Management Plan

Ironbank Bushland

Allotment 2

A Nature Foundation Heritage Agreement

2011 – 2016

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March 2011

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1. The Management Plan in Brief

1.1 What does the Plan do?

The purpose of this plan is to:

- describe the natural physical and biological assets of the Ironbank Bushland;
- describe the values of the native vegetation making up the bushland;
- explain the importance of protecting and conserving the bushland
- identify the threats to the bushland's values;
- set out the strategies to control these threats and properly manage the bushland;
- explain how to monitor and measure the success of work undertaken.

1.2 What does the Plan say?

This plan is made up of six sections, this summary section being the first:

- Section 2 gives a brief description of the property; title details, its area and a brief outline of its physical and biological characteristics.
- Section 3 describes the conservation values of the Heritage Agreement.
- Section 4 sets out the reasons why it is important to protect and conserve the bushland within the Heritage Agreement. This section talks about what needs to be done to protect and conserve the area and explain how best to go about this work.
- Section 5 sets out the specific tasks, measures and activities that need to be undertaken or put in place to protect and conserve the native vegetation and the animals that use it as habitat. These tasks, measures and activities are outlined below in Section 1.4.
- Section 6 contains lists of plants and birds from the area.

1.3 Scope and period of operation of this plan

This plan applies only to that area covered by the Heritage Agreement. The Heritage Agreement provides that this plan and its subsequent versions, as amended from time to time (as specified in each version), forms part of the Heritage Agreement and as such, is required to be implemented.

This version of the plan is to remain in operation from the date of purchase of the property from the Nature Foundation SA until 30 June 2016or as amended before then by agreement between the owner of the property and the Minister responsible for administering the *Native Vegetation Act 1991*.

Prior to the expiration of the period of operation of this, or any later, version of the plan, the owner, in consultation with the Nature Foundation SA, shall prepare a revised version for submission to, and approval by, the Minister. In the event agreement cannot be reached on the provisions

of the revised edition, the current version shall remain in operation until agreement is reached.

1.4 Summary of management tasks required

Section 5 of this plan sets out, in tabular form, the tasks required to be undertaken to provide proper management of the Ironbank Bushland.

Section 5.1 Weed control

- Map weeds to identify distribution and extent of priority species. Deal with these weeds as specified.
- Map weeds to identify distribution and extent of other species. Deal with these weeds as specified.
- Determine whether Bridal Creeper is present and if so, determine extent and location and institute control measures.
- Apply appropriate weed control technique according to soil moisture conditions.

Section 5.2 Feral animal control

- Arrange early inspection with local Animal and Pest Plant Control Officer.
- Based on this meeting, and in follow-up consultation with Bush Management Advisor (BMA), prepare a schedule of control for each pest animal identified as a problem.
- Implement program of pest animal control as per schedule.

Section 5.3 Fire management

- Contact Regional Fire Prevention Officer for fire management advice. Seek advice from BMA.
- Mark out and slash a fuel reduced strip (up to 5 metres, depending on advice) along the southern boundary of the Heritage Agreement area.

Section 5.4 Fencing

- Regularly patrol and maintain existing fencing.

Section 5.5 Walking access

- Establish and map track routes according to the principles set out in the plan. Maintain tracks at their designated width.
- Restrict use of walking tracks to pedestrian traffic.

Section 5.6 Monitoring and reporting

- Using the principles and the table set out in section 5.6.1, monitor work done and the progress achieved to determine the effectiveness of the management strategies and the way in which these strategies are implemented.
- Using the table set out in section 5.6.2, prepare progress reports to facilitate the useful assessment of the effort put in to management actions.

2. Description of the property

2.1 Property details

The Ironbank Bushland is located in the Mount Lofty Ranges, South Australia, adjoining the Mark Oliphant Conservation Park. The estate is accessible via Ironbank Road. The property is approximately 10.5 kms south east of Belair of and 20 kms south east of Adelaide, via Upper Sturt Road, taking approximately half an hour by vehicle.

