recommended Works

Recommended Works	
Curta Rocks Block	Upgrade Memory Cove Gate to Curta Rocks Track to a Minor Track.
	Minimise the likelihood of more than 50% of coastal heath burning in a single fire event to conserve an important association for diverse fauna.
	Minimise the likelihood of more than 50% of Drooping Sheoak woodland burning in a single fire event to conserve significant habitat.
	Minimise the likelihood of more than 50% of EP Southern Emu-wren habitat burning in a single fire event.
	Prescribed burn adjacent EP Southern Emu-wren habitat to reduce the likelihood of spread of fire into the habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.
	This area has no recorded fire history. Undertake ecological burning to increase heterogeneity, particularly in MVS No. 32 (<i>Leucopogon</i> and <i>Acrotriche</i> shrublands) communities in the southern section of the block.
Memory Cove Block	Create an area of reduced fuel hazard by prescribed burning between the Pillie Hut to Taylor's Landing area and the Memory Cove Road to Shag Cove area. This should aid to minimise the likelihood of fire moving through the block from the north. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the area to create a mosaic so that conservation values are maintained.
	Minimise the extent of coastal heath burnt by bushfire to less than 50% of the habitat in the block to conserve an important association for diverse fauna.
	Where possible minimise the extent of EP Southern Emu-wren habitat burnt during bushfire to less than 50% of the habitat.
	Undertake ecological burning to increase heterogeneity in the block by burning approximately 25% of MVS No. 32 (<i>Eucalyptus</i> mallee woodland and shrubland) east of the Memory Cove Road and MVS No. 32 (Ridge-fruited Mallee (<i>Eucalyptus angulosa</i>) and Port Lincoln Mallee woodland) in the south.
	Prescribed burn adjacent EP Southern Emu-wren habitat to limit the spread of fire into the habitat. Use prescribed burning to maintain the ecological integrity of EP Southern Emu-wren habitat.
	Minimum impact suppression techniques should be used in accordance with the SA Code of Practice for Wilderness Protection Areas and Zones (DEH, 2004a).
	Realign the dangerous corner located half way along the Memory Cove Road.

Recommended Works	
Stamford Block	Where possible limit the amount of EP Southern Emu-wren habitat burnt during bushfire to less than 50% of the habitat area.
	Prescribed burn adjacent EP Southern Emu-wren habitat to limit the spread of fire into the habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.
	Undertake ecological burning to in the block to increase heterogeneity in MVS No. 29 (<i>Eucalyptus</i> mallee woodland and shrubland) communities in the east and north-east.
	Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure.
	Create a reduced fuel hazard area by prescribed burning between the MacLaren Point Track and Taylor's Landing Track to limit the spread of fire into or from the Donington Peninsula. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic so that conservation values are maintained.
Donington Block	Identify the protection of Donington Cottage and Lighthouse assets as a priority objective during fire suppression.
	Investigate the use of prescribed burning as part of an integrated weed management strategy for introduced species including South African Daisy.
	Reform Carcase Rock Track surface near coast. Construct adequate surface drains to divert water from the track.
	Upgrade Carcase Rock, The Granites and MacLaren Point Tracks to Minor Tracks
Islands Block	If a need is identified, prescribed burning for ecological or protection purposes should be addressed via the DEH Prescribed Burn Plan and Environmental Assessment process.
Lincoln Block	Investigate the use of prescribed burning as a method of weed control for threatening species including Polygala and Aleppo Pine.
	Create a reduced fuel hazard west of Tulka by prescribed burning in the Lincoln CP and SA Water Lincoln Basin area. Manage the area so that a reduced fuel hazard exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic of habitat age classes so that conservation values are maintained.
	Where possible limit the extent of Drooping Sheoak woodland burnt by bushfire to < 50% of the habitat area in the block.
	Limit the spread of fire into, and impact on remnant Drooping Sheoak woodland habitat via low-intensity fuel reduction within this habitat type. Manage fuel load reduction with regard for habitat vital attributes.
	Increase heterogeneity in the block by ecological burning approximately 25% of MVS No. 29 (<i>Eucalyptus</i> mallee woodland and shrubland) in the north and east

Recommended Works	
Proper Bay Block	Maintain the Lincoln Basin entrance road as a Major Track with a 15 m break.
	Maintain fuel reduced B-zones adjacent Major Tracks to limit the spread of fire into or out of DEH managed land.
	Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure.
Kathai Block	Work cooperatively with SA Water to maintain 5 m breaks around SA Water infrastructure (water tanks, radio shed and tower).
	Maintain a reduced fuel hazard area by prescribed burning in the block to limit the spread of fire into or from the reserve. Manage the area so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel hazard area within the block area to create a mosaic so that conservation values are maintained.
	Maintain a 15 m wide firebreak (including the road surface) on the north side of the reserve, adjacent Blue Fin Road.
	Encourage landscape fire management in the area by identifying prescribed burning issues and opportunities via the DBPC. Encourage neighbours to consider fuel reduction via the DBPC.
Kellidie Bay North Block	Reduce the likelihood of EP Southern Emu-wren habitat burning during bushfire to less than 50% of the habitat area
	Prescribed burn immediately adjacent EP Southern Emu-wren key habitat to reduce fuel loads with the intent of limiting the spread of fire into key habitat areas. Where possible offset burn areas to retain dispersal corridors. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat in MVS No. 32 (<i>Melaleuca</i> and <i>Leucopogon</i> shrublands). Manage the area so that minimum habitat burn thresholds are not compromised.
	Encourage off-reserve firebreaks in existing fuel reduced areas. Where possible work cooperatively with neighbours.
	Investigate the use of prescribed burning as a method of weed control for threatening species including <i>Polygala</i> and Aleppo Pine.
Kellidie Bay South Block	Upgrade Centre Track to a Major Track.
	Improve vehicle access over the boundary track hill in the south-eastern corner of the block.
	This area has no recorded fire history. Create a mosaic in the block through prescribed burning MVS No. 29 (<i>Eucalyptus</i> mallee woodlands) and MVS No. 29 (<i>Melaleuca</i> shrublands) in the central area of the block.
	Inform the Coffin Bay Pony Society of the risk assessment for this block. Encourage the society to implement prevention measures and prepare an action plan for safe and appropriate response to a fire.
	Investigate the use of prescribed burning as a method of weed control for threatening species including <i>Polygala</i> and Aleppo Pine.

