Shire of Serpentine Jarrahdale

Korribinjal Brook Reserve
Management Plan

Version 2 - March 2021

1. EXECUTIVE SUMMARY 4

1.1 INTRODUCTION 4
1.2 OBJECTIVES 4
1.3 LOCATION AND DESCRIPTION 4
Figure 1 – Site Location of Korribinjal Brook Reserve 5
Figure 2 – Korribinjal Brook Reserve Outline 6
Figure 3 – Korribinjal Brook Reserve Sections 6
1.4 REPORT STRUCTURE 7
1.5 KEY PRIORITY ACTIONS 7
Table 1 – Key Actions for the Management of Korribinjal Brook Reserve 7
1.6 SHORT TERM ACTIONS 8
Table 2 – Short Term Actions for the Management of Korribinjal Brook Reserve 8

2. GOVERNANCE 9

2.1 VESTING AND LAND TENURE 9
Table 3 – Korribinjal Brook Reserve Locations and Uses 9
2.2 COMMUNITY CONSULTATION AND PARTICIPATION 9
2.3 GOVERNANCE: ACTIONS 10
Table 4 – Governance Actions for Management of Korribinjal Brook Reserve 10

3. ENVIRONMENTAL CHARACTERISTICS 11

3.1 LAND RESOURCES 11
3.1.1 Description 11
Table 5 – Landform and Soil Classifications 11
3.1.2 Threats and Pressures 12
3.2 WATER RESOURCES 12
3.2.1 Description 12
3.2.2 Threats and Pressures 13
3.3 BIODIVERSITY 14
3.3.1 Description 14
3.3.2 Flora 15
Table 6 – Native Flora Species List for Korribinjal Brook Reserve 15
Table 7 – Common Weeds of Korribinjal Brook Reserve 16
3.3.3 Fauna 16
Table 8 – Threatened and Priority Fauna, Shire of Serpentine-Jarrahdale 17
Table 9 – Fauna Recorded in Korribinjal Brook Reserve (July 1999) 17
3.3.4 Threats and Pressures 18
3.4 ENVIRONMENTAL CHARACTERISTICS: ACTIONS 20
Table 10 – Environmental Actions for Management of Korribinjal Brook Reserve 20

4. SOCIAL AND ECONOMIC CHARACTERISTICS 23

4.1 ABORIGINAL HERITAGE 23
4.2 EUROPEAN HERITAGE 24
4.3 RECREATION 25
4.3.1 Description 25
4.3.2 User Groups 25
4.3.3 Threats and Pressures 25
Figure 4 – Korribinjal Brook Reserve Trail Network 26
4.4 INFRASTRUCTURE 27
4.4.1 Description 27
4.4.2 Threats and Pressures 27
4.5 SOCIAL AND ECONOMIC CHARACTERISTICS: ACTIONS 28
Table 11 – Social and Economic Actions for Management of Korribinjal Brook Reserve 28

5. IMPLEMENTATION 30

5.1 INTRODUCTION 30
5.2 PRIORITIES AND STATUS 30
5.3 RESPONSIBILITIES, MONITORING AND REVIEW 30
5.4 IMPLEMENTATION, MONITORING AND REVIEW ACTIONS 31
Table 12 – Implementation, Monitoring and Review Actions for Management of Korribinjal Brook Reserve ...31
5.5. ACTION PLAN 31
Table 13 – Actions for Management of Korribinjal Brook Reserve 31

6. REFERENCES 34

APPENDIX 1 – WEED CONTROL AND RESTORATION PLAN 35

APPENDIX 2 – KORRIBINJAL BROOK RESERVE FIRE MANAGEMENT STRATEGY 37

A2.1. INTRODUCTION 37
A2.2. FIRE MANAGEMENT OBJECTIVES 37
A2.2.1. Fire Prevention and Preparedness Strategies and Tactics 37
A2.2.2. Fire Suppression Strategies and Tactics 38
A2.2.3. Fire Recovery Strategies 38
A2.3. FIRE MANAGEMENT ZONES 39
Figure 5 – Fire Management Zones 39
A2.4. FIRE MANAGEMENT SCHEDULE OF WORKS 40
A2.5. FIRE MANAGEMENT RESPONSE PLAN 40
A3.6. ENVIRONMENTAL ADVICE 41

1. Executive Summary

1.1 Introduction

Korribinjal Brook Reserve covers a total area of almost 5.5 hectares. It is located about 55 km southeast of Perth in the Darling Range, in the Millbrook area of Jarrahdale. The reserve is a highly disturbed local natural area with a weedy understorey under a mainly natural tree canopy, and follows the course of the Korribinjal Brook. The reserve purpose is public recreation, but the area has significant conservation values and high community interest.

Local residents, Landcare SJ Inc. and the Shire of Serpentine Jarrahdale have been working since 1987 to improve the condition of the reserve through weed control and revegetation with local native plants. The aim is to restore the reserve closer to its original state and condition, while enhancing its important conservation values through the establishment of two major walk trails.

Korribinjal Brook Reserve (KBR) consists of four land parcels, one to the west and three to the east of Medulla Road. Unless otherwise specified, the terms *Korribinjal Brook Reserve*, *KBR*, or *reserve* refer to the combined areas of all four land parcels.

1.2 Objectives

The objectives of this management plan are to:

- Provide the necessary background information and site descriptions for informed management of the reserve;
- Define specific management objectives for maintaining and improving the conservation values of the reserve:
    1. Assess the vegetation quality and potential for rehabilitation;
    2. Assess the major problems affecting safety, aesthetics and public enjoyment, such as fire management and weed control;
    3. Assess the types and degree of environmental degradation and possible ways to address these issues; and
    4. Provide a plan for the residents' group to follow when regenerating the area;
- Document the actions required to successfully manage the reserve;
- Identify any management constraints and possible ways to overcome them;
- Ensure consistent management into the future, so that the goal or focus is clearly defined and easy to follow despite change of personnel and residents; and
- Provide the community with the opportunity to become involved in the decision-making process for management of the reserve.

1.3 Location and Description

Korribinjal Brook Reserve is located in the Millbrook area of Jarrahdale, and consists of two sections, East and West. The Western part of the reserve (Lot 4017, R42251) is on the northern side of Millbrook Close, west of Medulla Road, and is over two hectares in size. The Eastern part of the reserve (Lots 4022, 2604 and 2603 – R42251, R36434 and R36436 respectively) is on the eastern and northern side of

Medulla Road, and totals approximately 3.4 hectares. Both parts of the reserve have large identifying signs visible from the road.

Korribinjal Brook runs through the reserve, and is a tributary of the larger Medulla Brook. This brook discharges into the Serpentine River, which empties into the Peel Harvey Inlet. The total area of the eastern and western parts of the reserve is over 5.4 hectares.

Figure 1 shows the location of Korribinjal Brook Reserve, Figure 2 the reserve outline, and Figure 3 the land parcels or sections that make up the reserve.

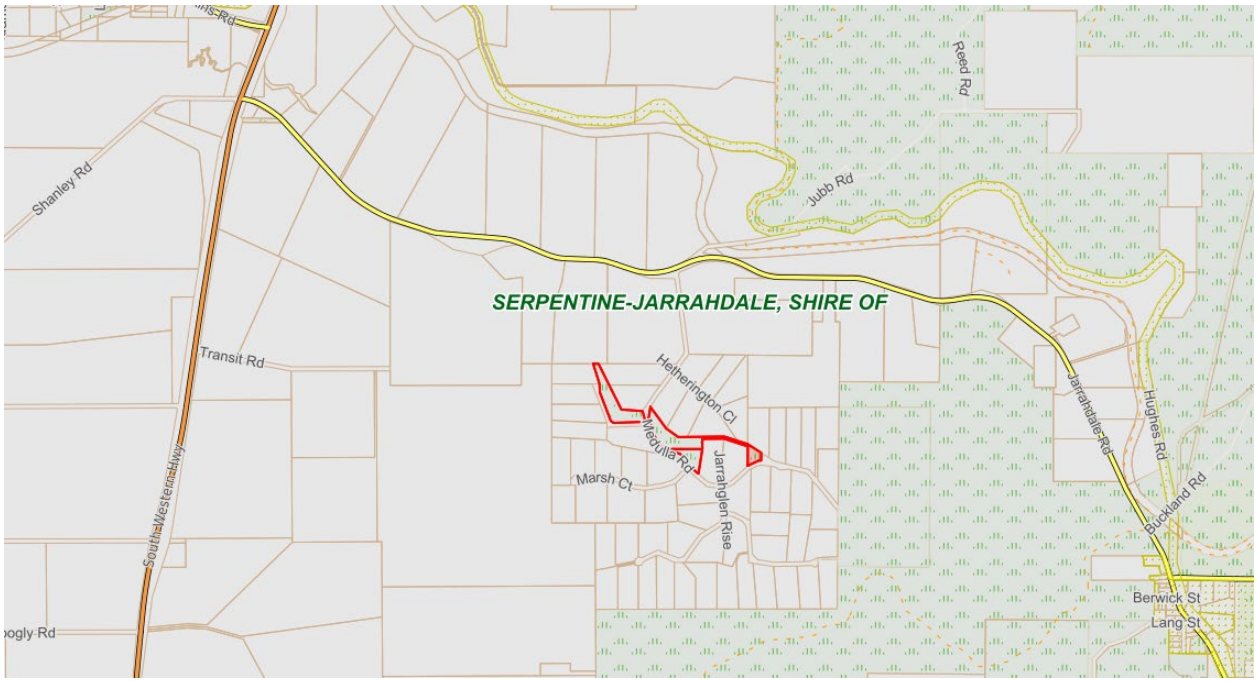

Figure 1 – Site Location of Korribinjal Brook Reserve

Prior to European settlement, woodlands, forests, waterways and swamps provided resources for Aboriginal people. In 1872, timber concessions were granted in the Jarrahdale area, leading to widespread timber cutting and transport for shipping all over the world. The reserve provides an important example of the tree canopy which once covered much of the western Darling Range and upper Darling Scarp.

Prior to reservation, Korribinjal Brook Reserve was part of a farm, and was heavily grazed. By the late 1970s, little of the original understorey flora remained and weed infestation was heavy. The area was rezoned during the Millbrook subdivision in 1980 from grazing land to a public recreation reserve.