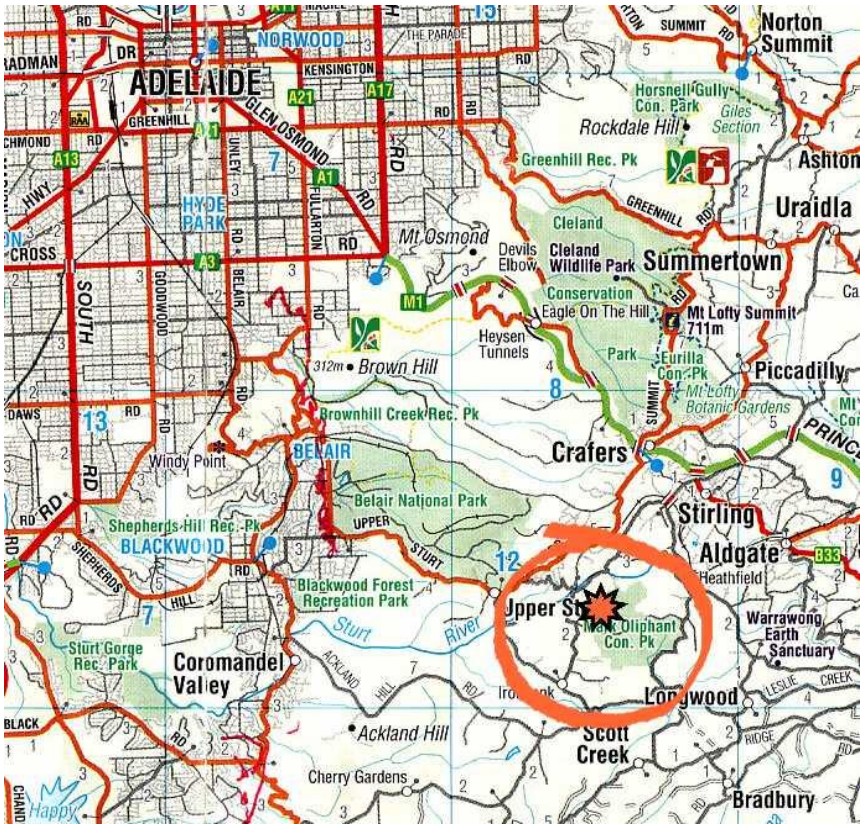
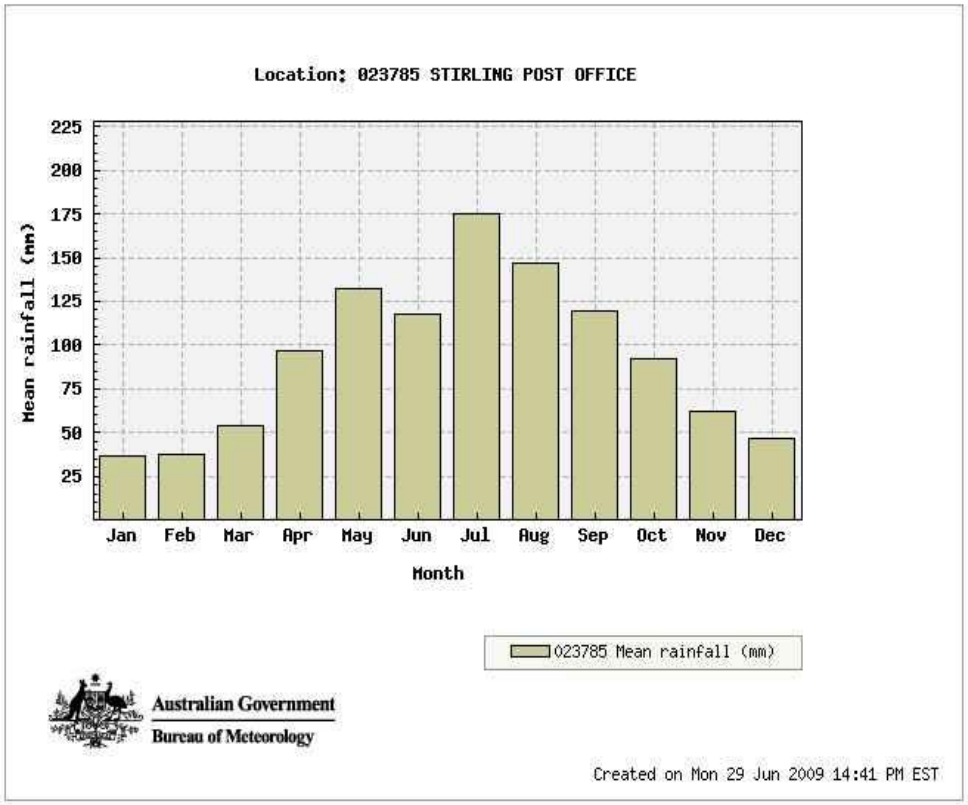


Figure 1- Locality Maps (excerpt from the 1:200,000 Fleurieu Peninsula & Southern Adelaide Hills map (RAA)).