Recommended Works

Recommended Works	
Kellidie Bay West Block	Fuel reduce the B-zone to the required level. Create a mosaic of habitat age classes so that an area of reduced fuel load exists at any given time between the centre track fire break & the West boundary fire break to limit the spread of fire to Coffin Bay. Manage the mosaic so that no area is burnt so frequently that minimum habitat burn thresholds are not compromised at one location.
	Upgrade the SA Water tank access track to a Major Track.
	Upgrade the southern boundary firebreak between the south-western corner and the SA Water tank access track to 15 m fire break.
	Inform the owners of the Kellidie Bay east shacks of the risk assessment. Encourage the owners to implement prevention measures & prepare an action plan for safe & appropriate response to fire.
	Upgrade access track to Coffin Bay shack sites to 15 m wide firebreak
	Maintain the western boundary firebreak A-zone to 20 m. Note this is less than the A-zone standard due to low mallee habitats and the fuel reduced zone.
	Maintain the western boundary firebreak access track to a Standard Track.
	Maintain screens of unburnt vegetation immediately prior to the Coffin Bay entrance to preserve the aesthetics of the entrance to the town.
	This area has no recorded fire history. Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 29 (<i>Eucalyptus</i> mallee woodlands) and MVS No. 49 (<i>Melaleuca</i> shrublands) in the central section of the block.
	Work cooperatively with SA Water to maintain 5 m breaks around the Coffin Bay water tanks and pumping cubicle.
Investigate the use of prescribed burning as a method of weed control for threatening species including Boneseed.	
Gonyah Beach Block	Create a reduced fuel load area by prescribed burning adjacent the north boundary to limit the spread of fire into or from the reserve. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel load area within the block area to create a mosaic so that conservation values are maintained.
	Where possible limit the amount of coastal heath burnt by bushfire to <50% of the habitat area in the block to conserve an important habitat for diverse fauna.
	Minimise the likelihood of EP Southern Emu-wren habitat burning during bushfire to less than 50% of the habitat area.
	Prescribed burn adjacent EP Southern Emu-wren habitat to limit the spread of fire into the habitat. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat.
	Maintain firebreaks and fuel reduced zones around the Coffin Bay ranger's residence and workshops.
	Upgrade Gonyah Beach Tack to a Minor Track.
Create a mosaic in the block by prescribed burning approximately 25% of the following MVS No. 32 (<i>Lasiopetalum</i> , <i>Olearia</i> and <i>Leucopogon</i> shrublands) in the west, MVS No. 49 (<i>Melaleuca</i> shrubland) MVS No. 49 in the north and MVS No. 32 (<i>Acrotriche</i> shrubland) and MVS No. 29 (<i>Eucalyptus</i> woodland) in the southeast.	

Recommended Works	
Lake Damascus Block	Install a 22 000 litre tank at Big Turf waterhole.
	Create a reduced fuel load area by prescribed burning in the Lake Jesse area to limit the spread of fire into or from the peninsula. Manage the block so that a reduced fuel hazard area exists at any given time but alternative sites are used so that minimum habitat burn thresholds are not compromised at one location. Where possible, manage the progression of the reduced fuel load area within the block to create a mosaic so that conservation values are maintained.
	Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 49 (<i>Melaleuca</i> shrublands) in the north-west and MVS No. 32 (<i>Leucopogon</i> shrublands) in the north (Eely Point area).
Point Sir Isaacs Block	Investigate the use of prescribed burning to restore Drooping Sheoak woodland habitat.
	Reduce the likelihood of coastal heath burning by bushfire to less than 50% of its extent within the block to conserve an important association for diverse fauna.
	Reduce the likelihood of Swamp Paperbark tall shrubland burning by bushfire to less than 50% of its extent within the block.
	Install a 22 000 litre tank at Trap Yards waterhole.
	This area has no recorded fire history. Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 29 (<i>Eucalyptus</i> mallee woodlands), MVS No. 32 (<i>Leucopogon</i> shrublands) and MVS No. 49 (<i>Melaleuca</i> shrublands) in the south-west as well as MVS No. 32 (<i>Olearia</i> shrubland) and MVS No. 32 (<i>Melaleuca</i> shrubland) in the north.
Whidbey Block	Reduce the likelihood of coastal heath burning by bushfire to less than 50% of the habitat area in the block to conserve an important association for diverse fauna.
	Reduce the likelihood of Mallee Honey-myrtle (<i>Melaleuca brevifolia</i>) tall shrubland burning by bushfire to less than 50% of the habitat area.
	This area has no recorded fire history. Create a mosaic in the block by prescribed burning approximately 25% of MVS No. 29 (<i>Eucalyptus</i> mallee woodland), MVS No. 32 (<i>Lasiopetalum</i> shrubland) and MVS No. 49 (<i>Melaleuca</i> shrublands) in the south-west as well as MVS No. 32 (<i>Leucopogon</i> shrubland) and MVS No. 49 (<i>Melaleuca</i> shrubland) in the east and MVS No. 49 (Mallee Honey-myrtle tall shrubland) in the north-east.
Murrnatta Block	When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.

Recommended Works	
Murrumbidgee Swamp Block	Prescribed burn immediately adjacent EP Southern Emu-wren key habitat to reduce fuel loads with the intent of reducing the likelihood of fire spreading into key habitat areas. Where possible, offset burn areas to retain dispersal corridors. Use prescribed burning to maintain the health of EP Southern Emu-wren habitat in MVS No. 49 (<i>Melaleuca</i> shrublands). Manage the area so that minimum habitat burn thresholds are not compromised.
	When minimum fire interval thresholds are reached, consider prescribed burning less than 25% of the block to create a mosaic within the block.
Wanilla Land Settlement Block	When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.
	Use of heavy machinery is not permitted within the reserve in order to reduce the likelihood of impact to significant threatened flora populations. Minimum impact suppression techniques and existing control lines should be used.
Wanilla Block	When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.
	Minimum impact suppression techniques should be used. PC hygiene practices should be implemented due to the high risk in this area.
Tucknott Scrub Block	When minimum fire interval thresholds are reached consider prescribed burning less than 25% of the area to create a mosaic within the reserve.
	Reduce the likelihood of Peppermint Box woodland burning by bushfire to less than 50% of the habitat area.