Since 1987, local residents have been involved in weed control, walk trail establishment and planting of local native plants, with assistance from Landcare SJ Inc., the Jarrahdale Heritage Society, the Karnet Prison Farm inmates, and funding from the Natural Heritage Trust and Alcoa.

As local properties change hands and dedicated volunteers move away, the conservation and recreation values of the reserve are coming under increasing pressure from reduced maintenance and associated fire hazard concerns. This management plan seeks to sustainably manage reserve maintenance in view of local interests and the environmental, social and economic values of the reserve.

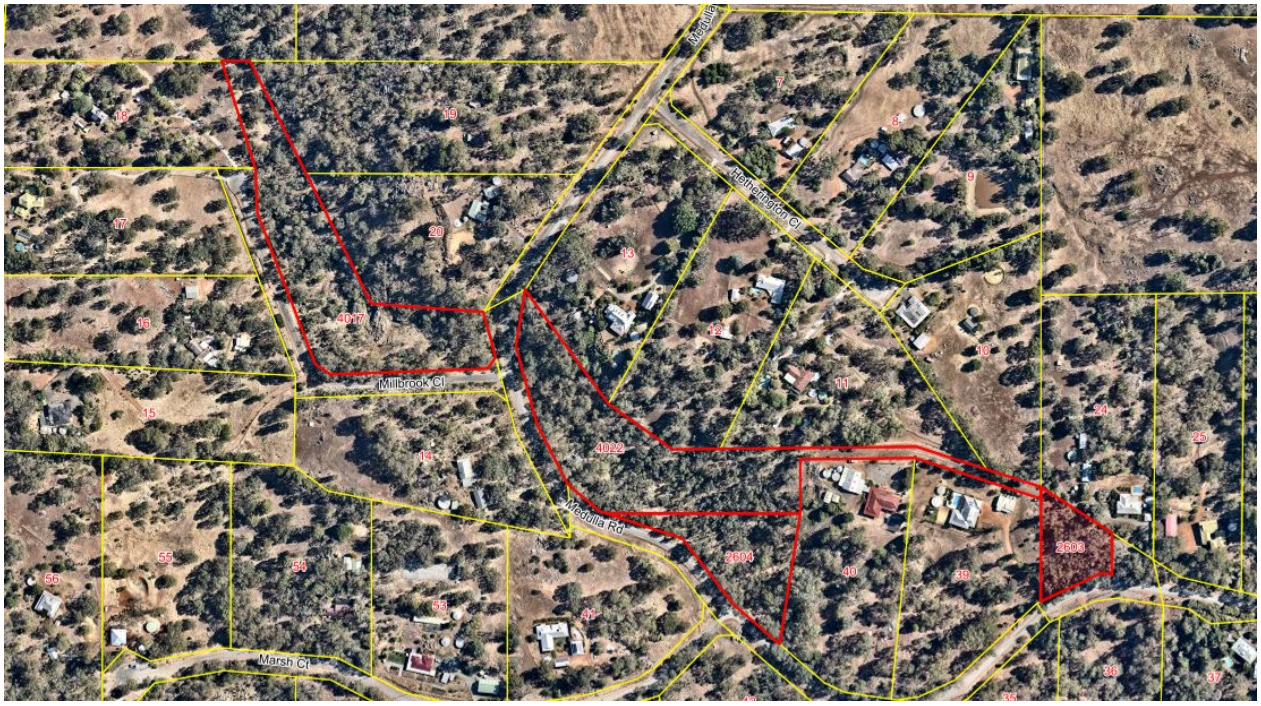

Figure 2 – Korribinjal Brook Reserve Outline

Figure 3 – Korribinjal Brook Reserve Sections

1.4 Report Structure

This management plan is structured into the following sections:

- Governance:
  - *Identifies the existing legislation and policies that apply and therefore have management implications for the reserve. The management plan has been prepared within this framework.*
- Environmental characteristics:
  - *Analyses landform, land, water and biodiversity features on the reserve. Threats to these features have also been considered.*
- Social and economic characteristics:
  - *Identifies the main human uses of the reserve, with consideration given to issues such as tenure, access, recreation and heritage.*
- Implementation:
  - *Provides guidance to Council and the community on implementation mechanisms for each management recommendation. Priorities, responsibilities and potential costs and partners are identified.*

1.5 Key Priority Actions

Table 1 – Key Actions for the Management of Korribinjal Brook Reserve
(Business as Usual)

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Governance					
1	An appropriate application is to be submitted and assessed prior to improvement, development or requests for works.	Key Business as Usual	Ongoing	Natural Reserves Coordinator, Emergency Services	Staff time
Weeds					
10	Map and monitor weed distribution, and prepare and implement a weed control program.	Key Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for weed mapping and control
Recreation					
21	Encourage, support and facilitate the community to participate in the management of the reserve.	Key Business as Usual	Ongoing	Natural Reserves Coordinator. Landcare, User Groups	Staff time
Infrastructure					
22	Ensure that the existing trail is maintained in a useable condition.	Key Business as Usual	Ongoing	Natural Reserves Coordinator, Landcare	Staff time Funding for maintenance

1.6 Short Term Actions

Table 2 – Short Term Actions for the Management of Korribinjal Brook Reserve

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Environmental Characteristics					
Water Resources					
5	Design and implement a water quality monitoring program for surface water.	Medium Short Term	Not Yet Implemented	Natural Reserves Coordinator	Staff Time Funding for monitoring
Fire					
6	Liaise with Emergency Services to prepare/update and implement a Fire Management Plan that prioritises conservation alongside people and property.	High Short Term	Not Yet Implemented	Emergency Services, Natural Reserves Coordinator	Staff time Funding for fire management plan preparation
7	Carry out mosaic burns if any control burning is required, allowing habitat restoration before burning the next area.	Medium Short Term	Not Yet Implemented	Emergency Services, Natural Reserves Coordinator, Fire Brigades	Staff time

2. Governance

2.1 Vesting and Land Tenure

Korribinjal Brook Reserve consists of four land parcels which are zoned Rural in the *Metropolitan Regional Scheme* and Public Open Space in the Serpentine Jarrahdale *Town Planning Scheme No. 2*. All four parcels are Crown land vested in the Shire of Serpentine Jarrahdale in 1980 for the purpose of Public Recreation. Table 3 shows the locations and uses of the land parcels.

Table 3 – Korribinjal Brook Reserve Locations and Uses

Reserve Name	Reserve Number	Area (ha)	Land transfer date	Purpose	Current Use
Korribinjal Brook West Reserve	42251	2.015	1980	Public Recreation	Recreation and Conservation
Korribinjal Brook East Reserve	42251	2.162	1980	Public Recreation	Recreation and Conservation
Korribinjal Brook East Reserve	36434	0.824	1980	Public Recreation	Recreation and Conservation
Korribinjal Brook Top Reserve	36436	0.426	1980	Public Recreation	Recreation and Conservation

The Shire has overall responsibility for management, use and protection of the lands. This includes ensuring that the management and use of the land complies with relevant State and Commonwealth legislation, regulations and policies, as well as local government legislation and policy frameworks.

The Korribinjal Brook Reserve lies within the catchment of the Peel Harvey Estuary.

Many of the works on Shire reserves are undertaken by community members, and must comply with legislation, Shire policies and approved plans, and be coordinated by the Natural Reserves Coordinator.

2.2 Community Consultation and Participation

Community input is essential for the protection of the conservation and recreation values of Korribinjal Brook Reserve. The main community forum is the Reserves Advisory Group (RAG) and the stakeholder group of local residents.

The Reserves Advisory Group (RAG) consists of up to eight community members, Shire staff, Landcare SJ representatives and a Council delegate. Members have a high level of relevant knowledge, expertise or experience and are expected to participate in a non-representative manner.

The roles of the RAG are to:

- Provide advice to Council on reserve values, threats, management targets and strategies to protect ecological and social values and take account of community aspirations;
- Provide advice to Council about on-ground management programs and issues; and

- Undertake audits of reserve management plans and report the results to Council.

The stakeholder group involved in the use and management of Korribinjal Brook Reserve consists of local residents who have been working since 1987 with Landcare SJ Inc. and the Shire of Serpentine Jarrahdale to improve the condition of the reserve through weed control and revegetation with local native plants. The original group was known as the Korribinjal Brook Residents Group, but held their last planting day in 2013. A new group of local residents resumed reserve management activities in 2019.

2.3 Governance: Actions

Table 4 – Governance Actions for Management of Korribinjal Brook Reserve
(Business as Usual)

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Governance					
1	An appropriate application is to be submitted and assessed prior to improvement, development or requests for works.	Key Business as Usual	Ongoing	Natural Reserves Coordinator, Emergency Services	Staff time

3. Environmental Characteristics

3.1 Land Resources

3.1.1 Description

The soils of Korribinjal Brook Reserve are part of the Darling Plateau system, consisting of alluvial deposits over laterite. The soils are acidic yellow duplex, and are well-drained. The reserve is situated in a steep valley on a granite outcrop, located on the Darling Scarp and within the Mediterranean-type climatic zone, all of which influence the dominant vegetation types in the area.

The Darling Plateau is ancient. The basement rocks are around three billion years old, deeply weathered in the upland areas and eroded along the western edge. The basement rocks have been extensively weathered into laterite formations, and the less eroded parts usually have gravel in the surface profile.

The Plateau's upland soils belong to the Dwellingup Subsystem, and include well drained, shallow to moderately deep gravelly brownish sands, pale brown sands and earthy sands over the weathered laterite base. The colluvial soils of the river and stream valleys and the Darling Scarp belong to the Murray Valley System which includes the Helena, Murray and Myara subsystems. Agriculture WA soil maps indicate that there are three soil types from the Murray complex within the Korribinjal Brook Reserve (Table 5).

Table 5 – Landform and Soil Classifications

Soil type	Location	Description	Land Quality Considerations
Murray 1 phase	West Reserve	Moderate sideslopes (10-30%) and very narrow valley floors, with few to commonly occurring areas of rock outcrop. Variable moderately well to well drained duplex and gradational soils.	Water erosion, phosphorus export
Murray 2 phase	Majority of East Reserve and Top Reserve	Gentle to moderately inclined sideslopes (3-25%) and narrow valley floors with few areas of rock outcrop. Variable moderately well to well drained duplex and gradational soils.	Water erosion, phosphorus export
Murray 3 phase	Northeast of East Reserve and north of Top Reserve	Very gentle to moderately inclined sideslopes and lower slopes (<15%) with very few areas of rock outcrop. Variable moderately well to well drained duplex and gradational soils.	

