



Korribinjal Brook Reserve Management Plan

Final
25th October 2010

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1. Executive Summary

1.1 Introduction

Korribinjal Brook Reserve (also referred to as KBR or 'the reserve'), located in the Millbrook area of Jarrahdale, is a highly disturbed local natural area reserve with an understorey almost entirely dominated by weeds under a mainly natural overstorey. The reserve is currently vested with the Shire of Serpentine Jarrahdale for the purpose of public recreation, but due to its conservation value and community interest, it is recommended that the purpose be changed to include conservation. Interested local residents and the Shire of Serpentine Jarrahdale have been working since 1987 to improve the condition of the reserve via weed control and planting of local native plants. The community group (known as the Korribinjal Brook Residents Group or KBRG) and Shire are keen to restore the stream reserve closer to its original state and condition enhancing the already important conservation values of the reserve through the establishment of two major walk trails through the reserves.

1.2 Objectives

An initial management plan for Korribinjal Brook Reserve was developed in 2000, and information from this management plan has been incorporated in this more current management plan. The objectives within the initial 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 continuity of management in the future, so that the goal or focus is clearly defined and easy to follow despite lack of personnel continuity; and
- Provide the community with the opportunity to become involved in the decision-making process for 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 is on the northern side of Millbrook Close, west of Medulla Road, while the Eastern part of the reserve is on the eastern and northern side of Medulla Road (see Figures 1 - 3). 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 approximately five hectares.

As part of the creation of this plan a meeting was held with interested residents at the Serpentine Jarrahdale Community Landcare Centre in December 2000. Appendix 1 contains information on the agenda of the meeting and the topics discussed.

1.4 Report Structure

This management plan has been prepared in accord with the *Shire Reserves Planning and Management Policy*¹. The report is structured into the following sections:

- Legislative and policy framework:
 - *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.*
- Physical and biological characteristics:
 - *Analyses landform, land, water and biodiversity features on the Study Area. Threats to these features have also been considered.*
- Cultural and social characteristics:
 - *Identifies the main human uses of the Study Area, 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 Priority Recommendations

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
Governance						
1	Change of reserve purpose to include conservation along with public recreation.	Key	Yet to be implemented	Environmental Services	Staff Time \$1,000	
Environmental Characteristics						
8	Liaise with the Fire and Emergency Services Officer to create a Fire Management Plan for the area.	Key	Ongoing	Environmental and Fire and Emergency Services	Staff Time \$1,000	
15	Strategically remove African_love grass from bushland	Key	Ongoing	Environmental Services and Community	Contract spraying - \$2,000 charged by hour and chemical	

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
					type.	
26	Advise all local residents of the impacts of dogs and cats on the reserve fauna.	Key	Yet to be implemented	Health and Ranger Services conjunction with Environmental Services	Staff Time \$1,000	
27	Provide all developers and landowners within one kilometre of the Reserve with management plan information and requirements.	Key	Yet to be implemented	Environmental Services and Landcare	Staff Time \$1,000	
28	Develop a public education program that targets local landowners and users of the reserve, to include local and indigenous flowering species in the reserve, the vegetation itself, impacts of domestic cats and dogs, impacts of weeds and how they spread, impacts of dieback (<i>Phytophthora cinnamomi</i>), impacts of physical disturbance and impacts of fire.	Key	Yet to be implemented	Environmental Services Operations Parks and Reserve Officer and Landcare	Staff Time \$1,000	
29	Protection of fauna - erection of Bandicoot Crossing sign and other information signs.	Key	Implemented in part	Shire, Community & Landcare Centre	Around \$1,500 for Bandicoot Crossing sign, \$200 for informative signs.	Within 6 months of completion of plan.
Social and Economical Characteristics						
32	Encourage, support and facilitate the community to provide ongoing participation in the management of the reserve..	Key	Ongoing	Environmental Services	Staff Time \$1,000	

Figure 1: Korribinjal Reserve Location - Lots and Cadastre

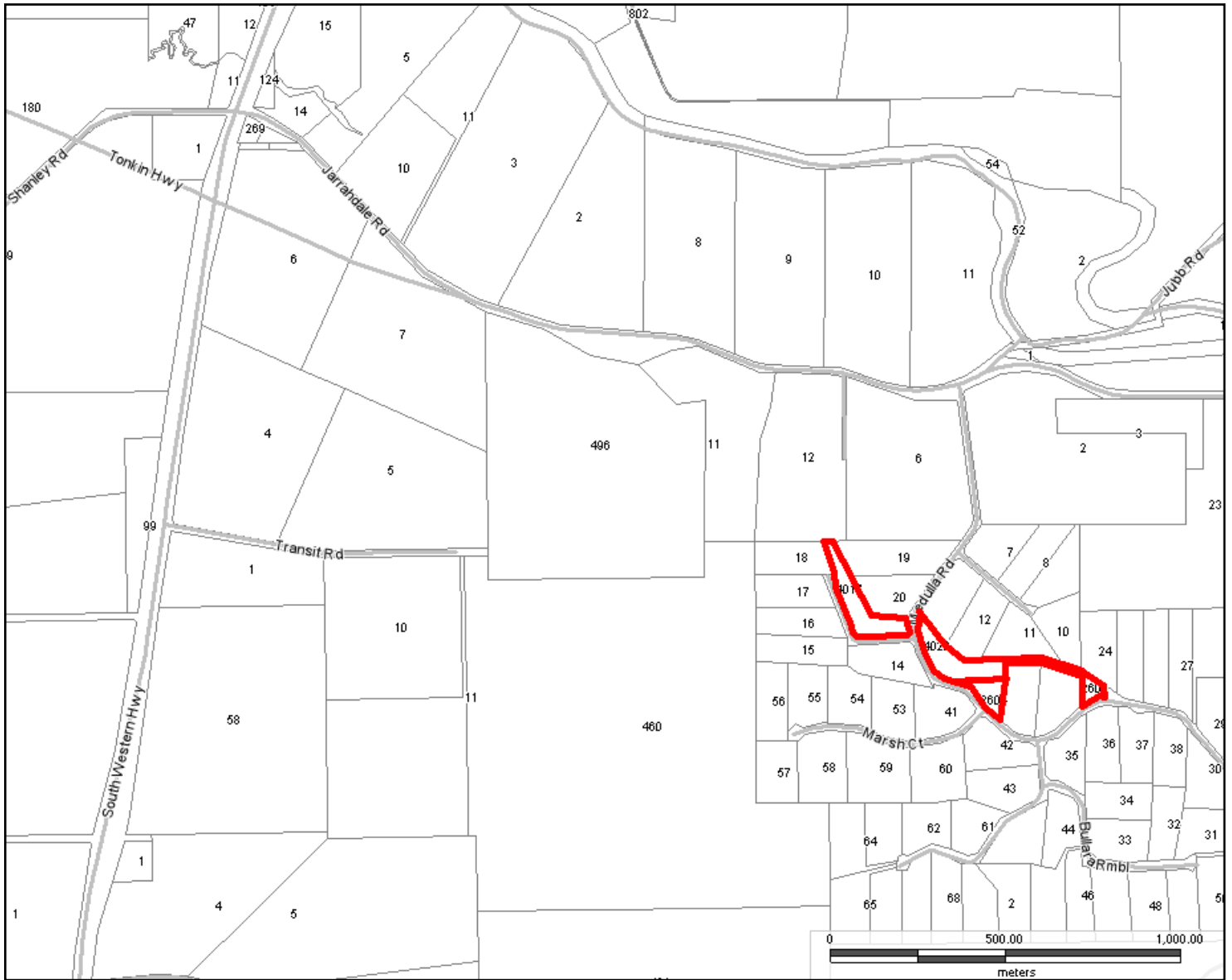
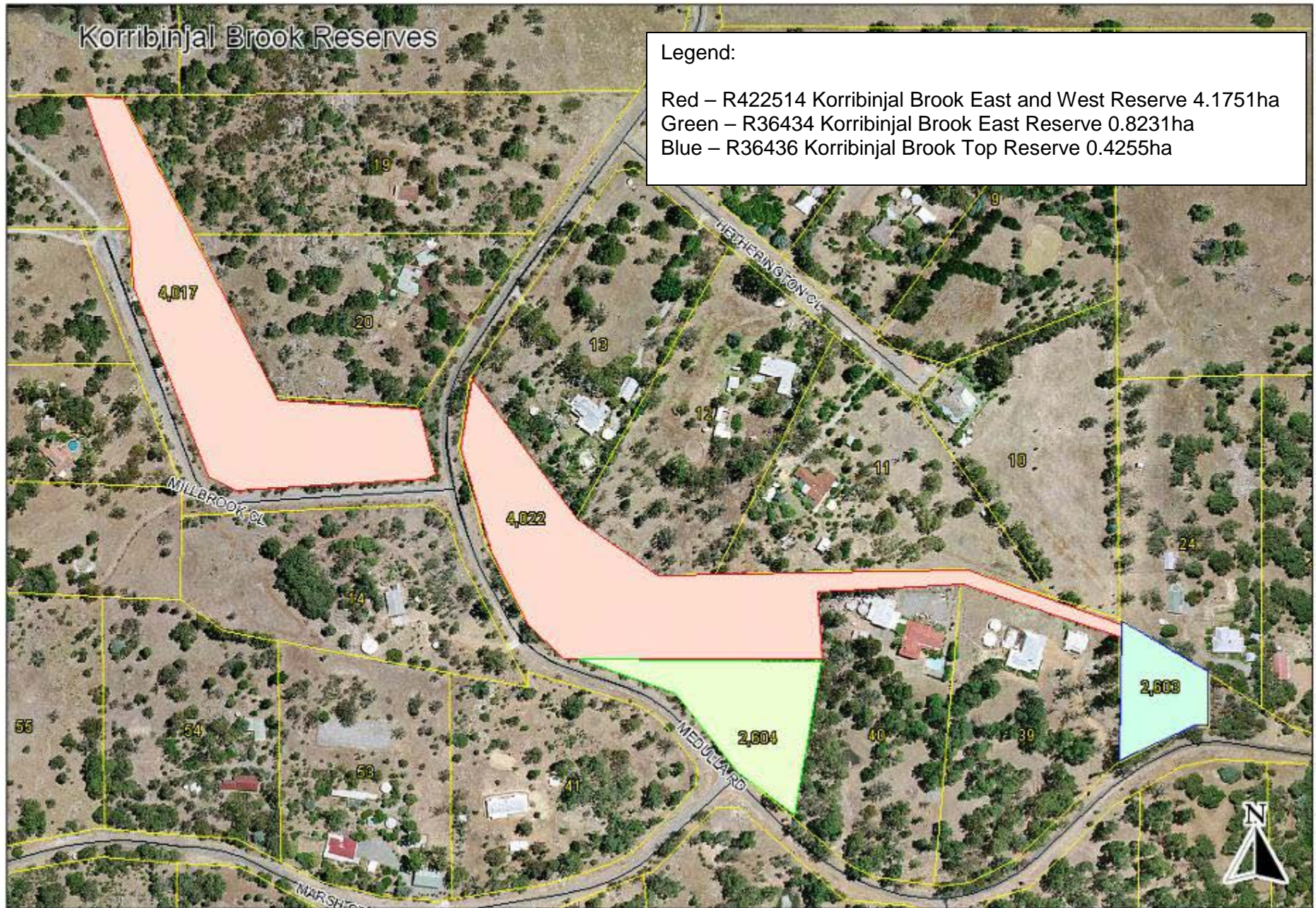