2.2 Climate and Rainfall

The area has a mean average rainfall of approximately 1100 mm per annum. This figure has been attained from rainfall data recorded at the Stirling Post Office, which is 6km east of the property. The majority of rainfall occurs the winter months with an average of 82.7 days of the year recording more than 1mm of rainfall.

Climatic conditions can be described as cool to cold in the winter months and cool to hot in the summer months with average daily maximum temperatures at Stirling Post Office ranging from 12.5 °C in July to 27 °C in February1.



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm)	36.8	37.5	54.3	96.7	132.4	118.0	175.1	147.2	119.7	91.9	61.7	47.0	1115.1	21

Figure 2- Monthly Average Rainfall for Stirling Post Office- Australian Bureau of Meteorology.

[1] Australian Government Bureau of Meteorology (www.bom.gov.au)

2.3 Title Details

The property is contained within Allotment 2 in DP82284 in the Hundred of Noarlunga. It is located within the Adelaide Hills Council and is 8.41 hectares in size with 8.1 hectares placed under a Nature Foundation SA Heritage Agreement and a 3004m2 Heritage Agreement exclusion zone.

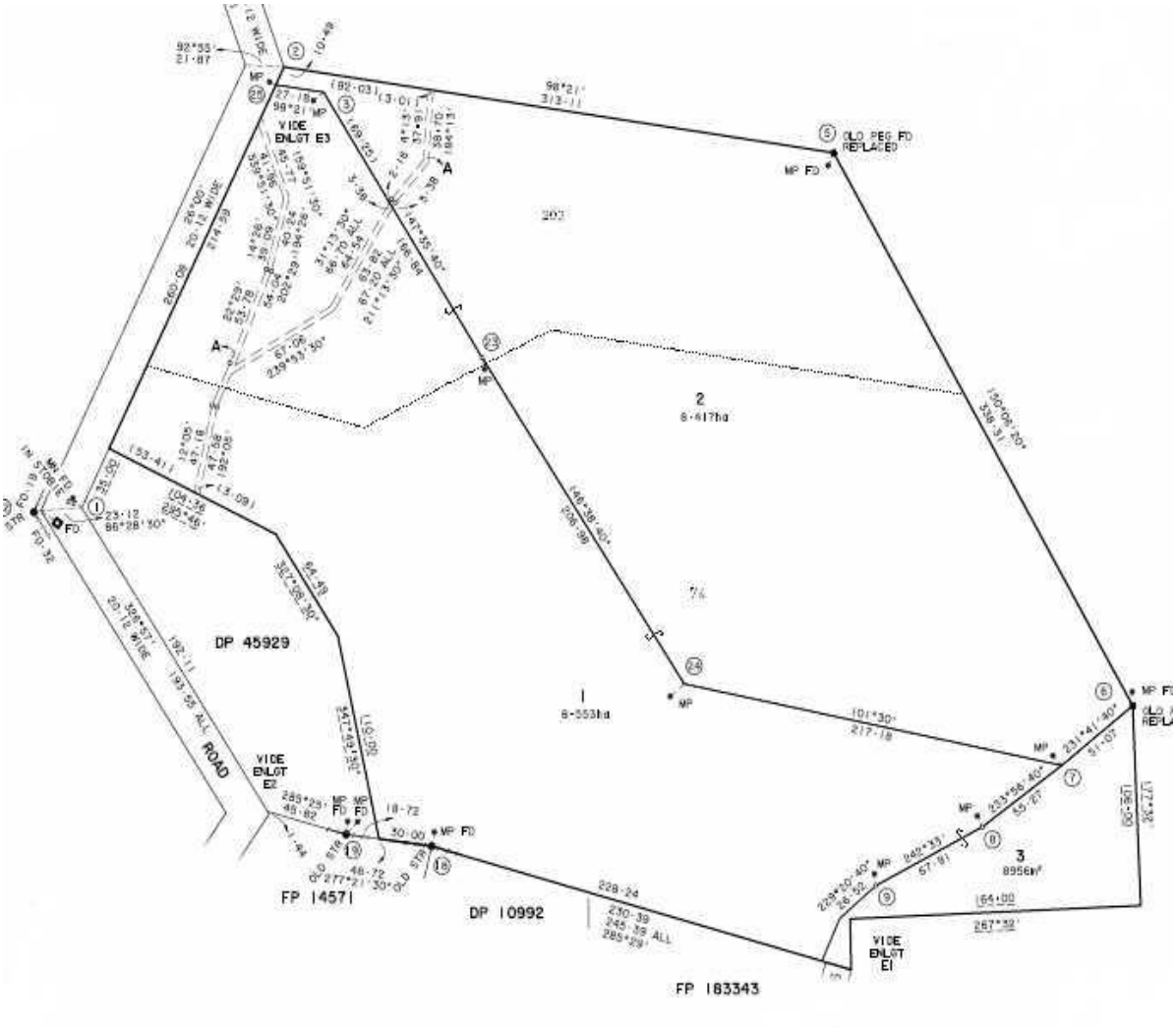


Figure 3- Plan of Subdivision for Ironbank Bushland.

2.4 Property Description

The property has a southerly aspect on the fall of the ridge that runs east west some 200 to 300 metres to the north. Evans' Drive is located on the ridge-top. From the ridge, the country falls southward to Coats Gully. This gully flows into the Sturt River about 2kms to the west. Within the property there are two gullies that provide sufficient change in topography as to produce some variation in the vegetation associations present.

The local area around Ironbank is described as hilly uplands with dissected lateritic tableland remnants.

The property itself is hilly and totally vegetated, with a history of fire. Access to the property is limited to the far north-west corner and via a track to the southern boundary through the Mark Oliphant Conservation Park. The property is virtually without walking tracks.

2.5 Nature Foundation Heritage Agreement area

A pre-existing Heritage Agreement, applied in 1998, covered the entire property. An application was made to the Native Vegetation Council to have an area excluded from the Heritage Agreement to enable a house to be built on the property, subject to standard building approval. The purpose of the exclusion site is to encourage the property to be occupied by a resident owner, thereby facilitating a higher level of management than could be expected from an absentee owner.