The condition of the land through most of the plateau is good, as a vegetation cover of forest and woodland has been retained. Most of this area is managed as State Forest, water catchment or conservation reserves.

Along the Scarp, substantial areas have been cleared for agriculture. This has exposed the land surface to wind and water erosion, and led in some areas to loss of sediment, nutrients, organic matter, and soil water retention capabilities.

3.1.2 Threats and Pressures

Erosion

Erosion is the removal of topsoil, and in extreme cases deeper layers of the soil profile, by the action of water or wind. The risk of erosion depends on the stability of the surface soil, influenced by vegetation cover and the force or speed of the wind or water.

Water erosion occurs in streams when water washes out soil from the banks and deposits it downstream. The degree of bank erosion depends on the amount and type of the remaining vegetation cover. Bank erosion is evident in the reserve due to a lack of vegetation on the stream's banks, much of which can be attributed to the past grazing of the reserve by local stock. Weeds such as olive trees (*Olea europaea*) have historically stabilised the banks in some areas, but the olive trees were removed in 2020 for fire mitigation, which may lead to increased erosion.

Nutrient Export

Nutrient export occurs from the addition of fertilisers to soils that do not retain nutrients, which is likely to result in surface- and ground-water pollution. Excess fertilisers and manure threaten the soil's chemical balance and microbial communities.

Grazing

Korribinjal Brook Reserve was grazed by local stock for many years, leading to soil degradation and structure decline as well as streamline erosion. Grazing has contributed to soil compaction, tree ringbarking, altered patterns of run-off, nutrient build-up in the soil, introduction of weeds, and consumption of leaf litter. A combination of these problems has led to a major decline in understorey vegetation and associated fauna.

Salinity

Surface salinity occurs where high salt levels in the surface soil affect plant growth. It can be natural or anthropogenic, and can be caused by rising saline water tables or evaporation of surface water. Salinity alters the chemical balance of the soil and limits plant growth, leading to bare sealed surfaces with low infiltration and increased runoff and erosion.

Soil Compaction

Soil compaction or structure decline refers to the crushing of soils to a point where the physical structure is altered, creating layers that are almost impenetrable, affecting fertility and the soil microbial community.

3.2 Water Resources

3.2.1 Description

Water assets provide a variety of ecosystem services. Groundwater provides water storage that interacts with the surface waterways and wetlands. During long dry spells the groundwater supports surface water and wetland ecosystems. Dams create reservoirs, but can result in loss of riparian areas important for

wildlife habitat, as well as loss of environmental flow downstream. The area has a Mediterranean climate with hot, dry summers and cool, wet winters. About 70% of annual rain falls from May to August; these winter rains recharge the ground and surface water.

Surface Water

Korribinjal Brook is within the Serpentine Catchment, which contributes around 15 percent of the inflow to the Peel Harvey Estuary, which is of regional, national and international significance and is protected by Commonwealth legislation. The estuary has been severely degraded by nutrients from the catchment which cause algal blooms. The Dawesville Channel increased estuarine flushing, and water quality was also improved through better land management to reduce nutrient inputs.

Catchment land use is subject to policies that set nutrient export targets. These include a maximum phosphorus load from the Serpentine River, water management plans for recreation facilities, and maximum nutrient application rates of 40 kg of nitrogen and 6.5 kg of phosphorus per hectare per year.

Groundwater

Groundwater quality in the Shire is generally good, although information is limited. There is a natural variation in groundwater salinity. In the coastal plain, it is possible that the groundwater could be subject to acid plumes and localised nutrient enrichment. The impact of this and any other pollutants will depend on complex biological, chemical and physical processes in the groundwater systems. The information on groundwater quality in the area of the reserve is even more limited than for the coastal plain, but it is believed to be good.

Groundwater levels may decline due to over-extraction, and many aquifers are almost fully allocated on the coastal plain. Groundwater assets in the Plateau are more plentiful but variable, as many come from fractured rock systems which provide an inconsistent and short-term supply.

3.2.2 Threats and Pressures

The most significant threats to the water assets relate to both lower recharge rates and higher demand for use. Predicted climate change, with significantly lower rainfall, would have a major effect on recharge, while the expanding population will increase demand. Other significant threats are actions that affect water quality, including nutrient export and chemical pollutants.

Climate Change

Since the 1950s there has been a substantial decline in rainfall coupled with a slight increase in temperature. Current models suggest that rainfall will decrease by as much as 20 percent by the year 2030, while temperatures will increase. The exact impact on water assets is unknown because of the complex processes involved. However, it is anticipated there will be significantly less water entering the system, and the higher temperatures will lead to higher levels of evapotranspiration as well as higher demand for human uses. Rainfall events are expected to become more intense, leading to higher runoff generation, especially on soils with low infiltration rates.

Overall, the water assets will become increasingly precious and there will be a need to be far more efficient in water use and more effective in surface water management.

Water Pollution

Korribinjal Brook Reserve is in the catchment of the Peel Harvey Estuary, which has been under extreme pressure from eutrophication (elevated nutrients). Many land uses continue to contribute significant nutrient loads, which impact directly on the Serpentine River and other waterways before reaching the estuary. Broad acre agriculture is the source of the majority of nutrients. Urban and rural living land uses also contribute significant nutrient loads from septic tanks, eroded soil particles and over-fertilisation.

Allied to nutrient export is the export of soil particles and organic matter. Soil particles are often the carrier for nutrients, as well as directly impacting water systems by increasing turbidity, filling pools and creating barriers to drainage. Erosion is a problem within the reserve, and the area is potentially a contributor of soil particles and nutrients to downstream areas.

Salinity is not a major problem for the reserve as it (and its upstream catchment area) does not suffer from rising saline groundwater. The salinity of wetlands generally increases through summer due to high evaporation and decreases when flushed by winter rains. This winter flushing effect may be a key factor in preventing salinity, and the predicted decrease in winter rains could increase the risk of salinity.

Chemicals such as pesticides, herbicides, cleaning agents and petrochemicals can also pollute water. A precautionary approach should be taken when transporting, storing and using chemicals, and manufacturers' instructions must be adhered to at all times.

Changing Hydrology

Groundwater levels across the Shire are declining in both the deeper and surface aquifers. The greatest declines are consistent with the areas of most intensive development and particularly with a high number of domestic water bores. With lower rainfall in the future the situation will most likely deteriorate.

Climate change and the over-use of groundwater are significant threats to the hydrological balance. As more areas of the Shire are developed for residential use there will be other major changes to hydrology. As water becomes increasingly precious there will be more pressure to store and reuse surface water.

Vegetation plays an important role in creating a healthy ecosystem in both agricultural areas and remnant vegetation. Vegetation cycles carbon and nutrients, filters the air and modifies the local climate through evapotranspiration, shading and windbreak effects. Clearing of vegetation for urban and more intensive development needs to be balanced by revegetation and remnant vegetation protection.

3.3 Biodiversity

3.3.1 Description

Korribinjal Brook Reserve has over five hectares of remnant vegetation of one community type, generally in poor or degraded condition with little understorey, well represented elsewhere, and well connected with other nearby areas of state forest. Longstanding and ongoing revegetation contributes to biodiversity.

State legislation protects plants and animals that are listed as Threatened. Priority species have uncertain status and need further research, and depend on active strategies for long-term survival. No Threatened or Priority flora species have been recorded in Korribinjal Brook Reserve. State legislation also protects threatened ecological communities, and some are protected by Commonwealth legislation.

3.3.2 Flora

Korribinjal Brook Reserve lies in the Jarrah Forest bioregion, within which a variety of plant communities occur. The Heddle vegetation classification is based on soil types and landforms with some survey data. A vegetation complex contains plant communities that are associated with a single soil landscape system. Korribinjal Brook Reserve is on the Darling Scarp, and Heddle lists the vegetation as Scarp Complex, associated with Scarp soils.

Darling Scarp Complex

The vegetation of the Jarrah Forest bioregion, which includes the geophysical regions of Plateau and Scarp, is dominated by its namesake (*Eucalyptus marginata*). Jarrah forest covers the laterite plateaus, and includes other tree species such as marri (*Corymbia calophylla*), blackbutt (*Eucalyptus patens*), flooded gum (*Eucalyptus rudis*) and wandoo (*Eucalyptus wandoo*). Smaller tree species such as bull banksia (*Banksia grandis*), sheoak (*Allocasuarina fraseriana*) and snottygobble (*Persoonia longifolia*) form a lower layer with an understorey of shrubs. Open areas of granite outcrop support species such as pincushions (*Borya* spp.), fuchsia grevillea (*Grevillea bipinnatifida*), hakeas (such as *Hakea elliptica* and *Hakea undulata*), rock sheoak (*Allocasuarina huegeliana*) and Darling Range Ghost Gum (*Eucalyptus laeliae*). On the Darling Scarp there is a marri-wandoo woodland with occasional Darling Range Ghost Gums on the granite outcrops.

Korribinjal Brook Reserve would have originally had vegetation of the Scarp complex. There is very little native understorey vegetation remaining, the ground cover being dominated by weeds, but the remnants indicate that the understory may have been quite unique. There are several tree species which provide a good level of overstorey cover. The native flora species in the reserve (including those with a probable origin from revegetation) are listed in Table 6, and common weeds in Table 7.