Figure 2: Korribinjal Reserve Outline



Figure 3 Korribinjal Brook Reserve Sections



2. Governance

2.1 Vesting

Korribinjal Brook Reserve is vested with the Shire of Serpentine Jarrahdale for the purpose of Public Recreation. However, owing to the extensive remnant overstorey flora and significant fauna communities inhabiting the reserve, it is recommended that the vesting be changed to include Conservation as a purpose for the reserve along with Public Recreation. The reserve has been undergoing rehabilitation activities by a local residents' group from 1987 to the present day, and so the change in purpose would acknowledge the reserve's current uses and community conservation values.

MRS Zoning: Rural
TPS Category: Public Open Space
Lot Type: Crown Reserve
Native Vegetation ID: N/A
Bush ID: N/A
SWBP: Local Natural Area
Reserve Class: C
Heritage Features: No
Landscape Protection Policy Draft Area: Feature 151

2.2 Land Tenure

The land tenure and vesting purpose of the several sections of Korribinjal Brook Reserve (as shown in Figures 1 - 3) are shown in Table 2.

Table 2: Korribinjal Brook Reserve Locations and Uses

Reserve name	Reserve Number	Area (ha)	Land transfer date	Purpose	Current Use
Korribinjal Brook East and West Reserve	R42251	4.1739	1980	Public Recreation	Recreation and Conservation
Korribinjal Brook East Reserve	R36434	0.8231	1980	Public Recreation	Recreation and Conservation
Korribinjal Brook Top Reserve	R36436	0.4255	1980	Public Recreation	Recreation and Conservation

2.3 History (1980-2009)

Prior to reservation, Korribinjal Brook Reserve was part of a farm, and as such was heavily grazed. Two small areas are still grazed by arrangement, which is not permanent and is under regular review. By the late 1970s, little of the original indigenous

understorey flora remained, and the weed infestation was heavy; including African Lovegrass, Cotton Bush, Paterson's Curse and Olive Trees. The area was rezoned during the Millbrook subdivision in 1980 from grazing land to a public recreation reserve.

Since 1987, local residents, the Korribinjal Brook Reserve Group have been involved in weed control, walk trail establishment and planting of local native plants. Concentrated planting and weeding have been undertaken in the reserve since 1998, with assistance from the Serpentine Jarrahdale Landcare, Jarrahdale Heritage Society funding from Natural Heritage Trust and Alcoa. The reserve has been planted with several thousand plants of local native species over the last ten years. In the last two years, success rates have been high due to watering with small donated tanks. Plantings twenty years ago also had good success due to good rains.

A vertebrate survey was done in 1989 of the long corridor reserves and few animals were identified. Recently SJ Landcare put up an artificial nesting box (cockatube) for endangered black cockatoos.

Cotton bush (*Gomphocarpus fruticosus*) was once a major weed problem, but now is much reduced, due to "busy bees" or weeding days with residents. The Karnet Prison Farm inmates have also been involved, creating a walk trail in the western part of the reserve and Green Skills have helped fund a small bridge across the brook. This provides residents with a safer and more pleasant walking experience.

The reserve has received Natural Heritage Trust (NHT) funding to undertake weed control, installation of signage, planting of local native plants, fauna surveys, installation of walk trail seating, and establishment of photographic records. Alcoa funding has been also received and allocated to weed spraying and the purchase of plants and fertilizer. These activities have been undertaken, including the erection of a sign for the reserve, in the eastern part of the reserve.

There are currently 6 resident families who are active in the care and revegetation of the East and West Korribinjal Reserves, forming a long corridor on both banks of the brook. Following these efforts, there has been an increase in the number of wildlife inhabiting the revegetated bushland and the new walk trail has been successfully featured in the 2008 publication "Walks Around Jarrahdale", as well as the Jarrahdale Heritage Society running guided walks and planting days throughout the reserves.

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

This management plan has become possible as well as weed mapping and additional planting with Green Corp assistance, as a result of a successful Lotterywest Grant prepared and submitted by local residents, the Shire's Reserves Officer and the Shire's Environmental Services.

2.4 Bush Forever

The bushland has not been recognised as regionally significant through Bush Forever; it is not known to contain priority flora, but there are records of quenda inhabiting the reserve (priority 5 fauna).

2.5 Governance Recommendations

Table 3: Governance Recommendations

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
Governance						
1	Change of reserve purpose to include Conservation along with Public Recreation	Key	Yet to be implemented	Environmental Services. Within 3 months of completion of plan.	Staff time \$1,000	

3. Environmental Characteristics

3.1 Physical Features

3.1.1 Land

Description

The soils of Korribinjal Brook Reserve are part of the Ridge Hill Shelf system, consisting of alluvial deposits over laterite (Table 4). The soils are acidic yellow duplex, and as such are well-drained. The reserve is situated in a steep valley on a granite outcrop, which at various places can be seen at the surface. This is located on the Darling Scarp and is within the Mediterranean-type climatic zone, both of which influence the dominant vegetation types in the area.

The Darling Plateau is ancient. The basement rocks are around three billion years old and are deeply weathered in the upland areas and eroded along the western edge. The part of the Plateau lying within the Shire boundaries has an elevation of between 250 and 350 metres above sea level. The western edge drops away steeply to meet the coastal plain at about 60 metres above sea level.

Table 4: Landform and Soil Classifications

Geomorphic Region	Soil Landscape Zone	Soil Landscape System
Darling Plateau	Western Darling Range	Darling Plateau
		Murray Valleys ^a

^a – includes Darling Scarp

The Darling Plateau and Scarp

The Plateau is part of the Yilgarn Craton, one of the oldest landscapes in the world, with basement rocks of granite and gneiss with some dolerite intrusions. The granitic rocks have been extensively weathered into laterite formations, and the less eroded parts of this landscape usually have gravel in the surface profile.

The Plateau is a gently undulating land form. The gently undulating upland soils belong to the Dwellingup Subsystem, and consist of 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 surrounds belong to the Murray Valley System which includes the Helena, Murray and Myara subsystems.

Condition and Status

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 of the slopes have been cleared for agricultural use. This has exposed the land surface to wind and water erosion, and led in some areas to loss of sediments, nutrients, organic matter, and soil water retention capabilities. Impacts to soil have resulted from overly intensive grazing, inappropriate excavation, landfill and machinery use.

Major Threats and Pressures

Poorly managed human activities, from broad acre agriculture can lead to degradation of the soils. In recent years, soil degradation on rural residential holdings and “hobby farms” has highlighted the need for training in land management. There are also ongoing problems of soil degradation associated with broad acre agriculture. The range of degrading processes include phosphorus (and other nutrient) export, water and wind erosion, secondary salinity, soil structure decline, subsurface acidification, waterlogging and flood. Land degradation is a result of a complex interplay between land and soil properties and their management. Good land management requires a range of highly developed knowledge and practical skills.

Erosion

Erosion is the removal of topsoil, and in extreme cases (often including along fire breaks), deeper layers of the soil profile by the action of water or wind. This means a permanent loss of part of the land asset. The risk of erosion depends on the stability of the surface soil, often affected by the amount and type of vegetation cover (such as native perennial, pasture annual, or pasture perennial) and the force of the wind or water moving across the surface. Water speed is largely determined by slope, although level areas may be affected by water flowing from adjacent land. Water erosion is an accelerating process, as bare eroded areas generate more surface runoff, increasing the volume and speed of water movement downslope.

Water erosion occurs in streams when water washes out soil from the banks and deposits it downstream. However, human activity can and often does accelerate the process to harmful levels. The degree of bank erosion depends on the amount and type of the remaining vegetation cover, due to the increase in water availability when decreased vegetation cover reduces filtration and water uptake. The roots of the plants also act to stabilise the soil and control erosion. Some types of vegetation, such as reeds and rushes, filter nutrients from the water. Therefore, the stream’s vegetation is essential in preventing further erosion and damage. Bank erosion is evident in the reserve due to a lack of supporting vegetation on the stream’s banks, much of which can be attributed to the past grazing of the reserve by local stock. However, weeds such as African love grass (*Eragrostis curvula*) and olive trees (*Olea europaea*) are stabilising the banks in some areas.