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36 APPENDICES

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

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 Mgt Recommendations	Source
<i>Acacia alcockii</i>	Alcock's Wattle		R	26 27 29 32 49	LD MC WA WH ST DO	Shrub	<ul style="list-style-type: none"> Probably hardseeded Prolific response post-fire on EP Shrub to 3 m high Likely to flower in late winter-early spring 	<ul style="list-style-type: none"> Requires medium to high intensity fire for seedling recruitment. Fire intervals > 4 years required for reproductive maturity on lower EP 	SA^
<i>Acacia dodonaeifolia</i>	Hop-bush Wattle		R	21 29 49	KA KBN ST	Shrub	<ul style="list-style-type: none"> Probably hardseeded Prolific response post-fire on EP Flowers: July-December 	<ul style="list-style-type: none"> Requires medium to high intensity fire for seedling recruitment. Minimum fire intervals = 5 years required to sustain communities. Plant often senesces & disappears from communities > 20 years old 	RA^
<i>Anthocercis anisantha</i> ssp. <i>anisantha</i>	Port Lincoln Ray-flower		R	21 29 32	ST DO	Shrub	<ul style="list-style-type: none"> At times locally abundant after fire 	<ul style="list-style-type: none"> # 	RA^
* <i>Asparagus asparagoides</i>	Bridal Creeper			8 26 29 32 39 49	CR GB IS KA KBN KBW LD LB MC MU MS PB ST WN	Herb	<ul style="list-style-type: none"> Adults quickly resprout from tubers post-fire Flowers: August-September 	<ul style="list-style-type: none"> Not likely to be spread by fire. May out-compete native species regeneration post-fire. Small areas may be controlled by spot spraying post-fire. Biological control agents may establish if introduced post-fire. Burning for weed control preferably in autumn after the annual shoot cohort emerges 	Aus^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in 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 Mgt Recommendations	Source
					WLS				
<i>Caladenia bicalliata</i> ssp. <i>bicalliata</i>	Western Daddy-long-legs		R	29 32 49	KBN LD MC ST	Perennial Herb	<ul style="list-style-type: none"> Flowers: September-October Populations survived Wangary fire Flowering plants decrease with time since-fire. Life span for genus likely 5-15 yrs 	<ul style="list-style-type: none"> Fire intervals > 3 years recommended 	R^
<i>Caladenia brumalis</i>	Winter Spider-orchid	VU	V	8	WN WLS	Herb	<ul style="list-style-type: none"> Highly specialised relationship between orchid & pollinator (wasp likely). Increased in abundance after EP fires (unknown if this is due to existing population stimulation or new individuals) 	<ul style="list-style-type: none"> Likely to require fire stimulation as part of life cycle. Frequency unknown. Post-fire grazing management is critical. 	(Ecological Associates Pty Ltd, 2006a)
<i>Caladenia tensa</i>	Inland Green-comb Spider-orchid	EN		26	LCP	Herb	<ul style="list-style-type: none"> Likely to be stimulated by fire (unknown if this is due to existing population stimulation or new individuals) Flowers: September-October Fruits: October-November 	<ul style="list-style-type: none"> Late summer or early autumn prescribed burning is best Spring burns are seen as a potential threat 	(Todd, 2000)
<i>Choretrum glomeratum</i> var. <i>chrysanthum</i>	Yellow-flower Sour-bush		R	29	MH	Shrub	<ul style="list-style-type: none"> Post-fire germination occurs (trigger unknown – may be heat, smoke, increased light or reduced competition) Flowers: September-January Hemiparasitic (depend on a host) 	<ul style="list-style-type: none"> # 	SA^
<i>Drosera stricticaulis</i>	Erect Sundew		V	29 49	MS MU	Herb	<ul style="list-style-type: none"> Other species of <i>Drosera</i> quickly respond post-fire on lower EP 	<ul style="list-style-type: none"> # 	R^

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 Mgt Recommendations	Source
<i>Eucalyptus conglobata</i> ssp. <i>conglobata</i>	Port Lincoln Mallee		R	27 29 49	KBN MC MH ST DO	Mallee Tree	<ul style="list-style-type: none"> • Resprouts from lignotuber • Canopy held seed bank • Prolific post-fire germination 	<ul style="list-style-type: none"> • Avoid frequent inter-fire intervals 	R^
<i>Gahnia trifida</i>	Cutting Grass		E	38	KB MS	Perennial	<ul style="list-style-type: none"> • Flowers: August-October • Cutting Grass Sedgeland occurs in drainage lines & depressions • Provides important habitat for the EP Southern Emu-wren. 	<ul style="list-style-type: none"> • # 	R^
<i>Grevillea halmaturina</i> ssp. <i>laevis</i>	Prickly Grevillea		R	29 49	MS MU	Shrub	<ul style="list-style-type: none"> • Flowers: July-November • Mode of regeneration unknown 	<ul style="list-style-type: none"> • # 	SA^
<i>Halosarcia lepidosperma</i>			R	29 49	PSI ST	Succulent Prostrate Shrub	<ul style="list-style-type: none"> • Inhabit mud flats and salt marshes • Unlikely to be stimulated by fire 	<ul style="list-style-type: none"> • Not applicable 	SA^
<i>Isotoma scapigera</i>	Salt Isotome		R	49	KBS	Succulent Prostrate Shrub	<ul style="list-style-type: none"> • Inhabit mud flats and salt marshes • Unlikely to be stimulated by fire • Flowers: October-December 	<ul style="list-style-type: none"> • Not applicable 	SA^
<i>Levenhookia stipitata</i>			R	8 29 49	WN WLS MU	Herb	<ul style="list-style-type: none"> • Flowers: August-January 	<ul style="list-style-type: none"> • # 	SA^
<i>Lobelia heterophylla</i>			R	21 29	ST	Annual	<ul style="list-style-type: none"> • Little is known about the ecology and biology of this species 	<ul style="list-style-type: none"> • # 	-
* <i>Lycium ferocissimum</i>	African Boxthorn			29 31 32 37 39	GB IS ST	Shrub	<ul style="list-style-type: none"> • Juvenile period < 2 years. • Fruits dispersed by birds & foxes • Adults generally resprout following fire 	<ul style="list-style-type: none"> • Weed control required post-fire 	SA^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in the plan area

APPENDIX 1 – FIRE RESPONSE OF FLORA

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 Mgt Recommendations	Source
<i>*Marrubium vulgare</i>	Horehound			29 32 49	DO KBN PSI ST	Shrub	<ul style="list-style-type: none"> Seedlings readily recruit post-fire Adults killed by fire Fire may reduce < 80% seedbank Flowers: September-March 	<ul style="list-style-type: none"> Weed control required post-fire either through spraying or burning at short inter-fire intervals. 	SA^
<i>Myoporum parvifolium</i>	Creeping Boobialla		R	29 32	PSI ST	Prostrate Shrub	<ul style="list-style-type: none"> Flowers: October-March Adults killed by fire Soil seedbank germinates post-fire 	<ul style="list-style-type: none"> # 	Aus^
<i>*Olea europaea</i>	European Olive					Tree	<ul style="list-style-type: none"> Adults resprout following fire Seedlings are killed by fire Flowers: late spring Seeds germinate in autumn. Fruits dispersed by birds & foxes 	<ul style="list-style-type: none"> Weed control required post-fire. 	SA^
<i>Olearia pannosa ssp pannosa</i>	Silver Daisy-bush	VU	V			Shrub	<ul style="list-style-type: none"> Similar species have variable seed production, low seed viability & limited seed dispersal. Flowers August-October Resprouts from lignotuber 	<ul style="list-style-type: none"> # 	SA^
<i>Phyllanthus calycinus</i>	Snowdrop Spurge		R	29	MH	Erect Shrub	<ul style="list-style-type: none"> Flowers: May-October Often on sandy soils 	<ul style="list-style-type: none"> # 	SA^
<i>Pleuropappus phyllocalymmeus</i>	Silver Candles	VU	V	29 32 49	GB KBN KBW LD	Annual	<ul style="list-style-type: none"> Flowers: September-December Unlikely to be stimulated by fire as located in salt pans Seed production: mid summer (seeds fall into cracks in mud) 	<ul style="list-style-type: none"> Fire units should not drive through potential swamp habitat. 	SA^
<i>Poa drummondiana</i>	Knotted Poa		R	29	PSI	Perennial Grass	<ul style="list-style-type: none"> Flowers: September-November 	<ul style="list-style-type: none"> # 	SA^
<i>Poa fax</i>	Scaly Poa		R	29 31 32	GB LD ST	Erect Annual	<ul style="list-style-type: none"> Flowers: September-November in response to rain or flooding 	<ul style="list-style-type: none"> # 	SA^