Table 6 – Native Flora Species List for Korribinjal Brook Reserve

Plant species	Probable origin – naturally occurring or revegetation
Acacia celastrifolia	Naturally occurring
Acacia pulchella	Revegetation
Acacia saligna	Naturally occurring
Acacia dentifera	Naturally occurring
Amyema preissii	Naturally occurring
Austrodanthonia caespitosa	Naturally occurring
Banksia grandis	Revegetation
Chorizema ilicifolium	Revegetation
Corymbia calophylla	Naturally occurring
Darwinia citriodora	Naturally occurring
Eucalyptus rudis	Naturally occurring
Eucalyptus wandoo	Naturally occurring
Hakea lissocarpha	Revegetation
Hakea prostrata	Revegetation
Hakea trifurcata	Revegetation
Hakea varia	Revegetation
Hardenbergia comptoniana	Revegetation
Jacksonia sternbergiana	Revegetation
Melaleuca acerosa	Revegetation
Melaleuca preissiana	Naturally occurring

Melaleuca rhaphiophylla	Naturally occurring
Mirbelia dilatata	Revegetation
Orthrosanthus laxus	Naturally occurring
Pteridium esculentum	Naturally occurring
Typha orientalis	Naturally occurring

Table 7 – Common Weeds of Korribinjal Brook Reserve

Plant species	**Common name**
Anagallis arvensis	Pimpernel
Asparagus asparagoides	Bridal creeper
Avena barbata	Wild oats
Brassica tournefortii	Wild turnip
Briza maxima	Blowfly grass
Bromus diandrus	Great brome
Bromus hordeaceus	Soft brome
Echium plantagineum	Paterson's curse
Ehrharta calycina	Veldt grass
Eragrostis curvula	Love grass
Euphorbia terracina	Geraldton carnation weed
Ficus carica	Fig tree
Fumaria spp.	Fumitory
Gomphocarpus fruiticosus	Cotton bush
Hypochaeris glabra	Flatweed
Hypochaeris radicata	Flatweed
Lolium rigidum	Annual ryegrass
Lotus angustissimus	Narrowleaf trefoil
Lupinus luteus	Lupin
Melinis repens	Natal red top
Olea europaea	Olive tree
Rubus fruticosus	Blackberry
Solanum nigrum	Deadly nightshade
Sonchus oleraceus	Common sowthistle
Trifolium angustifolium	Narrow-leafed clover

Over a number of years, the residents' group planted the area with local native species found in the nearby national park, using the closest intact vegetation communities as a guide to the local flora. Planting a wide variety of understorey vegetation gives the best results in providing habitat. Weed control is essential to achieve good survival rates.

3.3.3 Fauna

All native animal species are protected throughout the State. However, some species are listed as rare or likely to become extinct, including the Baudin's, Carnaby's and Forest Red-Tailed Black Cockatoos which occur in Korribinjal Brook Reserve. These birds are protected under Commonwealth as well as State legislation. The disturbance, or taking, of these scheduled species attracts higher penalties. The State government also maintains lists of Priority fauna species which require active conservation efforts or further study. The Southern Bandicoot, known to occur in the reserve, is listed as a Priority 5 species, meaning that it is in need of monitoring. The fauna recorded in the Shire from these lists are identified in Table 8.

Table 8 – Threatened and Priority Fauna, Shire of Serpentine-Jarrahdale

Species Name	Known from the plateau	Known from the plain	Probability of Occurrence Elsewhere
Schedule 1 – Fauna that is rare or likely to become extinct			
Chuditch - *Dasyurus geoffroii*	X	Lowlands	Low
Numbat – *Myrmecobius fasciatus*	X		Low
Western Ringtail Possum – *Pseudocheirus occidentalis*	X		
Quokka – *Setonix brachyurus*	X		Low
Mallee Fowl – *Leipoa ocellata*	X		
Forest Red-tailed Black-Cockatoo - *Calyptorhynchus banksii naso*	X	X	High
Carnaby's Black-Cockatoo - *Calyptorhynchus latirostris*	X	X	High
Schedule 4- Other Specially Protected Fauna			
Peregrine Falcon - *Falco peregrinus*			High
Carpet Python – *Morelia spilota imbricata*	X		
Priority Two – Taxa with few, poorly known populations on conservation lands			
Glacidorbis occidentalis (a freshwater snail)	X		
Priority Three – Taxa with several, poorly known populations, some on conservation lands			
Wambenger (Brush-tailed Phascogale) - *Phascogale tapoatafa*	X	Lowlands	Moderate
Priority 4 – Taxa in need of monitoring			
Western Brush Wallaby - *Macropus irma*	X	Lowlands	Low
Water Rat – *Hydromys chrysogaster*	X	Lowlands	Low
Carpet Python – *Morelia spilota imbricata* (also listed in Schedule 4)	X		
Priority 5 – Taxa in need of monitoring (conservation dependent)			
Quenda (Southern Brown Bandicoot) – *Isoodon obesulus fusciventer*	X	X	High

A detailed fauna survey was carried out in the eastern part of the reserve in July 1999. Korribinjal Brook Reserve is very important to native fauna, as it provides habitat to twenty-four birds, two mammals, one amphibian and six reptile species (Table 9). However, it is possible other species were present but undetected.

Table 9 – Fauna Recorded in Korribinjal Brook Reserve (July 1999)

Fauna Group	Common Name	Species Name
Birds	Australian Ringneck Parrot	*Platycercus zonarius*
	Red-capped Parrot	*Platycercus spurius*
	Western Rosella	*Platycercus icterotis*
	*Laughing Kookaburra	**Dacelo novaeguineae*
	Splendid Fairy-wren	*Malurus splendens*
	Spotted Pardalote	*Pardalotus punctatus*
	Striated Pardalote	*Pardalotus striatus*
	Western Gerygone	*Gerygone fusca*
	Broad-tailed Thornbill	*Acanthiza apicalis*
	Western Thornbill	*Acanthiza inornate*

Fauna Group	Common Name	Species Name
	Brown Honeyeater	*Lichmera indistincta*
	Western White-naped Honeyeater	*Melithreptus chloropsis*
	New Holland Honeyeater	*Phlydonyris novaehollandiae*
	Western Spinebill	*Acanthochynchus superciliosus*
	Little Wattlebird	*Anthochaera chrysoptera*
	Scarlet Robin	*Petroica multicolour*
	Rufous Whistler	*Pachycephala rufiventris*
	Willie Wagtail	*Rhipidura leucophrys*
	Grey Fantail	*Rhipidura fuliginosa*
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
	Australian Magpie	*Cracticus tibicen*
	Australian Raven	*Corvus coronoides*
	Mistletoe Bird	*Dicaeum hirundinaceum*
	Grey-breasted White-eye	*Zosterops lateralis*
Mammals	Southern Brown Bandicoot (Quenda)	*Isoodon obesulus*
	Grey Kangaroo	*Macropus fuliginosus*
	*Fox	**Vulpes*
	*House Mouse	**Mus musculus*
	*Rabbit	**Oryctolagus cuniculus*
Reptiles	Barking Gecko	*Underwoodisaurus milii*
	Swamp Skink	*Bassiana trilineatum*
	Fence Skink	*Cryptoblepharus plagiocephalus*
	Southern Pale-flecked Morethia	*Morethia obscura*
	Bobtail	*Tiliqua rugosa*
	Dugite	*Pseudonaja affinis*
Frogs	Granite Froglet	*Crinia pseudinsignifera*

*Introduced species

Kangaroos use the reserve on a regular basis, and quenda are frequently sighted.

Feral animals found in the area of Korribinjal Brook Reserve include domestic and feral cats, foxes, rabbits and the common house mouse. Feral animals are detrimental to native animal populations. Foxes and rabbits can be baited, but feral animals are not considered a major problem, generally passing through the reserve rather than inhabiting it for a long period of time.

3.3.4 Threats and Pressures

Clearing and Disturbance

Clearing can be caused by grazing, overly frequent fires, polluted runoff or high impact recreation. Recreation in or adjacent to bushland can lead to high levels of disturbance, weed and disease invasion and more frequent fires. Recreational groups will sometimes apply pressure for frequent controlled burns to protect their assets. The damage caused by passive clearing is often used to justify complete removal of some areas of the vegetation.

Fire Management

Fire is important for stimulating regrowth and regeneration in native ecosystems, but if uncontrolled can damage property and vegetation and cause high fauna mortality. Small remnants are vulnerable to local extinctions from single catastrophic fires which burn the whole area. Reducing the risk of catastrophic

wildfire involves maintaining fire breaks and/or controlled burning to reduce fuel loads. Direction on time of year and intensity of burns for vegetation management will be guided by best practice fire ecology.

Fire risk is an important issue concerning residents at Millbrook. Korribinjal Brook Reserve is heavily infested with grassy weeds, which is a major fire risk to surrounding housing. The grass becomes dormant and therefore very dry and easily combustible for a large part of summer. The olive trees were removed in 2020 as a fire mitigation measure, but has significantly opened the canopy in many areas, which may increase the fuel load from grassy weeds.

Control burning is sometimes required to reduce fuel load and protect homes. However, burning the entire reserve at one time could be very detrimental. Mosaic burns are a good way to reduce fuel load and also leave some habitat for native fauna such as quenda. Maintaining fire breaks and the strategic removal of weeds is the most environmentally beneficially action, coupled with revegetation with local native plants.

Dieback (*Phytophthora cinnamomi*)

The spread of dieback is a critical threat to much of Western Australia's bushland. Dieback is a disease caused by the water mould *Phytophthora cinnamomi* that affects the roots of many species, usually leading to their death. Susceptible plants include jarrah (*Eucalyptus marginata*), the banksia family (Proteaceae), heath family (Epacridaceae), pea family (Fabaceae), hibbertia family (Dilleniaceae), balga (*Xanthorrhoea* spp.) and zamia (*Macrozamia* spp.). Marri (*Corymbia calophylla*), kangaroo paws (*Anigozanthos* spp.), sedges (Cyperaceae) and rushes (Juncaceae and Restionaceae) are not affected.

The water mould is spread by the movement of water or soil from infected sites, or directly between plant roots. The most common means for transport to new areas is human activities, particularly on vehicles, tyres, shoes and horse hooves (which can pick up divots of soil).

There is no known mechanism for eliminating the disease once an area is infected. The objective for managing the disease is to prevent any further spread of infection and to minimise the impact of existing infections. Korribinjal Brook Reserve has not been assessed for the presence of dieback disease. The plant species which are most affected by dieback are not found in the reserve. It is generally accepted that all areas adjacent to a water course on the Darling Scarp are infected. From a management point of view, it is best to assume that the reserve is infected, maintaining good hygiene practices and only planting dieback resistant plants in revegetation projects.

Weeds

Introduced weeds pose a significant threat to native plants through competition for limited resources. Weeds flourish in disturbed sites and often out-compete the native understory and alter local nutrient recycling. However, the Quenda in the reserve use some weeds as habitat, so it is important to remove such weeds progressively.