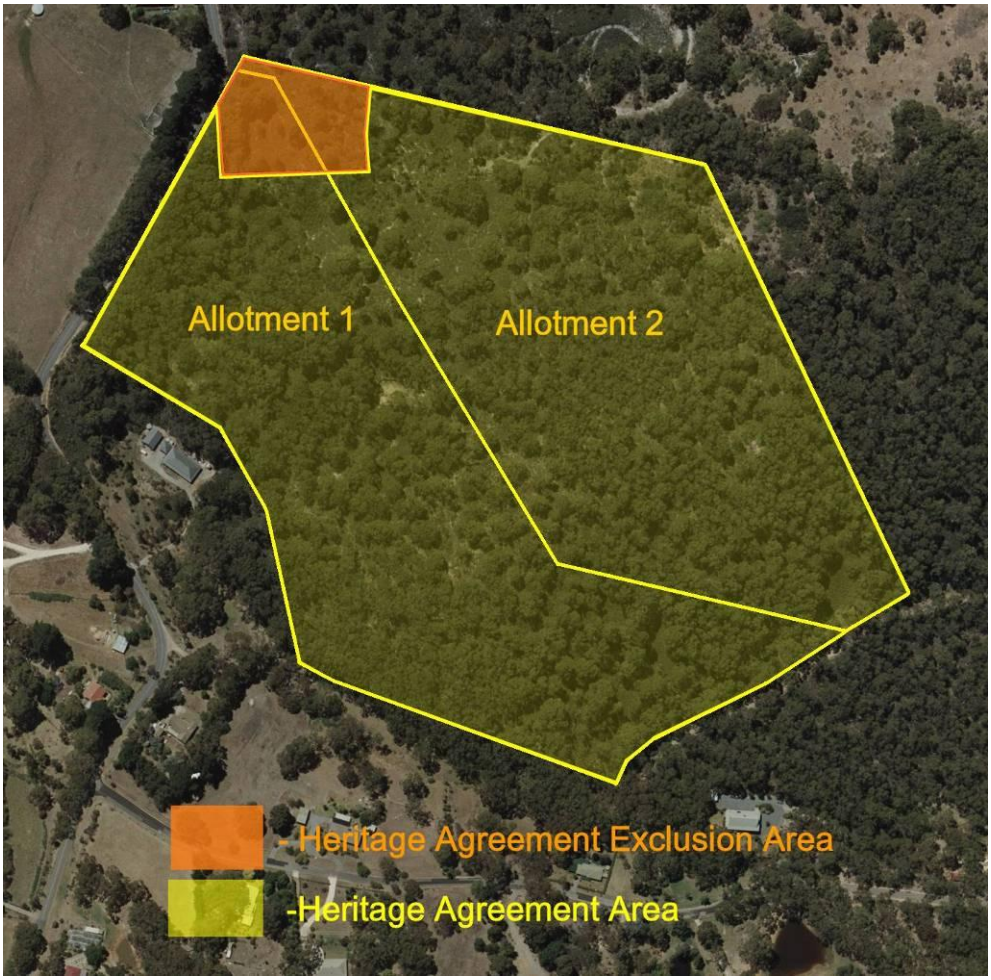


Figure 4 - Aerial View of the HA area, Scale 1:6950 (approx) I cm = 69.5 metres (approx). The area under Heritage Agreement 1079 covers Allotment 1 and 2 marked in yellow with the orange zone at the north of the property excluded from the HA area, refer to the GRO plan GP 69/2011 for more details)

(This plan scale was derived using desktop measurements and is therefore only an approximation, albeit reasonably close.)

2.6 Regional Conservation Significance of the Property

Remnancy statistics and levels of protection can be useful to determine the conservation significance of a property within a particular region. The system used to determine the various regions in Australia is known as IBRA or Interim Biogeographical Regionalisation of Australia. IBRA attempts to categorise Australia's landscapes and ecosystems into an ecologically sound framework within which to identify the gaps in the National Reserves System and to set priorities for filling these gaps[2]. Currently, there are 85 IBRA regions, 403 IBRA subregions and many more environmental associations.

	% remnant Vegetation	% remnant vegetation protected
Flinders Lofty Block IBRA Region	49.70%	5.60%
Mount Lofty Ranges IBRA Sub Region	15.50%	5.25%
Clarendon Environmental Association	33.70%	25.50%
Hundred of Noarlunga	18.70%	23.00%
Property containing remnant vegetation	100%	96.00%

Under the Interim Biogeographic Regionalisation of Australia (IBRA), the Ironbank bushland is in the Flinders Lofty Block IBRA Region, which is estimated to retain 49.7% of its original vegetation cover with only 5.6% of that formally protected in the National Reserve System. This is due to the majority of the region being used for pastoral and agricultural activities. The middle and southern parts