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APPENDIX 1 – FIRE RESPONSE OF FLORA

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 Mgt Recommendations	Source
<i>Prasophyllum calcicola</i>	Limestone Leek-orchid		V	29	MH ST	Perennial Herb	<ul style="list-style-type: none"> • Tuberos • Flowers: September-October • Found in coastal areas on calcareous sand. • Prolific flowering post fire on EP (unknown if this is due to existing population stimulation or new individuals) 	• #	SA^
<i>Prasophyllum fecundum</i>	Self-pollinating Leek-orchid		R	8 29 49	LB TS ST MU WN	Herb	<ul style="list-style-type: none"> • Likely to be stimulated by fire (unknown if this is due to existing population stimulation or new individuals) 	• #	SA^
<i>Prasophyllum occultans</i>	Hidden Leek-orchid		R	26 29	MC ST	Herb	<ul style="list-style-type: none"> • Likely to be stimulated by fire (unknown if this is due to existing population stimulation or new individuals) 	• #	SA^
<i>Prostanthera calycina</i>	West Coast Mintbush	VU	V	26	LB	Spreading Perennial Shrub	<ul style="list-style-type: none"> • Flowers: September-December 	• #	R^
<i>Pteris tremula</i>	Tender Brake		R	29	MH	Fern	<ul style="list-style-type: none"> • Found in wet, shaded gullies or gorges 	• #	SA^

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 NOTE: list includes species known or likely to occur in 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 Mgt Recommendations	Source
<i>Ptilotus beckerianus</i>	Ironstone Mulla Mulla	VU	V	8 29 49	TS WN MU WLS	Perennial	<ul style="list-style-type: none"> Flowers: September-January Found in Coastal White Mallee open shrubland Prolific flower production post-fire. Many individuals above ground, however one tuber below – spread by root material. Approximately 300% increase in flowering post-fire. However seed viability poor – perhaps linked to the dry finish of growing period. 	• #	SA^
<i>Pultenaea trichophylla</i>	Tufted Bush-pea	VU	R	8	TS	Small Shrub	<ul style="list-style-type: none"> Flowers: December Post fire reproduction. Showed first recruitment in 10 yrs Some evidence that partially burnt individuals can resprout 	• #	SA^
<i>Schoenus sculptus</i>	Gimlet Bog-rush		R	8 49	MS TS	Small Annual	<ul style="list-style-type: none"> Flowers: July, October and November 	• #	SA^
<i>Sphaerolobium minus</i>	Leafless Globe-pea		R	8 29	WN MU	Rush-like Shrub	<ul style="list-style-type: none"> Flowers: Spring 	• #	SA^
<i>Spyridium leucopogon</i>	Silvery Spyridium		R	29	ST	Shrub	<ul style="list-style-type: none"> Little is known about the biology and ecology of this species 	• #	-
<i>Spyridium spathulatum</i>	Spoon-leaf Spyridium		R	29	KA PB	Erect Shrub	<ul style="list-style-type: none"> Flowers: most of the year 	• #	SA^
<i>Stackhousia annua</i>	Annual Candles	VU	V	26 29	MC ST	Annual Herb	<ul style="list-style-type: none"> Little is known about the biology and ecology of this species 	• #	-

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in 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 Mgt Recommendations	Source
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	EN	E	8 29	WN MU	Herb	<ul style="list-style-type: none"> Flowers August-November (mainly October) Post fire increase in abundance on EP (unknown if this is due to existing population stimulation or new individuals) First record of seed set in known populations post Wangary fire May require disturbance for seedling recruitment in Victoria. Significant flowering only occurs after fire in Victoria. 	<ul style="list-style-type: none"> Likely to require fire stimulation as part of life cycle. Frequency unknown. Post-fire grazing management is critical. 	Aus^
<i>Thelymitra flexuosa</i>	Twisted Sun-orchid		R	8 49	WN MS WLS	Herb	<ul style="list-style-type: none"> Flowers: Spring 	<ul style="list-style-type: none"> # 	SA^
<i>Thysanotus nudicaulis</i>			E	29	ST	Perennial Herb	<ul style="list-style-type: none"> Flowers: December-January Similar species were prolific post Wangary fire. 	<ul style="list-style-type: none"> # 	SA^
<i>Thysanotus wangariensis</i>	Eyre Peninsula Fringe-lily		R	29 32	GB LD	Perennial	<ul style="list-style-type: none"> Flowers: November-December 	<ul style="list-style-type: none"> # 	SA^
<i>Wurmbea decumbens</i>	Trailing Nancy		R	29	LB ST	Perennial Herb	<ul style="list-style-type: none"> Presumably resprouts. 	<ul style="list-style-type: none"> # 	SA^
<i>Xanthorrhoea semiplana</i> ssp. <i>tateana</i>	Tate's Grass-tree		R	8 29	KA MH WN MU		<ul style="list-style-type: none"> Flowers: October & November Locally abundant. Flowers readily post-fire 	<ul style="list-style-type: none"> # 	SA^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in the plan area