Landuse change in the Shire has led to higher densities of weeds on cleared land. This larger source of weed seed, combined with increased levels of disturbance due to ongoing development, may create the potential for increasingly severe weed infestations. High weed populations significantly increase the ground fuel load, which subsequently increases the risk of fire. Frequent fires reduce the viability of native plants and create disturbed conditions that are ideal for weed invasion.

A weed control plan was developed in 2000 with the help of local residents. The specific areas and processes outlined in the plan (Appendix 1) could be followed in order to achieve a coordinated strategic approach to rehabilitation of the area.

Feral Animals

Feral animals are an ongoing threat to bushland remnants. Rabbits disturb vegetation, limit regeneration, and compete with local fauna. Foxes and cats predate small birds and mammals. Feral rodents such as the house mouse thrive in adjacent properties. Feral honey bees compete with native bees, and take over nesting hollows. Feral animal control relies on a variety of techniques, including trapping and poisoning. Current reserve usage and proximity to populated areas limits management options.

Natural Pests

Populations of naturally occurring insects can expand to the extent that they threaten the ecological balance, often as a result of other disturbing factors. An example is the leaf miner insect which can completely defoliate the Flooded Gum (*Eucalyptus rudis).* The ability of the flooded gum to recover following attack depends on other factors that also affect its health. Climate change may favour some invertebrate species and micro-organisms, leading to further imbalance in these ecosystems.

Climate Change

Expected changes in temperature and the amount, season and severity of rainfall will place extreme pressure on ecosystems that are already under threat from many other disturbing factors. While it is expected that wet and dry periods and historic variation in weather patterns will continue, the gradual changes in temperature and rainfall will affect the ecological balance of remnant vegetation.

All ecosystems are dependant to some extent on water. Models of climate change are predicting lower rainfall and different seasonal patterns. Continuing decline in the water tables, combined with longer dry periods and greater evaporation, could lead to the death of many areas of vegetation. Climate change is likely to cause a general southerly shift in species distribution. Ecological linkages are essential to enable this movement of species.

Understanding of Biodiversity

A lack of appreciation of the importance of protecting biodiversity, and a lack of understanding of threatening processes, undermines good management. Education programs for all users of the reserve could use techniques such as interpretive signage.

3.4 Environmental Characteristics: Actions

Table 10 – Environmental Actions for Management of Korribinjal Brook Reserve
(Short Term actions, Long Term actions, and Business as Usual)

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Environmental Characteristics					
Land Resources					
2	Identify and rehabilitate degraded areas, determine whether soil erosion remediation is required, and take action if required..	Medium Long Term	Not Yet Implemented	Natural Reserves Coordinator, Landcare	Staff Time Funding for erosion action

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
3	Prohibit unauthorised vehicle access to internal tracks and firebreaks, and erect signage as appropriate.	Medium Long Term	Not Yet Implemented	Natural Reserves Coordinator, Rangers	Staff Time Funding for signage
Water Resources					
4	Identify the need for, design and implement mechanisms to prevent erosion by stormwater, such as in-stream structures to slow water velocity.	Medium Long Term	Not Yet Implemented	Natural Reserves Coordinator, Landcare	Staff Time Funding for structures
5	Design and implement a water quality monitoring program for surface water.	Medium Short Term	Not Yet Implemented	Natural Reserves Coordinator	Staff Time Funding for monitoring
Fire					
6	Liaise with Emergency Services to prepare/update and implement a Fire Management Plan that prioritises conservation alongside people and property.	High Short Term	Not Yet Implemented	Emergency Services, Natural Reserves Coordinator	Staff time Funding for fire management plan preparation
7	Carry out mosaic burns if any control burning is required, allowing habitat restoration before burning the next area.	Medium Short Term	Not Yet Implemented	Emergency Services, Natural Reserves Coordinator, Fire Brigades	Staff time
8	Follow up any burning with weed control measures.	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for weed control
Dieback					
9	Monitor for trees presenting early signs of infection and known highly susceptible plants	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for dieback treatment
Weeds					
10	Map and monitor weed distribution, and prepare and implement a weed control program.	Key Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for weed mapping and control
11	Minimise disturbance and weed introduction through maintaining the number and width of tracks.	High Business as Usual	Ongoing	Natural Reserves Coordinator, User Groups	Staff time
Revegetation					
12	Prepare and implement a rehabilitation and revegetation plan.	High Long Term	Implemented in Part	Natural Reserves Coordinator, Landcare	Staff time Funding for revegetation
13	Monitor the requirement for fencing and install if necessary with a design that will not form a barrier to wildlife.	Medium Long Term	Ongoing	Natural Reserves Coordinator	Staff time Funding for fencing
Biodiversity					
14	Monitor the recovery of vegetation after fire and use this information to assess and update the fire management plan.	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff Time

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Fauna					
15	Review fauna surveys, gather additional information, and monitor Black Cockatoos' and quenda's usage of the reserve.	Medium Long Term	Implemented in Part	Natural Reserves Coordinator	Staff time
16	Monitor feral animals and undertake control programs as required, while complying with all safety and accreditation procedures.	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for feral animal control

4. Social and Economic Characteristics

4.1 Aboriginal Heritage

Local Aboriginal people are part of the Noongar community, whose territory covers the area southwest of a line from Geraldton to Esperance. Prior to European settlement, family groups in the Jarrahdale region were part of the Whadjug tribe. During the post-European settlement period, forced migration to Aboriginal settlement camps or into areas where labour was required resulted in a shift of tribal groups.

Noongar family groups did not have permanent places of habitation and generally moved along major river systems, such as the Serpentine and Murray, or chains of freshwater bodies. The family groups would camp for short periods of time at favoured points where food and water were reliable.

The water systems are spiritual places for Aboriginal people. Local tradition records that Waugal, the dreaming ancestor, created the Murray and Serpentine river systems. The Waugal is a spiritual force with a physical serpentine manifestation that is widespread throughout the southwest region. Most of the major rivers that drain the Darling Range, and many creeks, springs, pools, swamps and lakes within the Swan Coastal Plain, are associated with the Waugal belief.

Korribinjal Brook Reserve lies in a steep valley draining the Darling Plateau, which has a seasonal creek which may once have run year-round. The brook would have been a source of food and may have held spiritual meaning for the local Aboriginal people.

The Swan Coastal Plain has a high density of Aboriginal archaeological sites, associated with the richness of food resources. The State government currently has 23 heritage sites registered in the Shire, and an additional 63 sites are not (or not yet) registered. All places and objects of Aboriginal importance are protected by State legislation.

The Serpentine River is listed on the register of mythological and ceremonial sites, and includes a wide buffer to cover all the Aboriginal values in the vicinity. There are no registered heritage sites in the vicinity of Korribinjal Brook Reserve.

A Native Title Claim was registered over land including the Shire of Serpentine Jarrahdale, to enable local Aboriginal people to have their rights and interests recognised under Australian law. This claim was resolved as part of the South West Native Title Settlement, the details of which are recorded in six Indigenous Land Use Agreements (ILUAs), including the Gnaala Karla Booja ILUA which covers the Shire. The Native Title Registrar registered the ILUAs in October 2018. Applications for judicial review of the Registrar's decision were rejected by the Federal Court in December 2019, and applications seeking special leave to appeal the decision of the Federal Court were rejected by the High Court in November 2020. Resolution of all legal proceedings has cleared the way for implementation of the Settlement. The Gnaala Karla Booja ILUA is being co-ordinated by the South West Aboriginal Land and Sea Council.

To date no formal consultation has occurred with either the South West Aboriginal Land and Sea Council or local Noongar people regarding management of Korribinjal Brook Reserve. A lack of effective consultation with Noongar people and their representatives could lead to poor management decisions, conflict of use on the reserve and the degradation of Aboriginal values.

4.2 European Heritage

In March 1827, Captain James Stirling arrived in the Swan River, and the Swan River Settlement was founded in June 1829. In 1830, Mandurah was established and settlers moved up the Murray River in search of agricultural land. Remnant bushland provides a glimpse of what the settlers encountered.

Explorers also ventured up the Serpentine River, but navigational difficulties delayed settlement. The area was part of a massive 250,000 acre (100,000 ha) land grant to Thomas Peel, stretching from Wungong to Pinjarra and out to the coast. However, the nature of the land and vegetation, and the availability of good agricultural land elsewhere, ensured that much of the Peel Estate remained in its natural state for many years.

Some small farms, the largest only a few hundred hectares, were established along the Serpentine River below the scarp in 1865. The Serpentine settlement was at the foot of the scarp, about 1 km east of its present location, but in 1893, with the railway almost complete, the present townsite was gazetted.

The settlement of Jarrahdale was established after timber concessions were granted in 1872. A timber transport railway was constructed from Jarrahdale through Mundijong to Rockingham, with some of the timber processed locally and some exported around the world. Farmland along the foot of the Scarp, from Byford to Serpentine in particular, provided food for the timber workers. Following a fire that destroyed the town of Jarrahdale in 1895, the townsite was moved west and officially gazetted in 1913.

Prior to reservation, Korribinjal Brook Reserve was part of a farm, and heavily grazed. By the late 1970s, little of the original understorey flora remained, and weed infestation was heavy. The area was rezoned during the Millbrook subdivision in 1980 from grazing land to a public recreation reserve.

From 1987 to 2013, the Korribinjal Brook Residents Group were involved in weed control, walk trail establishment and planting of local native plants. Intensive planting and weeding occurred from 1998, with assistance from Landcare SJ Inc., the Jarrahdale Heritage Society, and funding from the Natural Heritage Trust and Alcoa. The reserve was planted with several thousand plants of local native species. Later plantings had higher success rates due to watering with small donated tanks. A new group of local residents resumed management activities in the reserve in 2019.

A vertebrate survey in 1989 of the long corridor reserves identified few animals. Landcare SJ has installed an artificial nesting box (cockatube) for the endangered black cockatoos.

Cotton bush (*Gomphocarpus fruticosus*) was once a major weed problem, but has been greatly reduced due to intensive control efforts. The Karnet Prison Farm inmates have also been involved, creating a walk trail in the western part of the reserve, and Green Skills helped fund a small bridge across the brook, providing residents with a safer and more pleasant walking experience.