Grazing

Korribinjal Brook Reserve was, for many years, subjected to grazing by local stock. This resulted in land degradation, as well as streamline erosion, which impact on the reserve’s conservation value. 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 the valuable leaf litter which normally provides the soil with essential nutrients. A combination of these problems has led to a major decline in understorey vegetation and therefore associated fauna.

Salinity

Surface salinity is a condition where the level of soluble salts in the surface soil is high enough to affect plant growth. It can be natural or anthropogenic, and can be caused by rising water tables or evaporation of surface water. Salinity alters the chemical balance of the soil and limits plant growth. This leads to the secondary impacts of bare sealed surfaces with low infiltration and increased runoff and erosion. Salinity is not currently known to affect the reserve.

Acid Sulphate Soils

Acid sulphate soils are sediments containing iron sulphides, which occur naturally in layers of waterlogged soils and are benign until disturbed. This is unlikely to be a problem in the reserve, as the soils are well-drained (not waterlogged) and soil disturbance to the level of the water table is improbable. As such, Korribinjal is classed as acid sulphate soil category 3, with no known risks.

3.1.2 Water

Description

Water assets provide a variety of ecosystem services, such as draining the excess surface water from the landscape and minimising flooding. The groundwater resources provide a water storage function that interacts with the surface waterways and wetlands. During long dry spells the groundwater supports surface water and wetland ecosystems as well as its own unique ecosystem. Dams can create important reservoirs of water for a range of uses, but can result in loss of important riparian areas required for wildlife habitat, as well as loss of important environmental flow downstream needed for the sustainability of riparian and river bed habitat. The biodiversity values of the rivers and wetlands are discussed in that section.

Surface Water

Korribinjal Brook is within the Serpentine Catchment, which contributes around 15 percent of the total annual surface inflow to the internationally significant Peel Harvey Yalgorup Ramsar Site. Maintaining and improving the quality of the catchment runoff is vitally important to protecting the health of the estuary.

Serpentine River and Dams

The Serpentine River is the most significant natural waterway in the Shire of Serpentine Jarrahdale. It rises to the east of the Shire and traverses the Shire from the southeast corner to the western boundary where it discharges to a large artificial drain. The River is dammed at two points in its upper reaches on the Darling Plateau. The smaller pipehead dam was completed in 1957 and the larger dam upstream in 1961. These reservoirs are an important source of water for the metropolitan region and their catchments are carefully managed by the Water Corporation to maximise water supply and quality.

Drainage Network

Overly efficient drains and clearing in and around streams has resulted in excessive loads of silt and nutrients being transported from the Shire's land surface into drains, streams and the estuary. The severity of this problem was recognised in the 1980s when the Peel-Harvey Estuary's ecosystem came close to collapse because of high nutrient levels. Most of these nutrients and eroded sediments come from the coastal plain.

Wetlands

Wetlands are, in general, expressions of the groundwater table and play an important role in the water cycle. In winter they store surface water, and in summer water evaporates from the surface. Many wetlands have been drained and filled, so they are a diminishing and threatened asset. Wetlands have an intrinsic place in the regional ecology and this role is discussed under biodiversity.

Groundwater

Groundwater quality in the Shire is generally good, although there is limited information on which to base an analysis. There is a natural variation in groundwater salinity. It is possible that lower groundwater tables and excavations could have exposed acid sulphate soils and released acid plumes into the groundwater of the coastal plain. It is also probable that there has been some level of nitrogen and phosphorus enrichment of groundwater in places, especially beneath the sands of the coastal plain. 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, and there are no problems which are currently thought to affect the area.

Major Threats and Pressures

The most significant threats to the water asset relate to both lower recharge rates and higher demand for use. The predicted climate changes, leading to significantly lower rainfall, would have a major effect on recharge, while the expanding population is likely to increase the demand for use. Other significant threats to the asset are actions that reduce water quality, including lowering of the water table and exposure resulting in acid sulphate soils, nutrient export and chemical pollutants.

Climate Change

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 still 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.

Overall the water asset 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.

Eutrophication (Nutrient Enrichment of Aquatic Ecosystems)

Korribinjal Brook Reserve falls within the catchment of the Peel-Harvey Estuary, an ecosystem which has been under extreme pressure from eutrophication. Many land uses continue to contribute significant nutrient loads to this estuary. These nutrients also impact directly on the ecology of the Serpentine River and other waterways.

Broad acre agriculture currently makes up about 90 percent of land use within the Peel Harvey Catchment and is the source of the majority of nutrients reaching the estuary. At present, urban and rural living land uses make up only 6 percent of the catchment area, but these land uses contribute much more than 6 per cent of nutrient loads. Possible sources of nutrients from urban and rural living land uses include septic tanks, eroded soil particles and over-fertilising of small areas of pasture or lawn. All of these possible sources are cumulative and likely from the area surrounding the reserve.

Siltation and Pollution of Surface Waters

Allied to the export of nutrients from the land surface is the export of soil particles and organic matter. The soil particles are often the carrier for nutrients, thereby creating part of the threat discussed above. They also directly impact on the water systems by increasing the turbidity of the water, filling pools and sometimes creating barriers to drainage that can lead to flooding. Erosion is known to be a problem within the reserve, and thus the area is likely to be a contributor of soil particles, and potentially nutrients, to downstream areas.

Salinity

Salinity is not a major problem for the reserve as it (and its upstream catchment area) does not suffer from rising saline groundwater. However, some areas of the Shire are affected by surface salinity, so it is likely that there has been some effect on the salinity of other waterways. The salinity of the groundwater varies and is high in some places due to the high salt content of the aquifer sediments. It is also noted that groundwater discharging to the Serpentine River has higher salt levels.

The salinity of wetland systems generally increases through the summer due to high evaporation and decreases when flushed by the winter rains. This winter flushing effect may be a key factor in preventing salinity, and the predicted decrease in the length and volume of winter rains could therefore increase the risk of salinity. An increase in the area of salt affected land in a catchment could also affect the salinity levels in surface and groundwater systems. Salinity is a threat to the water asset that requires further study.

Over-Use of Groundwater

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 the likelihood of lower rainfall in the future the situation will most likely deteriorate. It is unclear how this may affect the reserve, although it is known that declining groundwater levels are likely to put vegetation under stress resulting in negative impacts.

Acid Sulphates, Nitrates and Other Pollutants

Exposure of acid sulphate soils through either excavation or lowered water tables can result in plumes of sulphuric acid and heavy metals entering the surface and groundwater systems.

Nitrate pollution has been found under horticultural areas north of Perth. Intensive use of fertilisers and intensive stocking such as feedlots creates a high risk of nitrogen leaching into the groundwater, particularly on sandy soils. Pesticides and other chemicals also pose a serious risk to ground and surface water systems. Careful management of all these materials, especially close to surface water or in high recharge areas, is essential.

Changing Hydrology

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

that is now flushed out to sea. All of these factors may influence the reserve in the future.

3.1.3 Climate, Rainfall and Air Quality

Description

The climate of this region is described as Mediterranean, because of the similarity to weather patterns experienced in the region of that name. It is a mild climate with hot, dry summers and cool, wet winters. The average annual rainfall varies from 800 to 1000 mm on the coastal plain area, increasing to 1200 mm on parts of the Darling Plateau. Most of the rain falls during the winter. Decaying tropical thunderstorms occasionally bring heavy rainfall to the region during summer or autumn.

The climate is currently much drier than it has been since the beginning of the last century. The innate variability of the climate makes it difficult to make long term predictions and climatic models also vary. Since the 1950s there has been a substantial decline in rainfall coupled with a slight increase in temperature. It is uncertain how much of this decrease in rainfall is due to natural variability and how much is caused by greenhouse effect. Nevertheless, current studies strongly suggest that winter rainfall will continue to decline putting greater pressure on this stream reserve.

Major Threats and Pressures

CSIRO studies predict that Western Australia will be much warmer and drier by 2030. Autumn and winter rainfall is likely to decrease by around 20 percent from 1990 values. Spring rainfall also is also expected to decrease somewhat and temperatures may rise by up to 2 degrees. The higher temperatures will cause higher evaporation and, coupled with decreased rainfall, will significantly affect the water balance. Rainfall events are expected to become more intense, leading to higher runoff generation, especially on soils with low infiltration rates.

Loss of Vegetation

Vegetation plays an important role in creating a healthy ecosystem. This includes 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.

3.2 Biodiversity

Description

Protecting biodiversity means conserving the full range of genes, species and ecosystems into the future. Given the range of threatening processes, including the prospect of climate change, this will be no mean feat. Protecting biodiversity is, however, essential, as biodiversity underpins the processes that support life, including human life, on this planet.

A variety of strategies have been adopted to protect biodiversity at State and Federal levels. One strategy is to conserve adequate areas of the full range of natural

ecosystems. The assumption is that by preserving representative ecosystems we will also preserve the full variety of species and genes. Unfortunately, the extent of ecosystem destruction has been so great that it is no longer possible to protect some ecosystems. This strategy therefore needs to be supplemented by other approaches such as recovery projects for threatened flora and fauna.

The State Government manages a system of national parks, nature reserves and conservation parks that aims to be comprehensive, adequate and representative. It also conducts a number of recovery programs for threatened species and communities.

This Shire is part of the Southwest Botanical Province, which has been recognised as a global biodiversity hotspot. Not only does this area boast a high diversity of species, but many of these plants and animals are found nowhere else in the world. The management and protection of many parts of this internationally important asset falls to local government and private landholders. The local community also has the responsibility to ensure that adjacent land uses do not damage the biodiversity assets.