Appendix 2 – Fire Response of Rated and Introduced Fauna

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>Burhinus grallarius</i>	Bush Stone-curlew		R	29	CR IS MH ST DO	I G C	<ul style="list-style-type: none"> Sites: ground (beside a fallen log in a scrape or small bare patch) Material: none Season: Jul-Jan 	<ul style="list-style-type: none"> High site fidelity Nocturnal Requires litter and fallen timber on the ground Fire during the breeding season may disrupt nesting and kill individual birds 	<ul style="list-style-type: none"> Avoid frequent fires 	(DEC, 2006)
Bird	<i>Calyptorhynchus funereus xanthanotus</i>	EP Yellow-tailed Black-Cockatoo		V			G	<ul style="list-style-type: none"> Sites: hollows high in trees Material: woodchips Season: Jul-Jan 	<ul style="list-style-type: none"> Nomadic or locally migratory Higher intensity fire can increase hollow loss Favours Eucalypt woodland and pine plantations (Aleppo Pine) Associated with old age class vegetation due to requirement for hollows. Fragmented feeding habitats may be impacted by large area fires. Fire likely to impact the availability of food sources 	<ul style="list-style-type: none"> Protect breeding hollows in Sugar Gum woodlands. Avoid high intensity fire in areas with breeding hollows Minimise the loss of important feeding sites & critical habitat (including pine plantations) Consideration should be given to replacement food sources if habitat is extensively impacted 	Aus^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in 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
Bird	<i>Cereopsis novaehollandiae</i>	Cape Barren Goose		R	29 31 38 39	GB IS MC MH ST DO	H	<ul style="list-style-type: none"> Sites: ground (in tussocks of open grasslands) Material: dry grass & plants, lined with down Season: July-September 	<ul style="list-style-type: none"> Found on offshore islands (granite), in areas of pasture, tussock grass or low heath Mobile species, move from islands in the summer months to feed on the mainland. Habitat unlikely to be directly affected by fire but may affect summer feeding sites 	<ul style="list-style-type: none"> Unlikely to be significantly impacted. If fires occur within breeding sites on offshore islands a response may be appropriate. 	Aus^
Bird	<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo		R	26 29 49		I	<ul style="list-style-type: none"> Sites: brood parasite Material: variable Season: Aug-Jan 	<ul style="list-style-type: none"> Reasonable abundance & distribution on lower EP. Migrates to southern Australia to breed in spring. Occurs across the south & west coast of EP with distribution centred on the Koppio Hills. Fire likely to increase parasitism, exposing nests 	<ul style="list-style-type: none"> Manage habitats on a landscape scale. Bias toward old age growth habitat. Reduce the likelihood of extensive bushfires 	(Carpenter, 2007) SA^
Bird	<i>Egretta sacra</i>	Eastern Reef Egret		R	32	GB IS LD MH	C	<ul style="list-style-type: none"> Sites: on rock or in the branches of a low bushy tree Material: sticks Season: Sept-Feb 	<ul style="list-style-type: none"> Found on islands, rocky shores, beaches, tidal rivers, inlets, mangoves, singly or in pairs. Habitat unlikely to be directly affected by fire. 	<ul style="list-style-type: none"> Not applicable 	Aus^

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 NOTE: list includes species known or likely to occur in 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
Bird	<i>Falco peregrinus</i>	Peregrine Falcon		R	32	GB	C	<ul style="list-style-type: none"> Sites: rock crevices, cliffs Material: rock Season: Aug-Nov 	<ul style="list-style-type: none"> Breeding sites on ranges may be susceptible. May return to same nest sites Pairs will maintain a home range approximately 20-30km² May follow fires hunting disturbed prey as fire will change the availability of prey within home range. 	<ul style="list-style-type: none"> Reduce the likelihood of extensive bushfires 	Aus [^]
Bird	<i>Gerygone fusca</i>	Western Warbler/ Western Gerygone		R	8	TS WN WLS	I	<ul style="list-style-type: none"> Sites: suspended from a branch, 1-7 m above the ground Material: bark, grass, feathers, cobwebs. Season: Oct-Sept 	<ul style="list-style-type: none"> Prefers mallee and open <i>Eucalypt</i> and <i>Acacia</i> woodland. Small bird that frequents the tree canopy. Distribution on EP centred on area burnt by Wangary fire. More prevalent during spring. 	<ul style="list-style-type: none"> Recorded more at unburnt sites during post-2005 fire survey but had more individuals per site at burnt sites. 	SA [^]
Bird	<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle		V	21 29 31 32 39	GB LD MC MH ST DO WI	C	<ul style="list-style-type: none"> Sites: large nest in large tree, on ledges of cliffs or on the ground on off-shore islands Material: sticks and leaves Season: May-Oct 	<ul style="list-style-type: none"> The same nest is often used for years in succession Nests may be susceptible to fire. 	<ul style="list-style-type: none"> # 	Aus [^]

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 NOTE: list includes species known or likely to occur in the plan area

APPENDIX 2 – FIRE RESPONSE OF FAUNA

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>Leipoa ocellata</i>	Malleefowl	VU	V	29	MC MU ST	G I	<ul style="list-style-type: none"> Sites: mound builder Material: sand, gravel and vegetative matter Season: nest construction in Autumn, laying between Sept-Apr 	<ul style="list-style-type: none"> Requires old age class habitat. Ideal habitat age thresholds estimated between 20-60 years. Population size unknown in LNP, but likely to be few remaining individuals. Mortality as a result of fire may be substantial. 	<ul style="list-style-type: none"> Ensure a bias toward old age class vegetation. Reduce the likelihood of landscape scale fires 	Aus^
Bird	<i>Malurus pulcherrimus</i>	Blue-breasted Fairy-wren		V	21 26 29 32 38 39		I	<ul style="list-style-type: none"> Sites: close to the ground in a low bush Material: grass, feathers and fine material Season: Jul-Dec 	<ul style="list-style-type: none"> Prefers sand plain heath, with or without overstorey of scattered mallee <i>Eucalypts</i>, often occurring as remnant patches. 	<ul style="list-style-type: none"> Research into Splendid Fairy-wrens (<i>M. splendens</i>) indicates wrens can survive fires but show changes in behaviour & population structure for 3-5 years post-fire. 	(Woinarski, 1999) Aus^
Bird	<i>Neophema petrophila</i>	Rock Parrot		R	26 29 32	CR GB IS LD MC ST DO	G	<ul style="list-style-type: none"> Sites: in a hole in a cliff or in a cavity under a rock. Season: Aug-Feb 	<ul style="list-style-type: none"> Granivorous species may invade or become more abundant in recently burnt areas. 	<ul style="list-style-type: none"> # 	Aus^
Bird	<i>Numenius madagascariensis</i>	Eastern Curlew		V	32	LD	C	<ul style="list-style-type: none"> Does not breed in Australia 	<ul style="list-style-type: none"> Common summer migrant Highly mobile 	<ul style="list-style-type: none"> # 	Aus^

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APPENDIX 2 – FIRE RESPONSE OF FAUNA

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>Pandion cristatus</i>	Eastern Osprey		E	26 29	GB KBN MH WN ST MU	C	<ul style="list-style-type: none"> Sites: rock or cliff-face overlooking ocean, in a tree, or on the ground on islands. Material: sticks, driftwood, seaweed Season: Jul-Sept 	<ul style="list-style-type: none"> Found on borders of rivers, lakes, inlets of coasts and small islands lying off-shore, singly or in pairs. 	<ul style="list-style-type: none"> # 	Aus^
Bird	<i>Pedionomus torquatus</i>	Plains-wanderer	VU	E		WA	G H I	<ul style="list-style-type: none"> Sites: a depression sheltered by a tuft of grass or bush Material: lined with grass Season: Sept-Jan/Feb 	<ul style="list-style-type: none"> Prefers open plains and level grasslands 	<ul style="list-style-type: none"> # 	Aus^
Bird	<i>Podiceps cristatus</i>	Great Crested Grebe		R	49	MH	H C I	<ul style="list-style-type: none"> Sites: floating in water or moored to rushes or flotsam Material: green rushes, reeds & other aquatic plants Season: Nov-Mar 	<ul style="list-style-type: none"> Aquatic bird 	<ul style="list-style-type: none"> # 	Aus^