The reserve received Natural Heritage Trust (NHT) funding for weed control, signage, planting of local native plants, fauna surveys, walk trail seating, and photographic records. Alcoa funding was allocated to weed spraying and the purchase of plants and fertilizer. These activities were undertaken in the eastern part of the reserve.

Revegetation of the East and West Korribinjal Reserves by local residents has formed a corridor on both banks of the brook. This has resulted in an increase in the number of wildlife inhabiting the revegetated bushland, and the walk trail has been featured in the 2008 publication “Walks Around Jarrahdale”, as well as the Jarrahdale Heritage Society running guided walks throughout the reserves.

Local residents donated small water tanks to keep plantings going through their first summer. The Serpentine Jarrahdale Volunteer Fire Brigade kept the tanks full and used the reserves for training their cadets in small burn management.

There are no obvious historical remains on the reserve, but visitor experience could be enriched by signage on site, displays at the local museum, school programs and other publications.

4.3 Recreation

4.3.1 Description

The major uses of Korribinjal Brook Reserve are:

- Walking;
- Aesthetic appreciation; and
- Conservation of vegetation and wildlife habitat.

The use of trail bikes in the reserve has been noticed on occasion, but it is not permitted and strongly discouraged.

4.3.2 User Groups

The residents' group that uses the reserve was formed in 2019. Turnover of local residents meant that the original group who carried out the revegetation and weeding over many years had mostly moved out of the area, and revegetation ceased in 2013. The new group hopes to continue the work in the reserve.

The residents who carried out the previous revegetation called themselves the Korribinjal Brook Residents Group, and were one of many community land/bushcare groups supported by Landcare SJ Inc. They mostly operated in Korribinjal Brook East and West Reserves, although this probably extended to the Korribinjal Top reserves as well. Historically, the reserve group focused on and managed revegetation, weed management, signage and walk trails. There are 40 households around the reserves, of which 10 were actively involved, with others helping on planting days.

4.3.3 Threats and Pressures

Risk Management

Increasing insurance premiums and stricter attitudes to liability have made risk management plans mandatory for recreational facilities and clubs. Even the residents' group needs to consider risks like the use of chemicals and snake bites. Formal risk management plans must be developed by user groups in cooperation with the Shire to avoid exposing participants to unacceptable levels of risk.

Membership and Member Involvement

Community groups have a general problem with attracting and maintaining motivated volunteers. A few people tend to do most of the work. The residents' group finds inadequate membership a problem as low numbers limit activities. Individual groups may benefit from reviewing activities to identify the obstacles

for volunteers in joining groups or participating more fully in club management. Strategies to overcome these barriers can then be considered.

Conflict Among User Groups

Conflict among local residents can lead to a lack of cooperation in management of the reserve, and conflicts over the use of resources can lead to ineffective use and possibly degradation. While the residents' group prioritises the conservation values of the reserve and seeks to enhance it, other local residents see it as a fire hazard and apply pressure for regular control burns. This management plan is intended to facilitate broad community input, provide certainty for all stakeholders, and ensure that Council is fully informed. The Reserves Advisory Group provides a focus for community input.

Accessibility

The only fences around the reserve are adjacent private landowners' property fencing, and there are no gates. The most commonly utilised accessible entry point to the reserve is from the corner of Millbrook Close and Medulla Rd; there is an extensive trail network throughout the three reserves, linking them into one unit. A map highlighting this linkage was produced and featured in the "Walks around Jarrahdale" book and DVD (Figure 4).

Figure 4 – Korribinjal Brook Reserve Trail Network

Inadequate Parking Facilities

The lack of organised parking areas is a problem. The only parking areas are on the verges of Medulla Road and Millbrook Close, near the entries to the trail network. Parking on the road increases risks to visitors, even in a quiet residential area.

4.4 Infrastructure

4.4.1 Description

Korribinjal Brook Reserve is a passive recreational and conservation reserve with little formal infrastructure. The only fences around the reserve are adjacent private landowners' property fencing, and there are no gates. There are walking trails through all sections of the reserve, with bridges over the brook in places (see Figure 4), and signs identifying both the East and West reserves on Medulla Road. Parking facilities are limited to gravelled verges on Medulla Road and Millbrook Close.

4.4.2 Threats and Pressures

Inadequate Management

A lack of adequate management of the reserve could lead to degradation of conservation values and increased risk. This can be best managed by passive surveillance by local residents, a sense of ownership by the residents' group, and shared responsibility for management between the Shire and residents.

Particular issues which have been identified as requiring adequate management include:

1. Fire management, including integration of fire and weed control actions and fire management plans for surrounding properties;
2. Signage and safety barriers for walking infrastructure;
3. The reserve has a local-scale popularity and profile, with occasional wider-scale engagement;
4. Locally distributed brochure to engage Millbrook landholders in looking after the reserve;
5. Past grazing practices have increased weeds and reduced native species; and
6. Olive trees – removal of mature trees has increased erosion potential and opened areas to spread of other weeds, and juvenile trees must be prevented from spreading.

Vandalism and Theft

Vandalism and theft are constant but low-level threats. Surveillance is an effective deterrent. The local community is well placed to keep an eye on the reserve and report unlawful activities. Community use of the areas for a range of activities is likely to improve security.

Vehicles, including two or four wheel motorbikes, can cause a great deal of damage to walking trails and bushland. Stock can damage revegetation and may also cause a nuisance. The lack of fencing and gates means that vehicles and stock cannot be excluded, and this is unlikely to change in such a low profile reserve. Passive surveillance by local residents is the best way to manage use of the reserve.

Fire Damage

Fire can threaten people, property and conservation values. Some local residents perceive a high fire risk in Korribinjal Brook Reserve, and request frequent control burning and other hazard reduction activities. Bush or grass fires threaten buildings and structures through embers, radiant heat and direct contact. To protect conservation values, fire and weed control actions should be integrated, and fire management plans for surrounding properties should be prepared.

Cleared areas around buildings limit the opportunity for bush and grass fires to reach them. No flammable material should be stored close to buildings, and gutters kept clear. Strategies to limit the frequency and severity of vandalism will reduce the likelihood of arson. Fire in nearby bushland has the potential to damage infrastructure.

Inadequate Car Parking Facilities

Informal car parking arrangements can lead to the damage of soil, vegetation, infrastructure and personal property, and increase risk for reserve visitors. A clearly marked and structured parking area with a modified surface to prevent erosion would significantly improve reserve facilities.

Community Use of Reserve Areas

Fostering community ownership of the reserve has a number of benefits, including surveillance and support for reserve improvements. An increase in ownership could be achieved by increasing usage, and by additional facilities that encourage passive and active use, such as interpretive signage.

4.5 Social and Economic Characteristics: Actions

Table 11 – Social and Economic Actions for Management of Korribinjal Brook Reserve
(Long Term actions and Business as Usual)

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Social and Economic Characteristics					
Aboriginal Heritage					
17	Establish and implement an effective process for ongoing Aboriginal liaison.	High Long Term	Not Yet Implemented	Community Development	Staff time
18	Develop an interpretation plan for the reserve that takes account of Aboriginal heritage values.	High Long Term	Not Yet Implemented	Community Development	Staff time Funding for signage
European Heritage					
19	All developments and activities to be documented and archived.	Medium Business as Usual	Ongoing	Natural Reserves Coordinator User groups	Staff time
20	Develop an interpretation plan for the reserve that takes account of European heritage values.	Medium Long Term	Not Yet Implemented	Community Development	Staff time Funding for signage
Recreation					
21	Encourage, support and facilitate the community to participate in the management of the reserve.	Key Business as Usual	Ongoing	Natural Reserves Coordinator.	Staff time

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
				Landcare, User Groups	
Infrastructure					
22	Ensure that the existing trail is maintained in a useable condition.	Key Business as Usual	Ongoing	Natural Reserves Coordinator, Landcare	Staff time Funding for maintenance
23	Investigate and implement a long-term plan to increase, renovate or upgrade reserve facilities.	Medium Long Term	Ongoing	Natural Reserves Coordinator	Staff time

5. Implementation

5.1 Introduction

An implementation plan is provided in this section. Various divisions within the Shire are responsible for implementation and it is anticipated that the strategies will be acted on over several years. All strategies in this plan are reproduced in a single table below, along with priorities, responsibilities and requirements.

5.2 Priorities and Status

Priorities for implementation of the strategies have been classified as follows:

- Key – an essential action for successful management of the reserve (3 actions);
- High – an important action which should be implemented in the short term (14 actions); and
- Medium – a longer-term action (10 actions).

The status of each strategy has been assessed as Implemented, Implemented in Part, Not Yet Implemented, and Ongoing. In addition, each strategy has been classified as:

- Business as Usual – an ongoing action that occurs as a matter of course (10 actions);
- Short Term – to be implemented within three years of adoption of the management plan (6 actions); and
- Long Term – a desired action that is funding dependent and may be implemented within ten years of adoption (11 actions).

5.3 Responsibilities, Monitoring and Review

The Shire of Serpentine Jarrahdale is responsible for strategies within this plan. In some instances, the Shire may be assisted in implementing a strategy by a partner who has an interest or responsibility, and there may be opportunities for grants to implement strategies. The management plan strategies will be monitored and reviewed, and the management plan will be revised if necessary.

Divisions within the Shire with responsibilities for implementation, sometimes in collaboration with Landcare SJ Inc., Fire Brigades, User Groups or Community, are as follows:

- Strategic Planning;
- Natural Reserves Coordinator;
- Operations;
- Parks and Gardens;
- Emergency Services;
- Corporate Services;
- Community Development;
- Development Services; and
- Environmental Health.

Requirements are designated as staff time and/or funding, which is dependent on business cases or grants.

Monitoring consists of regular reviews of the implementation of this management plan by an internal working group, which will meet quarterly to review short term actions, with an overall annual review. Additional meetings may be triggered by grant opportunities.