3.2.1 Flora

Remnant Vegetation Communities

The vegetation of the Jarrah Forest bioregion, which includes the geophysical regions of Plateau and Scarp, is still dominated by its namesake (*Eucalyptus marginata*). This vegetation covers the laterite plateaus. The forested area also 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 varied sclerophyll 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 younger red soils of the Darling Scarp there is a marri-wandoo woodland with occasional Darling Range Ghost Gums on the granite outcrops.

The Darling Plateau area has been greatly impacted by timber harvesting, bauxite mining and dieback disease but retains much of the original vegetation structure. Dieback (*Phytophthora cinnamomi*) has affected vast tracts of the Jarrah Forest across the Plateau. It is spread through water and the transport of infected soil, gravel and other materials. The disease is known to occur throughout the Shire.

Many Shire reserves with high biodiversity values have been invaded by the aggressive weeds watsonia (*Watsonia* spp.) and lovegrass (*Eragrostis curvula*). Despite ongoing programs of weed control the populations are spreading. The problem, particularly related to the spread of lovegrass, can usually be linked to either direct disturbance by humans, animals or machines or indirect disturbance such as stormwater runoff or effluent disposal. Unfortunately many Shire reserves are still subject to high levels of disturbance, often by recreation groups, which encourages weed invasion.

Landcare groups, working with the Community Landcare Centre, have restored areas of remnant vegetation and have revegetated large areas. These revegetation projects have used predominantly locally occurring species.

There is very little native understorey vegetation remaining in Korribinjal Brook Reserve, the ground cover being dominated by weeds, however indications are such that the understorey may have been quite unique and similar areas are being investigated to bring this unique value back to the reserve. There are some tree species which provide a good level of overstorey cover and the vegetation complexes would appear to be a mix of both Darling Scarp and Murray Valley. The native flora species in the reserve are listed in Table 5, and weeds in Table 6.

Table 5: Native Flora Species List for Korribinjal Brook Reserve

Plant species	Common name
<i>Acacia pulchella</i>	Prickly moses
<i>Acacia saligna</i>	Golden wreath wattle
<i>Austrodanthonia caespitosa</i>	Common wallaby grass
<i>Chorizema ilicifolium</i>	Holly flame pea
<i>Corymbia calophylla</i>	Marri
<i>Darwinia citriodora</i>	Lemon-scented darwinia
<i>Eucalyptus rudis</i>	Flooded gum
<i>Eucalyptus wandoo</i>	Wandoo
<i>Hakea lissocarpha</i>	Honey bush
<i>Hakea prostrate</i>	Harsh hakea
<i>Hakea trifurcate</i>	Two-leaf hakea
<i>Hardenbergia comptoniana</i>	Native wisteria
<i>Jacksonia sternbergiana</i>	Stinkwood
<i>Melaleuca acerosa</i>	Coastal honeymyrtle
<i>Melaleuca preissiana</i>	Moonah
<i>Mirbelia dilatata</i>	Holly-leaved mirbelia
<i>Pteridium esculentum</i>	Bracken fern

Weeds

A weed can be described as any plant growing where it is not wanted, where it is not naturally occurring or where it is severely out-competing other species. Weeds are a problem at Korribinjal Brook Reserve for two main reasons:

1. Weeds are a fire hazard, which affects landholder safety in the area, as well as the fauna of the reserve; and
2. The weeds are suppressing native plant growth, severely affecting biological diversity when weeds monopolise the sun, space, soil and water.

However, it should be noted that the Quenda present in the reserve do use some weeds as habitat. It is therefore important to remove such weeds progressively, and as they are removed they need to be replaced with native plants at an equivalent rate. Providing habitat is only valuable if animals are present, so this must be considered when revegetation occurs in the reserve.

Table 6: Common Weeds of Korribinjal Brook Reserve

Plant species	Common name
<i>Anagallis arvensis</i>	Pimpernel

<i>Asparagus asparagoides</i>	Bridal creeper
<i>Avena barbata</i>	Wild oats
<i>Briza maxima</i>	Blowfly grass
<i>Bromus diandrus</i>	Great brome
<i>Echium plantagineum</i>	Paterson's curse
<i>Eragrostis curvula</i>	Love grass
<i>Ficus carica</i>	Fig tree
<i>Fumaria</i> spp.	Fumitory
<i>Gomphocarpus fruiticosus</i>	Cotton bush
<i>Hypochaeris glabra</i>	Flatweed
<i>Hypochaeris radicata</i>	Flatweed
<i>Lolium rigidum</i>	Annual ryegrass
<i>Lupinus luteus</i>	Lupin
<i>Olea europaea</i>	Olive tree
<i>Rubus fruticosus</i>	Blackberry
<i>Solanum nigrum</i>	Deadly nightshade
<i>Trifolium angustifolium</i>	Narrow-leafed clover
<i>Typha orientalis</i>	Bulrush

Flora Management

Flora management is essential for increasing and maintaining biodiversity as a component of conserving natural heritage. The vegetation of Korribinjal Brook Reserve is very much degraded due to past use of the area as grazing land. Owing to the lack of current native understorey species, natural regeneration would be ineffective. It is therefore more productive to plant and direct seed the area, with concurrent necessary weed control.

Revegetation of Native Flora Species

Over the last ten winters, the residents' group has planted the area with local native species which are found in the nearby national park. Nearby local vegetation communities should be used as a guide to the local flora when revegetating the reserve. A variety of understorey vegetation should be planted, which will provide adequate Quenda habitat while slowly removing the lovegrass (*Eragrostis curvula*).

Some revegetation has occurred in the last ten years, and in order to achieve good success rates it is essential to undertake weed control around the existing plantings to allow them to establish. A weed control plan was developed in 2000 with the help of members of the Korribinjal Brook Group. The specific areas and processes outlined in the plan (Appendix 2) could be followed in order to achieve a coordinated strategic approach to rehabilitation of the area.

It is essential to analyse past works and determine the degree of success, thereby improving the quality of any works in the future. It would be advisable that a member of the residents' group be responsible for ordering plants for the next season, to ensure plants are ordered and collected. A planting day during winter with the residents would be an excellent way to plant or seed the areas, provide an effective working team and assist in the development of community spirit.

Dieback and Weed Prevention

Korribinjal Brook Reserve has not yet been assessed for the presence of dieback disease (*Phytophthora cinnamomi*). The plant species which are most affected by dieback (such as banksias, jarrah, grass trees) are not found in the reserve at present. 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.

Recreational users should keep to the tracks, with signage provided to inform the public of the need to do so. This is required to prevent walkers either deliberately or unknowingly walking on growing seedlings. Signage money is available from various funds the Korribinjal Brook Group has received in previous years. A member of the group, with assistance from the Serpentine Jarrahdale Community Landcare Centre, should design and order the appropriate signs for the reserve. This should be undertaken within six months of the completion of this management plan.

Another necessary action for decreasing and preventing further weed infestation in the reserve is spraying the weeds in the sections of the reserve that are to be planted, removing them only when there will be native seedlings to replace them. The Korribinjal Brook Group has in the past had weeding days, which would be a good idea when specific weeds are in need of manual removal. The removal of lovegrass (*Eragrostis curvula*) would be best undertaken by a spraying contractor; funds are available from various sources for such work. However, declared weeds should be controlled at all times, which is a Shire responsibility to be undertaken throughout the year.

Some methods of control for the major weeds in the reserve are listed below. Chemical control should be carefully considered so to not harm the native fauna; for example, as glyphosate kills amphibians, Bioactive glyphosate should be used instead, or manual removal.

Love grass (*Eragrostis curvula*), a major weed in the reserve, can be controlled by slashing, followed by spraying with glyphosate. Love grass has built up a resistance to some grass-specific herbicides. Burning is not the preferred method of control. Unless vigorous follow-up spraying occurs, the problem only increases because the burning promotes new growth. Love grass should be attacked in autumn and winter, when the weed is actively growing, which is essential for good chemical uptake.

Paterson's curse (*Echium plantaginium*) must be sprayed or manually removed during its flowering season in late winter/early spring. Paterson's Curse is a declared plant under the Protection of Agriculture and Related Resources Act (1976). It is therefore a priority weed and should be dealt with as thoroughly as possible.

Cotton bush (*Gomphocarpus fruticosus*) is also a declared plant and should be rigorously controlled. Generally, hand removal is the most effective on cotton bush when they are still quite small and before flowering in summer.

3.2.2 Fauna

In Western Australia, rare or endangered species are protected by the *Wildlife Conservation Act (1950)*. Protected fauna are listed in four schedules under the *Wildlife Conservation (Specially Protected Fauna) Notice*. The Department of Environment and Conservation (DEC) also maintains lists of Priority fauna species which require active conservation efforts or further study. The fauna recorded in the Shire from these lists are identified in Table 7.

Table 7: Threatened and Priority Fauna, Shire of Serpentine-Jarrahdale^a

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

a : Based on records supplied by the Department of Environment and Conservation (DEC) from the Threatened Fauna Database

b: Based on a report by J.Henry, Ninnox Wildlife Consulting (2000)

John Dell from the Western Australian Museum conducted a detailed fauna survey for the eastern part of the reserve in July 1999, in association with Ninnox Wildlife Consulting (Dell, 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 (as found in the study). However, due to the considerable habitat it is possible many other species are present and went undetected in the survey.

The report came to several conclusions, one of which was that: "Several of the bird species found are listed as significant on the Swan Coastal Plain of the Perth Metropolitan Region (Department Of Environmental Protection, 1998a) because they are habitat specialists with a reduced distribution on the Swan Coastal Plain, or because they are wide-ranging but have low population numbers." Therefore the reserve needs to be managed correctly and efficiently in the future to help maintain and increase this valuable habitat.