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APPENDIX 2 – FIRE RESPONSE OF FAUNA

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>Psophodes nigrogularis ssp. leucogaster</i>	Western Whipbird	VU	V	29 49	ST	I G C	<ul style="list-style-type: none"> Sites: up to 2 m above ground under mallee, <i>Banksia</i> sp. or swordgrass Material: bark, twigs and grass Season: Jul-Oct Low reproductive rates. 	<ul style="list-style-type: none"> Preference for older age-classes (heath 50 years +) Relatively poor dispersal ability. Appears to be most abundant in 10 - 25 year old mallee. 	<ul style="list-style-type: none"> Habitat suitable 4 - 7 yrs post-fire. Species persist in long-unburnt thickets (up to 50 yrs) Fire intervals of 10 - 50 yrs, or reduce the likelihood of entire habitat patches being burnt. Other research recommends longer fire-free intervals (> 30 yrs but preferably 50 yrs). 	(Woinarski, 1999)
Bird	<i>Puffinus carneipes</i>	Fleshy-footed Shearwater		R		IS	C	<ul style="list-style-type: none"> Sites: chamber at the end of a burrow on coast Season: late Sept-May 	<ul style="list-style-type: none"> Burrows found on Williams Island 	<ul style="list-style-type: none"> # 	Aus^
Bird	<i>Stagonopleura guttata</i>	Diamond Firetail		V	8	CR KBN MH ST MU WN	G I	<ul style="list-style-type: none"> Sites: shrub and tree canopy Material: grass Season: Oct-Jan 	<ul style="list-style-type: none"> Lives in pairs & small groups in grassy woodlands dominated by native grasses. Recorded equally at burnt and unburnt sites post Wangary fire. Feeds exclusively on ground Requires ground cover, including fallen timber Local movements Strong fliers likely to evade fire Habitat likely to be temporarily impacted by fire Decline due to loss of Drooping 	<ul style="list-style-type: none"> >50% of habitat patch should not burn in a single fire event 	Aus^ (Carpenter, 2007)

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in 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
									Sheoak Woodlands through grazing and fire <ul style="list-style-type: none"> • May benefit from exposed sites being able to forage for seeds and insects 		
Bird	<i>Sterna nereis</i>	Fairy Tern		E	29 32	IS KBN LD ST DO	C	<ul style="list-style-type: none"> • Sites: depression in the sand • Season: Sept-Mar 	<ul style="list-style-type: none"> • Found in inlets & on beaches usually in flocks • Mobile species. • Habitat unlikely to be directly affected by fire. • There is a low likelihood that fire may affect summer breeding by disturbing adults from nests 	<ul style="list-style-type: none"> • # 	Aus^
Bird	<i>Stipiturus malachurus parimeda</i>	EP Southern Emu-wren	VU	E	21 29 32 49	DP GB KB MC MU ST WA	I	<ul style="list-style-type: none"> • Sites: dense cover ~ 3 m above ground. • Season: spring-summer. • Young fledge 2 weeks after hatching. • Require habitat of approx 1 ha per breeding pair. 	<ul style="list-style-type: none"> • Recolonise areas as vegetation structure becomes more closed (> 3 years post-fire). • Recolonisation occurs if there is adjacent unburnt occupied habitat or a adequately connected source population • In older heaths (> 10-20 years old) a reduction in productivity may see a decline in the species. • Limited capacity for dispersal due to poor flying habits. • Requires dense corridors of vegetation for dispersal. 	<ul style="list-style-type: none"> • Avoid frequent fire • The majority of any habitat patch should remain unburnt per burn cycle. • Minimum inter-fire intervals in wet sedge/shrubland = 10 years • Minimum inter-fire intervals in dry shrubland/mallee = 25 years • Coastal mallee heaths may require longer minimum inter-fire intervals to re-establish • Burn regimes must allow for unburnt refuge areas & 	(Pickett, 2006)

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
NOTE: list includes species known or likely to occur in the plan area

APPENDIX 2 – FIRE RESPONSE OF FAUNA

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
										<ul style="list-style-type: none"> maintain population connectivity. • Burn during Autumn. 	
Bird	<i>Thinornis rubricollis</i>	Hooded Plover		V	26 29 32	GB LD MC MH PSI ST DO	I	<ul style="list-style-type: none"> • Sites: depression in the sand • Season: Sept-Jan 	<ul style="list-style-type: none"> • Occupies seashores, dunes, occasionally the margins of coastal lagoons and inland salt lakes, in pairs or family groups. 	<ul style="list-style-type: none"> • # 	Aus^
Bird	<i>Turnix varia</i>	Painted Button-quail		V	29	KBW PB DO MU MS	G I	<ul style="list-style-type: none"> • Sites: terrestrial under vegetation within a depression • Material: grass acting as a hood & lined with finer grass • Season: Aug-March 	<ul style="list-style-type: none"> • Generally feeds in pasture. • Widely distributed over the southern half of EP where sufficient leaf litter is avail for feeding – has declined in more cleared districts. • Increase in abundance in recently burnt areas 3 to 10 years post-fire 	<ul style="list-style-type: none"> • Manage habitat based on a landscape approach. • Found equally in burnt/unburnt habitats surveyed post Wangary fire. • >50% of habitat patch should not burn in a single fire event 	(Carpenter, 2007) (Woinarski, 1999) Aus^
Bird	<i>Tyto novaehollandiae</i>	Masked Owl		E		ST	C	<ul style="list-style-type: none"> • Sites: tree hollows (high) or possibly a cave or blow-hole • Season: Mainly Apr-Jul 	<ul style="list-style-type: none"> • Found in forests, open woodlands, farmlands with tall or dense mature trees adjacent open areas • Prefers areas with a sparse understorey 	<ul style="list-style-type: none"> • # 	Aus^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in the plan area