5.4 Implementation, Monitoring and Review Actions

Table 12 – Implementation, Monitoring and Review Actions for Management of Korribinjal Brook Reserve
(Business as Usual)

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
24	Implement actions according to priority and status, and source external funding for implementation.	Medium Business as Usual	Implemented in Part	Natural Reserves Coordinator	Staff time
25	Monitor implementation of actions through regular reviews.	Medium Business as Usual	Implemented in Part	Strategic Planning, Natural Reserves Coordinator	Staff time
26	Periodically review the efficiency and effectiveness of management plan implementation and revise if necessary.	Medium Business as Usual	Implemented in Part	Strategic Planning	Staff time

5.5. Action Plan

Table 13 – Actions for Management of Korribinjal Brook Reserve
(Short Term actions, Long Term actions, and Business as Usual)

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
Governance					
Governance					
1	An appropriate application is to be submitted and assessed prior to improvement, development or requests for works.	Key Business as Usual	Ongoing	Natural Reserves Coordinator, Emergency Services	Staff time
Environmental Characteristics					
Land Resources					
2	Identify and rehabilitate degraded areas, determine whether soil erosion remediation is required, and take action if required..	Medium Long Term	Not Yet Implemented	Natural Reserves Coordinator, Landcare	Staff Time Funding for erosion action
3	Prohibit unauthorised vehicle access to internal tracks and firebreaks, and erect signage as appropriate.	Medium Long Term	Not Yet Implemented	Natural Reserves Coordinator, Rangers	Staff Time Funding for signage
Water Resources					

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
4	Identify the need for, design and implement mechanisms to prevent erosion by stormwater, such as in-stream structures to slow water velocity.	Medium Long Term	Not Yet Implemented	Natural Reserves Coordinator, Landcare	Staff Time Funding for structures
5	Design and implement a water quality monitoring program for surface water.	Medium Short Term	Not Yet Implemented	Natural Reserves Coordinator	Staff Time Funding for monitoring
Fire					
6	Liaise with Emergency Services to prepare/update and implement a Fire Management Plan that prioritises conservation alongside people and property.	High Short Term	Not Yet Implemented	Emergency Services, Natural Reserves Coordinator	Staff time Funding for fire management plan preparation
7	Carry out mosaic burns if any control burning is required, allowing habitat restoration before burning the next area.	Medium Short Term	Not Yet Implemented	Emergency Services, Natural Reserves Coordinator, Fire Brigades	Staff time
8	Follow up any burning with weed control measures.	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for weed control
Dieback					
9	Monitor for trees presenting early signs of infection and known highly susceptible plants	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for dieback treatment
Weeds					
10	Map and monitor weed distribution, and prepare and implement a weed control program.	Key Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for weed mapping and control
11	Minimise disturbance and weed introduction through maintaining the number and width of tracks.	High Business as Usual	Ongoing	Natural Reserves Coordinator, User Groups	Staff time
Revegetation					
12	Prepare and implement a rehabilitation and revegetation plan.	High Long Term	Implemented in Part	Natural Reserves Coordinator, Landcare	Staff time Funding for revegetation
13	Monitor the requirement for fencing and install if necessary with a design that will not form a barrier to wildlife.	Medium Long Term	Ongoing	Natural Reserves Coordinator	Staff time Funding for fencing
Biodiversity					
14	Monitor the recovery of vegetation after fire and use this information to assess and update the fire management plan.	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff Time
Fauna					
15	Review fauna surveys, gather additional information, and monitor Black Cockatoos' and quenda's usage of the reserve.	Medium Long Term	Implemented in Part	Natural Reserves Coordinator	Staff time

No.	Strategy	Priority & Status	Implementation	Responsibility	Requirements
16	Monitor feral animals and undertake control programs as required, while complying with all safety and accreditation procedures.	High Business as Usual	Ongoing	Natural Reserves Coordinator	Staff time Funding for feral animal control
Social and Economic Characteristics					
Aboriginal Heritage					
17	Establish and implement an effective process for ongoing Aboriginal liaison.	High Long Term	Not Yet Implemented	Community Development	Staff time
18	Develop an interpretation plan for the reserve that takes account of Aboriginal heritage values.	High Long Term	Not Yet Implemented	Community Development	Staff time Funding for signage
European Heritage					
19	All developments and activities to be documented and archived.	Medium Business as Usual	Ongoing	Natural Reserves Coordinator, User groups	Staff time
20	Develop an interpretation plan for the reserve that takes account of European heritage values.	Medium Long Term	Not Yet Implemented	Community Development	Staff time Funding for signage
Recreation					
21	Encourage, support and facilitate the community to participate in the management of the reserve.	Key Business as Usual	Ongoing	Natural Reserves Coordinator. Landcare, User Groups	Staff time
Infrastructure					
22	Ensure that the existing trail is maintained in a useable condition.	Key Business as Usual	Ongoing	Natural Reserves Coordinator, Landcare	Staff time Funding for maintenance
23	Investigate and implement a long-term plan to increase, renovate or upgrade reserve facilities.	Medium Long Term	Ongoing	Natural Reserves Coordinator	Staff time
Implementation, Monitoring and Review					
24	Implement actions according to priority and status, and source external funding for implementation.	Medium Business as Usual	Implemented in Part	Natural Reserves Coordinator	Staff time
25	Monitor implementation of actions through regular reviews.	Medium Business as Usual	Implemented in Part	Strategic Planning, Natural Reserves Coordinator	Staff time
26	Periodically review the efficiency and effectiveness of management plan implementation and revise if necessary.	Medium Business as Usual	Implemented in Part	Strategic Planning	Staff time

6. References

Dell, J. (1999) An assessment of the vertebrate fauna, fauna habitats & management of Korribinjal Brook Reserve in the Shire of Serpentine-Jarrahdale.

Hussey, B, MJ. & Wallace, K, L. (1993) Managing Your Bushland, CALM Como.

Lovett, S. & Price, P. (1999) Riparian Land Management Technical guidelines, Vol. One & Two, LWRRDC, Canberra.

Oates, J. (2000) Water notes, Protecting riparian vegetation, LWRRDC, Canberra.

Scheltema, M. & Harris, J. (1995) Managing Perth's Bushlands, Greening WA.

Tubman, W. (1996) Riparian Management 2, Streambank stability, LWRRDC, Canberra.

Weaving, S. (1999) Peel-Harvey Catchment Natural Resource Atlas, Agriculture WA.

Appendix 1 – Weed Control and Restoration Plan

A weed control and restoration plan was developed with the help of the local community, to:

- Remove lovegrass and follow up with direct seeding and planting.
- Follow up weed control and infill planting/seeding of areas previously revegetated.
- Weed control and planting of sedges and shrubs along the brook.
- Start new weeding and planting of selected areas.
- Plant local native species from other similar environments, based on presence within the brook directly below the WA Blue Metal Quarry (see list below) and availability.

Acacia alata
Acacia pulchella
Acacia urophylla
Adenanthos barbiger
Agrostocrinum scabrum
Allocasuarina humilis
Astartea scoparia
Baeckea camphorosmae
Banksia armata
Banksia dallanneyi
Banksia grandis
Banksia sessilis
Bossiaea ornata
Burchardia congesta
Caesia micrantha
Chamaescilla corymbosa
Chorizema dicksonii
Clematis aristata
Conostylis aculeata
Conostylis setosa
Corymbia calophylla
Craspedia variabilis
Cyathochaeta avenacea
Dampiera linearis
Darwinia citriodora
Daviesia horrida
Dichopogon capillipes
Dioscorea hastifolia
Dodonaea ceratocarpa
Eucalyptus marginata
Gahnia aristata
Gompholobium marginatum
Goodenia micrantha
Grevillea bipinnatifida
Haemodorum laxum
Hakea lissocarpha
Hakea stenocarpa
Hakea trifurcata
Hakea undulata

Hemigenia incana
Hibbertia amplexicaulis
Hibbertia glomerata
Hibbertia huegelii
Hibbertia hypericoides
Hovea chorizemifolia
Hypocalymma angustifolium
Kennedia prostrata
Kunzea micrantha
Lagenophora huegelii
Lechenaultia biloba
Lepidosperma effusum
Lepidosperma tetraquetrum
Leucopogon capitellatus
Leucopogon gracillimus
Leucopogon nutans
Macrozamia riedlei
Melaleuca parviceps
Melaleuca radula
Mirbelia dilatata
Neurachne alopecuroidea
Orthrosanthus laxus
Patersonia occidentalis
Pentapeltis peltigera
Persoonia elliptica
Petrophile biloba
Phyllanthus calycinus
Pimelea ciliata
Pimelea imbricata
Pimelea spectabilis
Ptilotus manglesii
Scaevola calliptera
Scaevola glandulifera
Sowerbaea laxiflora
Stackhousia monogyna
Stypandra glauca
Taxandria linearifolia
Tetraria octandra
Tetratheca nuda
Thysanotus dichotomus
Thysanotus manglesianus
Thysanotus multiflorus
Thysanotus thyrsoideus
Trymalium floribundum
Verticordia huegelii
Verticordia pennigera
Xanthorrhoea gracilis
Xanthorrhoea preissii

Appendix 2 – Korribinjal Brook Reserve Fire Management Strategy

A2.1. Introduction

The Korribinjal Brook Reserve in the Millbrook area of Jarrahdale is managed by the Shire of Serpentine Jarrahdale. It covers a total area of almost 5.5 hectares, consisting of a mostly weedy understorey under a mainly natural tree canopy, and follows the course of the Korribinjal Brook. The area has significant conservation values and high community interest.

The challenge for the Shire is to develop an approach to fire risk management that reduces the risk of wildfire without significantly impacting on the biodiversity values of the reserve. Too frequent fires will lead to both a decline in the biodiversity of the reserve and an increase in the extent and density of weed populations, which thrive on disturbance. This in turn would increase the risk of wildfire, as weeds provide an ideal fuel load to initiate and spread a fire. Therefore, an essential element of fire risk reduction is effective weed management. A detailed weed management plan has been prepared for this reserve, which includes post fire impacts.

Any strategies or actions applied to this reserve also need to consider dieback management and hygiene.

This report presents strategies for the following aspects of fire management:

1. Fire prevention and preparedness
2. Fire response
3. Fire recovery

There are two attachments which can be used to guide actions undertaken in the reserve:

- The Fire Response Plan
- A schedule of actions to reduce fire risk and support fire response arrangements

A2.2. Fire Management Objectives

Fire prevention and preparedness strategies proposed in this plan have the dual and equal objectives of:

- Protection of life and property, and
- Conservation of biodiversity

The fire suppression strategies have the overriding objective of “Protection of life and property”, with conservation of biodiversity being considered when determining appropriate tactics.