It has also been seen through animal droppings that kangaroos are using the reserve on a regular basis.

The survey contains specific species lists and detailed information on the best strategies for achieving the protection of native fauna. These management considerations include fire management, weed control, feral animal control, minimisation of human disturbance, and revegetation.

Feral Animals

Feral animals found in the area of Korribinjal Brook Reserve include domestic cats, foxes, rabbits and the common house mouse. Feral animals are detrimental to native animal populations for several reasons, including:

1. Preying on native fauna;
2. Out-competing native species for resources such as food and space;
3. Spreading diseases and weeds (in their excrement); and
4. Damaging native flora and thus habitats for the native animals.

Foxes and rabbits can be baited with 1080, a naturally occurring chemical in Australian plants. 1080 is not harmful to native animals, as they have built up a natural resistance, whereas the poison affects feral animals. However, feral animals are not considered a major problem, generally passing through the reserve rather than inhabiting it for a long period of time.

Fauna Management

As more development occurs within the Shire, habitat for native animals is rapidly disappearing. Thus, the maintenance of existing remnant vegetation is of high importance in the protection of declining native fauna species. Low shrubs provide cover from predators, shelter and food for local fauna species.

Protection of Native Fauna

A sign should be installed on Medulla Road before the reserve, such as the current Bandicoot Crossing sign. This raises awareness in drivers, and lets residents know that the reserve contains valuable fauna and needs to be cared for. Residents should design and order the sign with funds available from various sources, within six months of finalisation of this management plan.

Planting of local native plants, as described in the section on revegetation actions above, would help to provide habitat for native fauna.

Control of feral animals must be carried out if they become an obvious threat. It would be wise to undertake further investigation into the presence of feral animals to establish whether they are causing more damage than is apparent.

3.2.3 Major Threats and Pressures

Clearing and Disturbance

Passive clearing can be caused by grazing by stock, overly frequent fires, polluted runoff or high impact recreation activities. Recreation activities located 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 an important tool for stimulating regrowth and regeneration in many Australian ecosystems. However, unplanned burns can have a catastrophic impact on vegetation and cause high mortality of fauna. The fragmented nature of most of the Shire's remnant vegetation means that natural re-colonisation processes for many species of flora and fauna cannot occur. The long hot summers create conditions in which there is a high fire risk. The predictions of longer drier periods and higher temperatures will increase the period of risk each year. The frequency of unplanned fires in peri-urban areas increase with increasing population, through the introduction of weeds and associated fuel load. Once communities have been established in an area more frequent burning to protect property may be required, and burning prescriptions for specific conservation requirements may not be able to occur.

Fire risk is an important issue concerning residents at Millbrook. Korribinjal Brook Reserve is heavily infested with love grass (*Eragrostis curvula*), which is a major fire risk to surrounding housing due to its annual lifecycle. The grass becomes dormant and therefore very dry and easily combustible for a large part of summer.

Control burning is sometimes required to reduce fuel load and protect homes. However, burning the entire reserve at one time could be very detrimental to the regeneration of the reserve. Mosaic burns are a good way to reduce fuel load and also leave some habitat for native fauna. The previous fauna surveys demonstrated the need for existing love grass as habitat until new native vegetation could be put in its place. The native bandicoot would suffer greatly from loss of habitat after fire. Thus maintaining good fire breaks and the slow strategic removal of weeds (via burning, spraying etc.) is likely to be the most environmentally beneficially action for the local fauna of the reserve.

The reduction of fire hazard, while simultaneously maintaining biodiversity values, can be achieved by:

- Maintaining existing fire breaks to slow any potential fires and to provide access for fire fighting vehicles, to be undertaken by the Shire each year;
- Strategic removal of love grass (*Eragrostis curvula*) from the bushland as per revegetation actions/recommendations to lower the fuel load; and
- Mosaic burning of one section per year, allowing habitat recovery before burning of the next area. It is essential to follow up any burning with weed spraying, as

fire promotes new growth. Burns should only be undertaken by the Voluntary brigades after permission has been gained from the Shire.

Dieback (*Phytophthora cinnamomi*)

Dieback is a disease that affects many of the native plant species in Western Australia, often causing death. It is caused by *Phytophthora cinnamomi*, an introduced soil borne pathogen that attacks the roots of plants. It is having serious impact on the biodiversity of the State and is listed by the *Commonwealth Endangered Species Protection Act (1992)* as one of five Key Threatening Processes. Plant species vulnerable to *Phytophthora* include jarrah, the banksia family, the heath family, pea family, hibbertia family, balga and zamia. Marri, kangaroo paws, reeds and rushes are not affected. The pathogen spreads through the soil in surface or subsurface flows and by the movement of soil or plant material from infected sites.

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 yet been assessed for the presence of dieback disease (*Phytophthora cinnamomi*). The plant species which are most affected by dieback are not found in the reserve at present. It is generally accepted that all areas adjacent to a water course on the Darling Scarp are infected.

Weeds

Introduced flora comprises up to 11 per cent of the plant species found in Western Australia. These plants pose a significant threat to native species through competition for limited resources, particularly space, light and water. Weeds flourish in disturbed sites and often out-compete the remaining native understorey and alter local nutrient recycling. Weed invasion is one of the major threats to remnant native vegetation.

Landuse change in the Shire has led to higher densities of weed species 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. The control of weeds is an important issue within the reserve.

Feral Animals

Feral animals, especially cats, rabbits and foxes, have had a major impact on the natural flora and fauna species. The smaller mammals have been impacted to the extent that many have become locally if not totally extinct. The success of fox baiting programs in the Jarrah Forest has brought back numerous species from the brink of extinction in a number of locations.

Cats are already a problem in many bushland areas and are likely to become more of a problem as urban areas are developed and the population increases. Special provisions for the control of cat populations will be needed to protect the fauna of these reserves. Successful initiatives, such as cat trapping, have been used to address the problem in numerous other areas of the State.

The European bee is well established throughout the Shire and has a significant effect on the balance and function of natural ecosystems. Rabbit populations are an ongoing problem and can have a devastating effect on the undergrowth if left uncontrolled. The disturbances caused by rabbits also predispose the areas to other threats such as erosion and weed invasion.

Natural Pests

Populations of naturally occurring insects can expand to the extent that they threaten the ecological balance. This is probably the result of other disturbing factors that affect the ability of these ecosystems to self regulate. 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. It is possible that 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.

Hydrological Change

All ecosystems are dependant to some extent on water. Models of climate change are predicting lower rainfalls and different seasonal patterns. At the same time, groundwater levels are declining, and drainage of more areas for residential and other uses is likely. Continuing decline in the water tables, combined with longer dry periods and greater evaporation, could lead to the death of many areas of vegetation.

Understanding of Biodiversity

It is not possible to put an economic value on biodiversity. The value of something unique and irreplaceable cannot be calculated. In a market driven society, it is difficult to convey the message of the necessity of protecting this biodiversity asset. Often people are unaware of actions that cause damage, such as the weed seeds in horse manure or the dieback spores in soil clods. Many residents of the Shire have a good understanding of biodiversity and environmental management while new residents may not. Conversely, there are also likely to be many enthusiastic nature lovers among the expanding population who could become powerful advocates for the Shire's natural ecosystems. The presence of an active, dedicated community group (the KBRG) working within the reserve is likely to ensure that the community continues to value the area for its conservation importance.

3.3 Environmental Recommendations

Table 8: Environmental Recommendations

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
Environmental Characteristics						
Land Resources						

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
2	Investigate and implement appropriate mechanisms to ensure stormwater does not cause erosion, such as in-stream structures to assist in slowing water velocity.	Ongoing	Ongoing	Engineering Services WSUD Officer	Staff Time \$1,000	
3	Identify and rehabilitate degraded areas, focusing on bare soil such as eroding tracks and firebreaks.	Ongoing	Ongoing	Operations, Parks and Natural Reserves Coordinator in collaboration with Landcare	Staff Time \$1,000	
4	Prohibit and monitor motorcycle access to internal tracks and firebreaks.	Ongoing	Ongoing	Health and Ranger Services	Staff Time \$1,000	
Water Resources						
5	Ensure that the principles of water sensitive urban design are implemented in all future urban development to minimise nutrient and water flow through the Reserve.	Ongoing	Ongoing	Engineering Services WSUD Officer Statutory Planning	Staff Time \$500	
6	Instigate a regular groundwater and surface water monitoring program (quality and quantity) within and around the Reserve	High	Yet to be implemented	Engineering Services WSUD Officer Statutory Planning	Staff Time \$1,000	
7	Review and implement a Nutrient Management Plan. Require the preparation of Urban Water Management Plans to accompany any proposed development that has the potential to increase the nutrient load entering the reserve.	Ongoing	Yet to be implemented	Engineering Services WSUD Officer, Statutory Planning, Operations Parks and Natural Reserves Coordinator	Staff Time Standard Practice	
Fire						
8	Liaise with the Fire Safety Officer to create a Fire Management Plan for the area.	Key	Ongoing	Shire and Fire brigade	Staff Time \$3,000	
9	Maintain existing fire breaks for slowing any potential fires and to provide access for fire fighting vehicles	Ongoing	Ongoing	Operations Parks and Natural Reserves each year	Staff Time \$1,000	Firebreaks to be maintained each year prior to summer.
10	Carry out mosaic burns, one section per year allowing habitat restoration before removal of the next area.	Ongoing	Ongoing	Fire and Emergency Services Voluntary fire brigade each year	Staff time \$1,000	Mosaic burns are best done before summer each year.
11	Follow up any burning with weed (love grass) spraying, as fire promotes new weed species growth, and replacement with native plants.	Ongoing	Ongoing	Fire and Emergency Services and Community each year	Cost only for removal of love grass \$1,000	Removal of love grass annually due to its vigorous regrowth.
Dieback						
12	Phosphite injections in trees presenting early signs of infection and known highly susceptible plants	High	Ongoing	Operations Parks and Natural Reserves and Community each year	About \$0.50 per tree \$1,000	
13	Dieback and Weed Control, weeding days, contract spraying, etc.	Ongoing	Ongoing	Operations Parks and Natural Reserves Weeding days with community &	Contract spraying is charged by the hour and type of chemical needed \$1,000	Weeding days to be held twice a year, for winter and summer weeds. Spraying of