APPENDIX 2 – FIRE RESPONSE OF FAUNA

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
Mammal	<i>Bettongia penicillata ogilbyi</i>	Brush-tailed Bettong (western sub-species)	CD	R	27 29	DO MC	H I	<ul style="list-style-type: none"> Sites: domed nests in a ground depression under bushes, in tussock grass or thick leaf litter Material: grass, shredded bark Season: continuous 	<ul style="list-style-type: none"> Prefers open forests and woodlands with shrub cover Depends upon scale and intensity of fire but are often reluctant to move from burnt home range areas. Likely to be impacted by increased predation after fire 	<ul style="list-style-type: none"> Refuge areas required Predators and competitors may increase in abundance after fire 	(Martin, et al., 2006)
Mammal	<i>Phascolarctos cinereus</i>	Koala		R	29		H	<ul style="list-style-type: none"> Sites: arboreal Season: approx Sept-Feb 	<ul style="list-style-type: none"> Introduced to EP Occupy home ranges which vary in size depending on habitat quality High intensity fires reduce available foraging habitat Unlikely to escape from fast moving fires 	<ul style="list-style-type: none"> Promote localised patchiness in fires in core habitat (refuge areas) Reduce the likelihood of canopy fires or crown scorch in known habitat Avoid falling of trees during mop up in known habitat Avoid spring and summer burning 	Aus^
Mammal	<i>Trichosurus vulpecula</i>	Common Brushtail Possum		R	32	GB MH	H	<ul style="list-style-type: none"> Sites: hollows in logs or trees Season: autumn or spring 	<ul style="list-style-type: none"> Food resources will be severely depleted post-fire. Loss of vegetation cover may increase possibility of predation If tree hollows lost may switch to surrogate dens. On EP individuals may have avoided starvation by feeding 	<ul style="list-style-type: none"> Predators and competitors may increase in abundance after fire Reduce the likelihood of landscape scale fires 	SA^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in the plan area

APPENDIX 2 – FIRE RESPONSE OF FAUNA

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
									<p>on the sap of Sugar Gums.</p> <ul style="list-style-type: none"> • Post-fire water availability is a significant issue due to the reliance on diet for hydration • Post-fire recovery likely to be constrained by den hollows. • Remnant vegetation with linking corridors is a priority for protection. 		
Reptile	<i>Bassiana trilineata</i>	Western Three-lined Skink		R	26 29 32	CR MC MH WH ST MU	I		<ul style="list-style-type: none"> • Reasonable abundance and distribution on lower EP. • May be affected on a localised scale but re-establish post-fire. • Prefers moist forests and woodland habitats 	<ul style="list-style-type: none"> • Manage habitats on a landscape scale 	SA^
Reptile	<i>Lerista arenicola</i>	Beach Slider		R		LD	I		<ul style="list-style-type: none"> • Confined to coastal habitat • Unlikely to be direct mortality due to fire. • Habitat quality will be altered by fire. 	<ul style="list-style-type: none"> • # 	SA^
Reptile	<i>Lerista microtis</i>	Long-legged Slider		R		IS	I		<ul style="list-style-type: none"> • Unlikely to be direct mortality due to fire. • Habitat quality will be altered by fire. 	<ul style="list-style-type: none"> • # 	SA^
Reptile	<i>Varanus rosenbergii</i>	Heath Goanna		R	29	MC DO ST	I C	<ul style="list-style-type: none"> • Sites: termite mounds • Season: summer-spring 	<ul style="list-style-type: none"> • Found in heath, open forest and woodland • Termite mounds are a critical habitat component • Individuals require large areas of habitat 	<ul style="list-style-type: none"> • # 	Aus^

Refer to Section 3.4 for MVS names and Section 37 for details on codes used in Appendices
 NOTE: list includes species known or likely to occur in the plan area

Appendix 3 – Fire Response of Rated and Significant Ecological Communities

Ecological Community	Proposed SA Rating (DEH, 2005b)	Occurrence	MVS No.	Components	Fire Response	Fire Management Guidelines	Source
<p>Drooping Sheoak (<i>Allocasuarina verticillata</i>) Grassy Low Woodland on clay loams of low hills</p>	Vulnerable (except where it occurs on calcareous soils of coastal plains)	<ul style="list-style-type: none"> Once widespread on EP, now threatened Rated community within Tucknott Scrub CP Coastal plains community occurs in Coffin Bay NP and Lincoln NP 	26	<ul style="list-style-type: none"> Open savannah woodland with Drooping Sheoak as the principal dominant tree species. Dryland Tea-tree (<i>Melaleuca lanceolata</i>) is a frequently associated and sometimes dominant tree species <i>Danthonia</i> and <i>Stipa</i> species are prominent perennial grasses in the understorey 	<ul style="list-style-type: none"> High frequency, intense fires results in a decline in mature Drooping Sheoak. Grazing pressure by herbivores, such as kangaroos and rabbits post-fire can affect recruitment of Drooping Sheoaks 	<ul style="list-style-type: none"> Avoid burning contiguous remnants of Drooping Sheoak Woodland in their entirety during a single fire event, instead aim to increase patchiness within the remnants; Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns. 	<p>(Woinarski, 1999)</p> <p>(Peeters, <i>et al.</i>, 2006)</p>
<p>Peppermint Box (<i>Eucalyptus odorata</i>) Grassy Low Woodland on loamy soils of low hills</p>	Endangered	<ul style="list-style-type: none"> Main distribution along the eastern side of the Koppio Hills, associated with the fertile red-brown soils 	5	<ul style="list-style-type: none"> Savannah woodland with Peppermint Box as the dominant tree Common Wallaby Grass (<i>Danthonia caespitosa</i>) Spear Grasses (<i>Stipa</i> sp.) 	<ul style="list-style-type: none"> Grassy understorey species regenerate well following low-moderate intensity fire Some shrub species regenerate following moderate-high intensity fire Hollows & coarse woody debris are important fauna habitat elements and can be adversely affected by moderate to high intensity fire 	<ul style="list-style-type: none"> Avoid burning large contiguous remnants of Peppermint Box woodland in their entirety during a single fire event, instead aim to increase patchiness within the remnants; Determine the response of the community to different disturbance regimes through the application of ecological/experimental burns. 	

APPENDIX 3 – FIRE RESPONSE OF ECOLOGICAL COMMUNITIES

Ecological Community	Proposed SA Rating (DEH, 2005b)	Occurrence	MVS No.	Components	Fire Response	Fire Management Guidelines	Source
<p>Smooth Cutting-grass (<i>Gahnia filum</i>) Sedgeland in drainage lines and depressions</p>	Vulnerable	<ul style="list-style-type: none"> Found in Kellidie Bay CP and Coffin Bay NP 	38	<ul style="list-style-type: none"> Dominant Species Smooth cutting-grass 	<ul style="list-style-type: none"> # 	<ul style="list-style-type: none"> # 	
<p>Cutting-grass (<i>G. trifida</i>) Sedgeland in drainage lines and depressions</p>	Endangered	<ul style="list-style-type: none"> In fresher water than <i>G. filum</i> Inland/sub-coastal drainage depressions, creeklines, swampy flats, and floodplains Protected within Murrunatta CP 	38	<ul style="list-style-type: none"> Dominant Species Cutting-grass Other Species Smooth Cutting-grass Sea Rush (<i>Juncus kraussii</i>) Mallee Honey-myrtle Totem Poles (<i>Melaleuca decussata</i>) Understorey Species <i>Apodasmia brownii</i> Bare Twig-rush (<i>Baumea juncea</i>) <i>Schoenus</i> sp. samphire pasture grasses 	<ul style="list-style-type: none"> # 	<ul style="list-style-type: none"> # 	