A2.2.1. Fire Prevention and Preparedness Strategies and Tactics

The Shire of Serpentine-Jarrahdale has a legal and moral obligation to protect the biodiversity values of this reserve as well as the life and property of the community. Managing biodiversity values in an urban and peri-urban setting is a difficult balancing act. The following strategies have been decided on in consultation with Shire Officers.

- Maintain “low-fuel” buffer zones adjacent to conservation areas.
- In vegetation communities outside the buffer zones, fire intervals should exceed 12 years. No prescribed burning to take place in these areas.
- Undertake comparative monitoring of fuel buffer zones and protected zones to determine impacts of fire and other disturbances.
- Use the results of the monitoring to review this strategy after 3 to 5 years.
- Ensure lower densities of future residential developments adjacent to the reserve, including road buffers between houses and bushland.
- Maintain good access into and through the reserve for firefighting crews.
- Maintain firebreaks around the perimeter of the reserve.
- Clean soil and plant material from all vehicles before entering and after leaving the reserve.
- Continue to undertake regular weed control, especially in areas of dense weed infestation.
- Limit opportunities for unofficial vehicles to access the reserve while maintaining adequate access for fire response crews.
- Limit community access to bushland to selected walking paths.
- Review efficacy of all strategies and actions after unplanned fire events.
- Ask neighbours to report any smoke or fires immediately by dialling 000.

A2.2.2. Fire Suppression Strategies and Tactics

- Manage fire suppression activities according to the Incident Control System.
- Contain wildfires to the smallest possible area.
- Prioritise objectives and reassess with weather changes.
- Consider evacuating residents and closing roads if fire intensity necessitates. Request police assistance for such actions.
- Avoid creating new fire breaks, unless essential.
- Maintain all vehicles free of soil and plant matter. Clean down all machinery before moving to other areas.
- Ensure adequate mop-up and control actions.

A2.2.3. Fire Recovery Strategies

- Conduct post fire reviews to assess causes of wildfire and conduct during suppression activities.
- Implement targeted and focussed weed control after burns.
- Spread local seed if appropriate and available in highly disturbed areas where large bare patches may exist following recovery of native plants after fire.

A2.3. Fire Management Zones

Figure 5 – Fire Management Zones
(Vegetation Management Zone shaded in red, Conservation Zone shaded in green and brook in blue)

Vegetation Management Zone – Areas that will be managed by maintaining lower fuel levels through the use of a combination of mowing or slashing, hazard reduction burning prescriptions and weed control.

Conservation Zone – Areas where prescription burns will take into consideration the higher conservation values of the brook and surrounding areas.

A2.4. Fire Management Schedule of Works

Action	Responsibility
Undertake controlled, mosaic burns in buffer zones with the timing to be determined by combination of fuel loads exceeding 8 to 12 tonne per hectare and years since last fire.	**Fire and Emergency Services Officer & Natural Reserves Coordinator**
Continue the program of weed control to reduce the extent and density of weed populations with emphasis on the aggressive weeds.	**Natural Reserves Coordinator**
Schedule weed control activities and revegetate at appropriate intervals after fires.	**Natural Reserves Coordinator / Landcare Officers**

A2.5. Fire Management Response Plan

<table>
<tr><td rowspan="4">Description</td><td>Location</td><td colspan="4">Korribinjal Brook Reserve, East and West</td></tr>
<tr><td>General</td><td colspan="4">Tree, Grass, Scrub, public access reserve, limited access in certain places</td></tr>
<tr><td>Terrain</td><td colspan="4">Steep rocky with water way through middle</td></tr>
<tr><td>Fuel</td><td colspan="4">Heavy</td></tr>
<tr><td>Values at risk</td><td colspan="5">➢ LIFE VERY HIGH RISK
➢ Power poles
➢ Fence posts
➢ Surrounding Properties
➢ Access walkway Bridge Over Creek</td></tr>
<tr><td>Hazard Identification</td><td colspan="5">➢ LV power lines
➢ Steep terrain
➢ Limited access
➢ One way in and out
➢ Rocky slippery tracks
➢ Limited water supply</td></tr>
<tr><td>HMA</td><td colspan="5">Department of Fire and Emergency Services</td></tr>
<tr><td>Controlling agency</td><td colspan="5">Shire of Serpentine Jarrahdale</td></tr>
<tr><td rowspan="3">Incident control point locations</td><td>Level 1 & 2</td><td>Primary</td><td>Medulla Rd</td><td colspan="2">UBD 472 Q-14</td></tr>
<tr><td>Level 1 & 2</td><td>Alternative</td><td>Jarrahdale BFB</td><td colspan="2">UBD 483 N-6</td></tr>
<tr><td>Level 3</td><td>Primary</td><td>Mundijong BFB – Cockram St Mundijong</td><td colspan="2">UBD 471 N-4</td></tr>
<tr><td rowspan="6">Mobilisation</td><td rowspan="5">Fire Danger Rating</td><td>Catastrophic</td><td colspan="3" rowspan="4">Three BFBs, Shire CBFCO, or Shire DCBFCO</td></tr>
<tr><td>Extreme</td></tr>
<tr><td>Severe</td></tr>
<tr><td>Very High</td></tr>
<tr><td>High</td><td colspan="3" rowspan="2">Jarrahdale BFB</td></tr>
<tr><td>Low/Moderate</td></tr>
<tr><td colspan="5">Note 1:- Fixed/rotary wing water bomber turnout is only available during the contracted period and is subject to availability.</td></tr>
<tr><td colspan="5">Note 2:- When making recommendations for back up resources to the incident controller, Heli/Air attack supervisors should take into consideration assets at risk, fuel types and water penetration requirements.</td></tr>
<tr><td rowspan="2">Access</td><td>Roads</td><td colspan="4">Medulla Road off Jarrahdale Road – (UBD 472 Q-13)</td></tr>
<tr><td>Gates</td><td colspan="4">N/A</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>Padlocks/Keys</td><td colspan="8">N/A</td></tr>
<tr><td>Firebreaks</td><td colspan="8">Firebreaks as depicted in map are maintained in accordance with Council's Firebreak Notice, i.e. 3m trafficable surface with 4m trimmed vegetation.</td></tr>
<tr><td>Communication Plan</td><td>MSE1</td><td colspan="2">40/221</td><td>360-365</td><td>46-49</td><td>MSE2</td><td>36/139</td><td>360-365</td><td>46-49</td></tr>
<tr><td rowspan="6">Communications</td><td rowspan="2"></td><td colspan="2">ComCen</td><td>ComCen</td><td>BFB</td><td>BFB</td><td>PAW</td><td>PAW</td><td rowspan="2"></td></tr>
<tr><td colspan="2">6IP</td><td>6AR</td><td>Duplex</td><td>Simplex</td><td>Duplex</td><td>Simplex</td></tr>
<tr><td rowspan="2">WAERN</td><td colspan="2" rowspan="2">220</td><td rowspan="2">371</td><td>139</td><td rowspan="2">360-365</td><td></td><td></td><td></td></tr>
<tr><td>221</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Mid-Band</td><td colspan="2" rowspan="2">55</td><td rowspan="2">80</td><td>36</td><td rowspan="2">46-49</td><td></td><td></td><td></td></tr>
<tr><td>40</td><td></td><td></td><td></td></tr>
<tr><td>Public Assembly Areas</td><td colspan="9">Bruno Gianatti Hall, Munro Street, Jarrahdale – (UBD 483 M-6)</td></tr>
<tr><td rowspan="4">Water points</td><td rowspan="2">Air Support</td><td colspan="6">Dam</td><td colspan="2">ESD 461 A-20</td></tr>
<tr><td colspan="6">Dam</td><td colspan="2">ESD 461 E-19</td></tr>
<tr><td rowspan="2">Ground Crews</td><td colspan="6">Static Water Supply Millbrook Close</td><td colspan="2">UBD 471 Q-13</td></tr>
<tr><td colspan="6">Static Water Supply Hetherington Close</td><td colspan="2">UBD 473 B-16</td></tr>
</table>

A3.6. Environmental Advice

***Phytophthora* hygiene**

All vehicles and machinery are to be "clean" prior to entering into reserves. "Clean" means free from clods or collections of soil and plant material. Particular attention should be paid to the undercarriage and mudguards of light vehicles and trucks and to belly plates, buckets, rakes and tracks of heavy plant. This may entail wash-down or brush-down at the entrance to the reserve, or alternatively wash-down at a formal wash-down point prior to arrival at the workplace.

Weed Hygiene

Prevent the introduction and spread of weeds by keeping machinery clean and not moving soil from weed affected areas to non-affected areas.

Protection of Threatened Flora and Threatened Ecological Communities

Caution is required when constructing fire breaks in the vicinity of known populations of rare flora, known Threatened Ecological Communities, and habitat of threatened fauna species. It is preferable for a population of Threatened Flora or a Threatened Ecological Community to be burnt than to be damaged by machinery.

Protection of soil, vegetation and habitat disturbance

Use existing breaks/tracks to contain the fire where possible.
Avoid damage to known rehabilitation sites.
Protect mature trees alongside internal tracks to prevent falls over track.

Use of fixed/rotary wing water bomber

Water containing additives to assist in fire control (foams, wetting agents or retardant) should not be applied on, or near, riparian zones around watercourses including wetlands.
Check and confirm if the status of the area is wet or dry.

Use of Appropriate Machinery

Consider smaller machines or rake trails in environmentally significant bushland areas.
Clear firebreaks to minimum suitable width, taking into account fire behaviour, vegetation type, and resources available.
When using earthmoving equipment for fire suppression, avoid unnecessary clearing and minimise environmental impacts.

	Agency	**Position**	**Phone**
Contacts	Shire of Serpentine Jarrahdale	SJ Chief	0409 080 778
		Natural Reserves Coordinator	0488 572 946
	Department of Fire and Emergency Services	ComCen	9395 9209
		Media Alerts and Warnings	0427 479 499
	Parks and Wildlife	South Coastal Region	9405 0700
Recommended Suppression Strategy	Work to contain the fire using only existing mineral earth tracks. Use aerial suppression platforms to decrease forward RoS and deploy ground crews to suppress the fire as it burns out to tracks. Defensive strategies such as RUI firefighting are to be used where fire behaviour is extreme in order to protect vulnerable assets indicated on map and adjoining properties.		