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
				spraying of declared plants		declared weeds when in flower.
14	Signage to inform public of importance of keeping to the paths.	Medium	Implemented in part	Operations Parks and Natural Reserves	Staff time and signs and labour \$1,000	
Weeds						
15	Strategically remove African love grass from bushland	Key	Ongoing	Operations Parks and Natural Reserves and Community	Contract spraying - charged by hour and chemical type \$1,000	
16	Weed Prevention/control and organise weeding days	Ongoing	Ongoing	Operations Parks and Natural Reserves and Community	Staff Time \$1,000	Weeding days need to be held twice a year- winter and summer weeds. Spraying of declared weeds when in flower.
Revegetation						
17	Use nearby local vegetation communities as a guide to the local flora when revegetating the reserve.	Ongoing	Ongoing	Operations Parks and Natural Reserves and Community	Staff Time \$1,000	
18	Plant a variety of understory vegetation, which will provide adequate bandicoot habitat, while slowly removing the love grass.	Ongoing	Ongoing	Operations Parks and Natural Reserves and Community	Staff Time \$1,000	
19	Undertake weed control surrounding the seedlings to allow them to establish.	Ongoing	Ongoing	Operations Parks and Natural Reserves and Community	Staff Time \$1,000	
20	Revegetation of native species as per annual revegetation plan.	Ongoing	Ongoing	Community & Landcare Centre	Around \$0.75 per seedling \$1,000	Order plants each October for planting the following winter. To be done every year.
Biodiversity						
21	Monitor the recovery of plant communities after fire and use this information to reassess the plan in 2010.	High	Ongoing	Environmental Services Operations Parks and Natural Reserves Coordinator Community	Staff Time \$1,000	
22	Review annually and implement a Weed Control Plan that maps and identifies weed species within the reserve, and identifies priority areas and appropriate techniques and strategies to reduce weed density and weed seed sources in the bushland, surrounding areas and active recreation areas.	Ongoing	Ongoing	Environmental Services Operations Parks and Natural Reserves Coordinator Community	Staff Time \$1,000	
23	Identify and remove all invasive non-local trees and shrubs from the reserve and its surrounds. Request and encourage that adjacent landholders do the same.	Ongoing	Ongoing	Operations, Parks and Natural Reserves Coordinator Community	Staff Time \$1,000	
24	Regularly monitor and record feral animals around the reserve. Undertake control programs when needed.	Ongoing	Yet to be implemented	Operations, Parks and Natural Reserves Coordinator in conjunction with	Staff Time \$1,000	

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
				Landcare		
25	Advise all local residents of the impacts of dogs and cats on the reserve fauna.	Key	Yet to be implemented	Health and Ranger Services conjunction with Environmental Services	Staff Time \$1,000	
26	Provide all developers and landowners within one kilometre of the Reserve with management plan information and requirements.	Key	Yet to be implemented	Environmental Services and Landcare	Staff Time \$1,000	
27	Develop a public education program that targets local landowners and users of the reserve, to include <u>local and indigenous flowering</u> species in the reserve, the vegetation itself, impacts of domestic cats and dogs, impacts of weeds and how they spread, impacts of dieback (<i>Phytophthora cinnamomi</i>), impacts of physical disturbance and impacts of fire.	Key	Yet to be implemented	Environmental Services Operations Parks and Natural Reserves Coordinator and Landcare	Staff Time \$1,000	
Fauna						
28	Protection of fauna - erection of Bandicoot Crossing <u>sign</u> and other information signs.	Key	Implemented in part	Shire, Community & Landcare Centre	Around \$250 - \$300 for Bandicoot Crossing sign, \$200 for informative signs \$1,300	Within 6 months of completion of plan.

4. Social and Economic Characteristics

4.1 Human Uses

Consultation with the community established that the major uses of Korribinjal Brook Reserve, currently and preferably into the future, are:

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

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

Zoning

Korribinjal Brook Reserve is zoned for recreation and is valued by the community for its conservation and aesthetic values. However, this reserve purpose offers no recognition and associated protection of the conservation values of the reserve. The reserve should have Conservation included as a purpose for the reserve to better reflect its public and environmental values. The change of purpose to include Conservation should be undertaken by the Shire of Serpentine Jarrahdale within three months of the finalisation of this management plan.

Community Working Group

The Korribinjal Brook Residents Group is one of many community land/bushcare groups supported by the Serpentine Jarrahdale Landcare Centre. They manage the labelled area of Korribinjal Brook East and West Reserve, although this probably extends to include the Korribinjal Top and most Eastern reserves as well. Historically, the reserve group has focused on and managed revegetation, weed management, signage and walk trails throughout the three reserves. Surrounding residents are actively involved in maintaining the reserve. There are 40 households around the reserves, of which 10 are actively involved, with others helping on planting days.

Accessibility

No gates or fences surround the reserve, excluding adjacent private landowners' property fencing. 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

30

Jarrahdale

FROM "WALKS AROUND JARRAHDALÉ"
BOOK + DVD : JHS 2008

KORRIBINJAL BROOK TRAILS



4.2 Social and Economic Recommendations

History

Historic photo point monitoring should be instigated and permanently marked, for example with a stake. Periodically thereafter, a member of the community group could take a photo from that point. If one person takes responsibility for this job, then continuity of results are more likely. This provides a photographic record of the reserve and the works being undertaken in it. Once a year would be a good record of reserve characteristics such as revegetation, plant growth, and weed extent. Photo point locations could be established in a way to add to the interpretive value of the reserve by using old split Jarrah Fence posts marked for the purpose.

Community and Shire Liaison

It is essential that good communication exists between the Shire and the community. The reserve would be managed most effectively with the two groups working together, assisting in projects. The Community Landcare Centre can provide a good link between the community and Shire.

Community Consultation and Participation

A community workshop was held at the SJ Landcare Center and a summary of the workshop proceedings follows:

Korribinjal Brook Reserve Management Plan Community Workshop Summary
Held on Monday the 19th of July 2010 at 7:00pm at the SJ Landcare Centre

VISION FOR KORRIBINJAL BROOK RESERVE

“A natural environment restored back to a stable state to be used for conservation, recreation and education.”

STAKEHOLDERS

Adjacent landholders
SJ Landcare Centre (coordination of restoration activities)
SJ Shire Reserves' support (governance)
WWOOFers / Karnet Prison Team (labour)
Lotterywest (funding)
Alcoa (funding)
Volunteer Fire Brigade (fire management)
Jarrahdale Heritage Society walking group (occasional activities)

STRENGTHS IN ORDER OF PRIORITY

1. Habitat values e.g. black cockatoos, bandicoots.
2. Passive recreation e.g. walking tracks, picnicking.
3. Aesthetic and landscape values i.e. nature appreciation.
4. Community involvement e.g. revegetation and weed control.

WEAKNESSES IN ORDER OF PRIORITY

1. Some parts of the reserve have been fenced out to be incorporated into adjacent private land (need for consolidation of the reserve to clearly define boundaries).

2. Lack of resident awareness and engagement.
3. Financial/resource limitations (small, low profile reserve).
4. Lack of connectivity of the reserve.

OPPORTUNITIES

1. Promotion of uniqueness of the reserve, its vegetation and geomorphology (through brochure).
2. Use of local groups and volunteers – Jarrahdale Heritage Society as conduit.
3. Reintroduction of unique vegetation e.g. Eucalypts rudis, Allocasuarina huegeliana in keeping with original unique species likely to have occurred.

THREATS IN ORDER OF PRIORITY

1. Weeds.
2. Fire – in particular, lack of access in the West reserve.
3. Rabbits (Note: this is a seasonal problem, with 2010 being a particularly bad year).
4. Rapid turnover of residents/changing demographics.

ISSUES/RESOLUTIONS IN ORDER OF PRIORITY

1. Lack of fire management
 - a) Integration of fire and weed control actions e.g. low fuel areas.
 - b) Fire management plans for surrounding properties.
2. Signage and safety barriers for walking infrastructure e.g. at the intersection of West track and Medulla Rd.
3. Popularity and profile of the reserve. We need to acknowledge that this will always be on a local scale i.e. adjacent landholders, with occasional wider-scale engagement e.g. Jarrahdale Heritage Society walking calendar, planting days.
 - a) Locally distributed brochure to engage Millbrook landholders in being involved in looking after the reserve.
4. Past grazing practices have increased weeds and reduced native species.
5. Olive trees – mature trees achieve a purpose, but they must be prevented from spreading.
 - a) Removal of young seedlings as they germinate.

Table 9: Social and Economic Recommendations

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
Social and Economical Characteristics						
29	Establish historic photo point monitoring locations.	Ongoing	Ongoing	Community member and Shire.	Staff time \$1,500 including film, development and laminating.	Each year in same place.
30	Community and Shire liaison.	Ongoing	Ongoing	Community and Shire.	Staff Time \$1,000	
Recreation						
31	Encourage, support and facilitate the community to provide ongoing participation in the management of the	Key	Ongoing	Environmental Services	Staff Time \$1,000	

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
	reserve.					
Development Pressures						
32	Investigate and implement a long term plan to increase, renovate or upgrade reserve facilities over the life of this plan.	Medium	Ongoing	Environmental Services Operations, Parks and Natural Reserves Coordinator	Staff Time \$1,000	
Implementation, Monitoring and Review						
33	Periodically monitor and review the efficiency and effectiveness of management plan strategy implementation and revise if necessary.	Ongoing	Yet to be implemented	Environmental Services Operations, Parks and Natural Reserves Coordinator	Staff Time \$1,000	

5. Implementation

5.1 Introduction

An implementation plan is provided in this section. Various divisions within the Shire will be responsible for implementation and it is anticipated that the recommendations will be acted on over several years.