37 SUMMARY OF CODES USED IN APPENDICES

Block Codes

Code	Block	Reserve	Code	Block	Reserve
MH	Miller's Hole	Lincoln NP & Sleaford Mere CP	KBS	Kellidie Bay South	Kellidie Bay CP
WA	Wanna	Lincoln NP	KBW	Kellidie Bay West	Kellidie Bay CP
CR	Curta Rocks	Lincoln NP & Memory Cove WPA	GB	Gunyah Beach	Coffin Bay NP
MC	Memory Cove	Lincoln NP & Memory Cove WPA	LD	Lake Damascus	Coffin Bay NP
ST	Stamford	Lincoln NP	PSI	Point Sir Isaacs	Coffin Bay NP
DO	Donington	Lincoln NP	WH	Whidbey	Coffin Bay NP
IS	Islands	Various (refer to Section 18)	MU	Murrunatta	Murrunatta CP
LB	Lincoln	Lincoln CP	MS	Murrunatta Swamp	Murrunatta CP
PB	Proper Bay	Crown land reserves	WLS	Vanilla Land Settlement	Vanilla Land Settlement CP
KA	Kathai	Kathai CP	WN	Vanilla	Vanilla CP
KBN	Kellidie Bay North	Kellidie Bay CP	TS	Tucknott Scrub	Tucknott Scrub 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	N Nectar feeder
		VU	Vulnerable	I Insectivore/"arthropodivore"/omnivore
		CD	Conservation Dependant	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.

38 GLOSSARY OF ACRONYMS AND FIRE MANAGEMENT TERMINOLOGY

Term	Definition
Backburn(ing)	A fire started intentionally along the inner edge of a control line to consume the fuel in the path of a bushfire.
Bushfire	An unplanned fire. A generic term that includes grass fires, forest fires and scrub fires.
CFS	The South Australian Country Fire Service.
Coarse Fuels	Dead woody material, greater than 25 mm in diameter, in contact with the soil surface (fallen trees and branches).
Control line	(fireline) A natural or constructed barrier, or treated fire edge, used in fire suppression and prescribed burning to limit the spread of fire.
DEH	The South Australian Department for Environment and Heritage.
Direct attack	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.
Discontinuous fuels	Significant gaps between clumps or patches of fuel (DEH, 2006e)
DPBC	District Bushfire Prevention Committee.
EAT	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, 2004d)
Elevated Fuel	Shrubs and juvenile understorey plants up to 3 m in height (DEH, 2006e)
EP	Eyre Peninsula
EPBC Act	The commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Extreme fire behaviour	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.
Extreme fire danger	The highest fire danger classification.
Fine fuel(s)	Grass, leaves, bark and twigs less than 6mm in diameter.
Fire access track	A track constructed and maintained expressly for fire management purposes.
Fire behaviour	The manner in which a fire reacts to the variables of fuel, weather and topography.
Fire break	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).

Term	Definition
Fire danger	The combination of all factors, which determine whether fires start, spread and do damage, and whether and to what extent they can be controlled.
Fire danger rating	An evaluation of fire rate of spread, or suppression difficulty for specific combinations of fuel, fuel moisture, temperature, humidity and wind speed. The rating can be Low, Moderate, High, Very High or Extreme.
Fire frequency	The number of fires that have occurred on the same area over a time period.
Fire intensity	The rate of energy or heat release per unit time per unit length of fire front, usually expressed in kilowatts per metre (kw/m) (Pausas, <i>et al.</i> , 2003)
Fire interval	The interval between successive fires.
Fire management	All activities associated with the management of fire-prone land, including the use of fire to meet land management goals and objectives.
Fire regime	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).
Fire scar	A destructive mark left on a landscape by fire.
Fire season	The period(s) of the year during which fires are likely to occur, spread and do sufficient damage to warrant organised fire control.
Fire severity	The effect of fire on an ecosystem, that is, on living plants, as well as on the amount and location of organic matter consumed during a fire (Pausas, <i>et al.</i> , 2003)
Fire suppression	The activities connected with restricting the spread of bushfire following its detection and making it safe.
Fuel	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.
Fuel arrangement	A general term referring to the spacing and arrangement of fuel in a given area.
Fuel hazard	The overall fuel hazard is defined as the sum of the influences of bark fuel, elevated fuel and surface fine fuel (DEH, 2006e)
Fuel management	Modification of fuels by prescribed burning, or other means.
Fuel reduction burning	The planned application of fire to reduce hazardous fuel quantities, undertaken in prescribed environmental conditions within defined boundaries.
Fuel type	An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause predictable rate of spread or difficulty of control under specified weather conditions.
GAFLC	South Australian Government Agencies Fire Liaison Committee.
IBRA	Interim Biogeographical Regionalisation for Australia.
Incident Controller (IC)	The individual responsible for the management of all incident operations and IMT.

Term	Definition
IMT	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.
Indirect attack	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.
Key Fire Response Species	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.
MFS	South Australian Metropolitan Fire Service.
Near-surface fuel	Grasses, low shrubs and heath, sometimes containing suspended components (leaves, bark and/or twigs).
NPW Act	The South Australian <i>National Parks and Wildlife Act 1972</i> .
NVC	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).
'Of conservation significance'	In this plan, used to describe important or <u>rated</u> populations or species of flora and fauna as well as vegetation communities. These may be: <ul style="list-style-type: none"> Nationally rated, that is, listed as Threatened (with a rating of Extinct, Critically Endangered, Endangered, Vulnerable or Conservation Dependent) under the federal <i>Environment Protection and Biodiversity Conservation (EPBC) Act 1999</i>; South Australian rated, listed as Threatened (with a rating of Endangered, Vulnerable or Rare) under the <i>National Parks and Wildlife Act 1972, Revised Schedules 7, 8 and 9</i>. Provisionally listed as Threatened (with a rating of Endangered or Vulnerable) in South Australia, that is, included on the unpublished DEH <i>Provisional List of Threatened Ecosystems of South Australia</i> (DEH, 2005b).
Prescribed Burn Plan	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.
Prescribed burning	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.
Response plan	A plan detailing the response for a risk or an area including the type and number of resources.
Retardant	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.
Risk assessment	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 Recommendations for risk mitigation. Considers <i>Likelihood</i> and <i>Consequence</i> to determine an overall risk rating using a

Term	Definition
	matrix as <i>Low, Moderate, High, Very High or Extreme</i> (DEH, 2008c).
SA Water	South Australian Water Corporation.
Spotting	The ignition of spot fires from sparks or embers
Total Fire Ban	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).
TPC	The <i>Threshold of Potential Concern</i> 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.
'Weed of national significance'	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)