All recommendations in the report are reproduced in a single table below, along with priorities, responsibilities and potential partners.

5.2 Priorities

Priorities have been classified as follows:

- Key – within the next financial year;
- High – within the next five years;
- Medium – within the next ten years; and
- Ongoing – as required.

5.3 Responsibilities, Monitoring and Review

The Shire of Serpentine Jarrahdale is responsible for recommendations within this plan. In some instances, the Shire may be assisted in implementing a recommendation by a relevant partner who has an interest or responsibility in the recommendation being considered, 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.

Strategies

1. Periodically monitor and review the efficiency and effectiveness of management plan strategy implementation and revise if necessary.

5.4 Implementation Plan

Divisions within the Shire with responsibilities for implementation sometimes in collaboration with the Landcare, Fire Brigade or Community are as follows:

- Engineering Services –
 - Operations, Parks & Natural Reserves Coordinator
 - WSUD Project Manager
 - Fire and Emergency Services
- Strategic Community Planning
 - Environmental Services
 - Community Development
- Development Services Directorate
 - Planning
 - Building
 - Health
 - Ranger Services

Table 10: Strategies

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
Governance						
1	Change of purpose to include Conservation as well as Public Recreation.	Key	Yet to be implemented	Environmental Services Operations, Parks & Reserves Officer	Staff Time \$1,000	
Environmental Characteristics						
Land Resources						
2	Investigate and implement appropriate mechanisms to ensure stormwater does not cause erosion, such as in-stream structures to assist in slowing water velocity.	Ongoing	Ongoing	Engineering Services WSUD Project Officer	Staff Time \$1,000	
3	Identify and rehabilitate degraded areas, focusing on bare soil such as eroding tracks and firebreaks.	Ongoing	Ongoing	Operations, Parks and Reserves Officer in collaboration with Landcare	Staff Time \$1,000	
4	Prohibit and monitor motorcycle access to internal tracks and firebreaks.	Ongoing	Ongoing	Health and Ranger Services	Staff Time \$1,000	
Water Resources						
5	Ensure that the principles of water sensitive urban design are implemented in all future urban development to minimise nutrient and water flow through the Reserve.	Ongoing	Ongoing	Engineering Services WSUD Officer Statutory Planning	Staff Time \$500	
6	Instigate a regular groundwater and surface water monitoring program (quality and quantity) within and around the Reserve	High	Yet to be implemented	Engineering Services WSUD Officer Statutory Planning	Staff Time \$1,000	

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
7	Review and implement a Nutrient Management Plan. Require the preparation of Urban Water Management Plans to accompany any proposed development that has the potential to increase the nutrient load entering the reserve.	Ongoing	Yet to be implemented	Engineering Services WSUD Officer, Statutory Planning, Operations Parks and Natural Reserves Coordinator Officer	Staff Time \$1,000	
Fire						
8	Liaise with the Fire Safety Officer to create a Fire Management Plan for the area.	Key	Ongoing	Fire and Emergency Services	Staff Time \$3,000	
9	Maintain existing fire breaks for slowing any potential fires and to provide access for fire fighting vehicles	Ongoing	Ongoing	Operations Parks and Natural Reserves Coordinator Fire and Emergency Services	Staff Time \$1,000	Firebreaks to be maintained each year prior to summer.
10	Carry out mosaic burns, one section per year allowing habitat restoration before removal of the next area.	Ongoing	Ongoing	Fire and Emergency Services and Voluntary fire brigade each year	Staff time \$1,000	Mosaic burns are best done before summer each year.
11	Follow up any burning with weed (love grass) spraying, as fire promotes new weed species growth, and replacement with native plants.	Ongoing	Ongoing	Fire and Emergency Services and Community each year	Cost only for removal of love grass. \$1,000	Removal of love grass annually due to its vigorous regrowth.
Dieback						
12	Phosphite injections in trees presenting early signs of infection and known highly susceptible plants	High	Ongoing	Environmental Services and the Community and Operations Parks and Natural Reserves Coordinator	About \$0.50 per tree \$1,000	
13	Dieback and Weed Control, weeding days, contract spraying, etc.	Ongoing	Ongoing	Weeding days with community & spraying of declared plants by Environmental Services and .Operations Parks and Natural Reserves Coordinator	Contract spraying is charged by the hour and type of chemical needed \$1,000	Weeding days to be held twice a year, for winter and summer weeds. Spraying of declared weeds when in flower.
14	Signage to inform public of importance of keeping to the paths.	Medium	Implemented in part	Environmental Services and Operations Parks and Natural Reserves Coordinator	Signage and Labour \$1,000	
Weeds						
15	Strategically remove African love grass from bushland	Key	Ongoing	Operations Parks and Natural Reserves Coordinator and Environmental Services and Community	Contract spraying - charged by hour and chemical type \$1,000	
16	Weed Prevention/control and organise weeding days	Ongoing	Ongoing	Operations Parks and Natural Reserves	Staff Time \$1,000	Weeding days need to be held twice a year - winter and

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
				Coordinator and Environmental Services and the Community		summer weeds. Spraying of declared weeds when in flower.
Revegetation						
17	Use nearby local vegetation communities as a guide to the local flora when revegetating the reserve.	Ongoing	Ongoing	Operations Parks and Natural Reserves Coordinator Environmental Services and the Community	Staff Time \$1,000	
18	Plant a variety of understorey vegetation, which will provide adequate bandicoot habitat, while slowly removing the love grass.	Ongoing	Ongoing	Operations Parks and Natural Reserves Coordinator and Environmental Services and the Community	Staff Time \$1,000	
19	Undertake weed control surrounding the seedlings to allow them to establish.	Ongoing	Ongoing	Operations Parks and Natural Reserves Coordinator and Environmental Services and the Community	Staff Time \$1,000	
20	Revegetation of native species as per annual revegetation plan.	Ongoing	Ongoing	Operations Parks and Natural Reserves Coordinator and Community & Landcare Centre	Around \$0.75 per seedling \$1,000	Order plants each October for planting the following winter. To be done every year.
Biodiversity						
21	Monitor the recovery of plant communities after fire and use this information to reassess the plan in 2010.	High	Ongoing	Environmental Services Operations Parks and Natural Reserves Coordinator Community	Staff Time \$1,000	
22	Review annually and implement a Weed Control Plan that maps and identifies weed species within the reserve, and identifies priority areas and appropriate techniques and strategies to reduce weed density and weed seed sources in the bushland, surrounding areas and active recreation areas.	Ongoing	Ongoing	Environmental Services Operations Parks and Natural Reserves Coordinator Community	Staff Time \$5,000	
23	Identify and remove all invasive non-local trees and shrubs from the reserve and its surrounds. Request and encourage that adjacent landholders do the same.	Ongoing	Ongoing	Operations, Parks and Natural Reserves Coordinator Community	Staff Time \$2,000	
24	Regularly monitor and record feral animals around the reserve. Undertake control programs when needed.	Ongoing	Yet to be implemented	Operations, Parks and Natural Reserves Coordinator in conjunction with Landcare	Staff Time \$1,000	

No	Strategy	Priority	Implementation	Responsibility	Cost Estimates	Notes
25	Advise all local residents of the impacts of dogs and cats on the reserve fauna.	Key	Yet to be implemented	Health and Ranger Services conjunction with Environmental Services	Staff Time \$1,000	
26	Provide all developers and landowners within one kilometre of the Reserve with management plan information and requirements.	Key	Yet to be implemented	Environmental Services and Landcare	Staff Time \$1,000	
27	Develop a public education program that targets local landowners and users of the reserve, to include local and indigenous flowering species in the reserve, the vegetation itself, impacts of domestic cats and dogs, impacts of weeds and how they spread, impacts of dieback (<i>Phytophthora cinnamomi</i>), impacts of physical disturbance and impacts of fire.	Key	Yet to be implemented	Environmental Services Operations Parks and Natural Reserves Coordinator Officer and Landcare	Staff Time \$1,000	
Fauna						
28	Protection of fauna - erection of Bandicoot Crossing <u>sign</u> and other information signs.	Key	Implemented in part	Environmental Services, Community & Landcare Centre	\$1,300 Around \$250 - \$300 for Bandicoot Crossing sign, \$200 for informative signs.	.
Social and Economical Characteristics						
29	History - photo point.	Ongoing	Ongoing	Community member and Environmental Services.	\$1,050 Staff Time plus \$50 for film, development and laminating.	Each year in same place. KBRG has photos, not Shire.
30	Community and Shire liaison.	Ongoing	Ongoing	Community and Environmental Services.	Staff Time \$1,000	
Recreation						
31	Encourage, support and facilitate the community to provide ongoing participation in the management of the reserve.	Key	Ongoing	Environmental Services	Staff Time \$1,000	
Development Pressures						
32	Investigate and implement a long term plan to increase, renovate or upgrade reserve facilities over the life of this plan.	Medium	Ongoing	Environmental Services Operations, Parks and Natural Reserves Coordinator	Staff Time \$1,000	
Implementation, Monitoring and Review						
33	Periodically monitor and review the efficiency and effectiveness of management plan strategy implementation and revise if necessary.	Ongoing	Yet to be implemented	Environmental Services Operations, Parks and Natural Reserves Coordinator	Staff Time \$1,000	

6. References

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Appendix 1 – Weed Control and Restoration Plan

A weed control and restoration plan was developed with the help of members of the Korribinjal Brook Group to:

- Remove strips of lovegrass along the sections marked on Map 3 in Appendix 5. Follow up with direct seeding and planting of the borders. These sections include one bushland area and along one roadside. Roadside revegetation is useful in lifting and improving the profile of the reserve and providing a buffer against further weed invasion.
- Follow up weed control and infill planting/seeding of areas revegetated last year. Remove strips of lovegrass along the sections marked on Map 3 in Appendix 5. Follow up with planting and seeding.
- Follow up weed control and planting/seeding of previous rehabilitation areas. Commence weed control and planting of sedges and shrubs along the brook to increase habitat for native fauna, including frogs.
- Follow up weed control and planting of any past areas in need of extra work. Start new weeding and planting of areas in the centre of the reserve or where it is needed.

Plant local native species from other similar environments selecting from the following based on presence within the brook directly below the WA Blue Metal Quarry.

Genus	species	subspecies	Notes
<i>Acacia</i>	<i>alata</i>	<i>alata</i>	
<i>Acacia</i>	<i>pulchella</i>		
<i>Acacia</i>	<i>urophylla</i>		
<i>Adenanthos</i>	<i>barbiger</i>		
<i>Adiantum</i>	<i>aethiopicum</i>		
<i>Agrostocrinum</i>	<i>scabrum</i>		
<i>Allocasuarina</i>	<i>humilis</i>		
<i>Astartea</i>	<i>scoparia</i>		
<i>Austrodanthonia</i>	<i>caespitosa</i>		
<i>Austrodanthonia</i>	<i>pilosa</i>		
<i>Baeckea</i>	<i>camphorosmae</i>		
<i>Banksia</i>	<i>grandis</i>		
<i>Banksia</i>	<i>sphaerocarpa</i>		
<i>Bossiaea</i>	<i>ornata</i>		
<i>Burchardia</i>	<i>umbellata</i>		
<i>Caesia</i>	<i>micrantha</i>		
<i>Caladenia</i>	<i>flava</i>		

<i>Cassytha</i>	<i>glabella</i>	
<i>Chamaescilla</i>	<i>corymbosa</i>	
<i>Cheilanthes</i>	<i>austrotenuifolia</i>	
<i>Cheilanthes</i>	<i>sieberi</i>	<i>sieberi</i>
<i>Chorizema</i>	<i>dicksonii</i>	
<i>Clematis</i>	<i>aristata</i>	<i>occidentalis</i>
<i>Conostylis</i>	<i>aculeata</i>	
<i>Conostylis</i>	<i>aculeata</i>	<i>preissii</i>
<i>Conostylis</i>	<i>setosa</i>	
<i>Corymbia</i>	<i>calophylla</i>	
<i>Craspedia</i>	<i>variabilis</i>	
<i>Cyathochaeta</i>	<i>avenacea</i>	
<i>Dampiera</i>	<i>linearis</i>	
<i>Darwinia</i>	<i>citriodora</i>	
<i>Daucus</i>	<i>glochidiatus</i>	
<i>Daviesia</i>	<i>horrida</i>	
<i>Desmocladius</i>	<i>asper</i>	
<i>Desmocladius</i>	<i>fasciculatus</i>	
<i>Dichopogon</i>	<i>capillipes</i>	
<i>Dioscorea</i>	<i>hastifolia</i>	
<i>Dodonaea</i>	<i>ceratocarpa</i>	
<i>Drosera</i>	<i>erythrorhiza</i>	
<i>Drosera</i>	<i>menziesii</i>	
<i>Drosera</i>	<i>menziesii</i>	<i>menziesii</i>
<i>Drosera</i>	<i>neesii</i>	
<i>Drosera</i>	<i>pallida</i>	
<i>Dryandra</i>	<i>armata</i>	<i>armata</i>
<i>Dryandra</i>	<i>lindleyana</i>	
<i>Dryandra</i>	<i>sessilis</i>	
<i>Eryngium</i>	<i>pinnatifidum</i>	
<i>Eucalyptus</i>	<i>marginata</i>	<i>marginata</i>
<i>Gahnia</i>	<i>aristata</i>	
<i>Gompholobium</i>	<i>marginatum</i>	
<i>Goodenia</i>	<i>micrantha</i>	
<i>Grevillea</i>	<i>bipinnatifida</i>	
<i>Haemodorum</i>	<i>laxum</i>	
<i>Hakea</i>	<i>lissocarpha</i>	
<i>Hakea</i>	<i>stenocarpa</i>	
<i>Hakea</i>	<i>trifurcata</i>	
<i>Hakea</i>	<i>undulata</i>	
<i>Hemigenia</i>	<i>incana</i>	
<i>Hibbertia</i>	<i>amplexicaulis</i>	
<i>Hibbertia</i>	<i>glomerata</i>	<i>darlingensis</i>

<i>Hibbertia</i>	<i>huegelii</i>	
<i>Hibbertia</i>	<i>hypericoides</i>	
<i>Hibbertia</i>	<i>pachyrrhiza</i>	
<i>Hovea</i>	<i>chorizemifolia</i>	
<i>Hyalosperma</i>	<i>cotula</i>	
<i>Hydrocotyle</i>	<i>callicarpa</i>	
<i>Hypocalymma</i>	<i>angustifolium</i>	
<i>Kennedia</i>	<i>prostrata</i>	
<i>Kunzea</i>	<i>micrantha</i>	<i>micrantha</i>
<i>Lagenophora</i>	<i>huegelii</i>	
<i>Lechenaultia</i>	<i>biloba</i>	
<i>Lepidosperma</i>	<i>drummondii</i>	
<i>Lepidosperma</i>	<i>effusum</i>	
<i>Lepidosperma</i>	<i>leptostachyum</i>	
<i>Lepidosperma</i>	<i>pubisquameum</i>	
<i>Lepidosperma</i>	<i>tetraquetrum</i>	
<i>Leucopogon</i>	<i>capitellatus</i>	
<i>Leucopogon</i>	<i>gracillimus</i>	
<i>Leucopogon</i>	<i>nutans</i>	
<i>Levenhookia</i>	<i>pusilla</i>	
<i>Lomandra</i>	<i>caespitosa</i>	
<i>Lomandra</i>	<i>micrantha</i>	<i>micrantha</i>
<i>Lomandra</i>	<i>sonderi</i>	
<i>Loxocarya</i>	<i>cinerea</i>	
<i>Luzula</i>	<i>meridionalis</i>	
<i>Macrozamia</i>	<i>riedlei</i>	
<i>Melaleuca</i>	<i>parviceps</i>	
<i>Melaleuca</i>	<i>radula</i>	
<i>Mirbelia</i>	<i>dilatata</i>	
<i>Monotaxis</i>	<i>grandiflora</i>	
<i>Neurachne</i>	<i>alopeкуроidea</i>	
<i>Opercularia</i>	<i>echinocephala</i>	
<i>Opercularia</i>	<i>hispidula</i>	
<i>Orthrosanthus</i>	<i>laxus</i>	
<i>Patersonia</i>	<i>occidentalis</i>	
<i>Pentapeltis</i>	<i>peltigera</i>	
<i>Persoonia</i>	<i>elliptica</i>	
<i>Petrophile</i>	<i>biloba</i>	
<i>Pithocarpa</i>	<i>corymbulosa</i>	P2
<i>Phyllanthus</i>	<i>calycinus</i>	
<i>Pimelea</i>	<i>ciliata</i>	
<i>Pimelea</i>	<i>imbricata</i>	<i>piligera</i>
<i>Pimelea</i>	<i>spectabilis</i>	

<i>Podolepis</i>	<i>lessonii</i>	
<i>Ptilotus</i>	<i>manglesii</i>	
<i>Pyrorchis</i>	<i>nigricans</i>	
<i>Ranunculus</i>	<i>colonorum</i>	
<i>Scaevola</i>	<i>calliptera</i>	
<i>Scaevola</i>	<i>glandulifera</i>	
<i>Senecio</i>	<i>hispidulus</i>	
<i>Siloxerus</i>	<i>multiflorus</i>	
<i>Sowerbaea</i>	<i>laxiflora</i>	
<i>Stackhousia</i>	<i>monogyna</i>	
<i>Stylidium</i>	<i>brunonianum</i>	
<i>Stylidium</i>	<i>calcaratum</i>	
<i>Stylidium</i>	<i>dichotomum</i>	
<i>Stylidium</i>	<i>hispidum</i>	
<i>Stypandra</i>	<i>glauca</i>	
<i>Taxandria</i>	<i>linearifolia</i>	
<i>Tetraria</i>	<i>capillaris</i>	
<i>Tetraria</i>	<i>octandra</i>	
<i>Tetrarrhena</i>	<i>laevis</i>	
<i>Tetradthea</i>	<i>nuda</i>	
<i>Thelymitra</i>	<i>crinita</i>	
<i>Thysanotus</i>	<i>dichotomus</i>	
<i>Thysanotus</i>	<i>manglesianus</i>	
<i>Thysanotus</i>	<i>multiflorus</i>	
<i>Thysanotus</i>	<i>thyrsoideus</i>	
<i>Trachymene</i>	<i>pilosa</i>	
<i>Trymalium</i>	<i>floribundum</i>	
<i>Trymalium</i>	<i>floribundum</i>	<i>floribundum</i>
<i>Verticordia</i>	<i>huegelii</i>	<i>huegelii</i>
<i>Verticordia</i>	<i>pennigera</i>	
<i>Xanthorrhoea</i>	<i>gracilis</i>	
<i>Xanthorrhoea</i>	<i>preissii</i>	