of the region have been extensively cleared. This is reflected in the Mount Lofty Ranges IBRA Sub-region, where the property is located, which contains only 15.5% of its original vegetation cover, and is a high priority for establishment of protected areas with only 5.25% protected in the National Reserve System.

The property is situated within the Clarendon Environmental Association (3.2.13). The Clarendon Environmental Association is described by Laut *et al*. (1977) as containing hilly uplands and dissected lateritic tablelands with a cover of open parkland, forest or woodland[3]. Approximately 33.7% of the original vegetation covers still remains in the Clarendon Environmental Association with 25.5% formally protected in the National

[2] R. Thackway and E.D. Cresswell (1995) *An Interim Biogeographic Regionalisation for Australia: A Framework for Setting Priorities in the National Reserves System Cooperative Program*, Version 4.0 Australian Nature Conservation Agency, Canberra.

[3] www.atlas.sa.gov.au/go/resources/environments-of-south-australia

Reserve System. With one third of the original native bushland remaining in this association it is very important to protect and manage as much of it as possible given that, overall, the Mount Lofty Ranges sub region has been extensively cleared. Additionally, this Heritage Agreement, although relatively small, makes a positive contribution to regional conservation by including high quality habitat into the National Reserve System.

The bushland on the property is part of a much larger area of native vegetation (see figure 5). In fact, it comprises the most westerly extent of a continuous bushland area of several hundred hectares, the greater part of which is contained in the Mark Oliphant Conservation Park (approx 190ha).

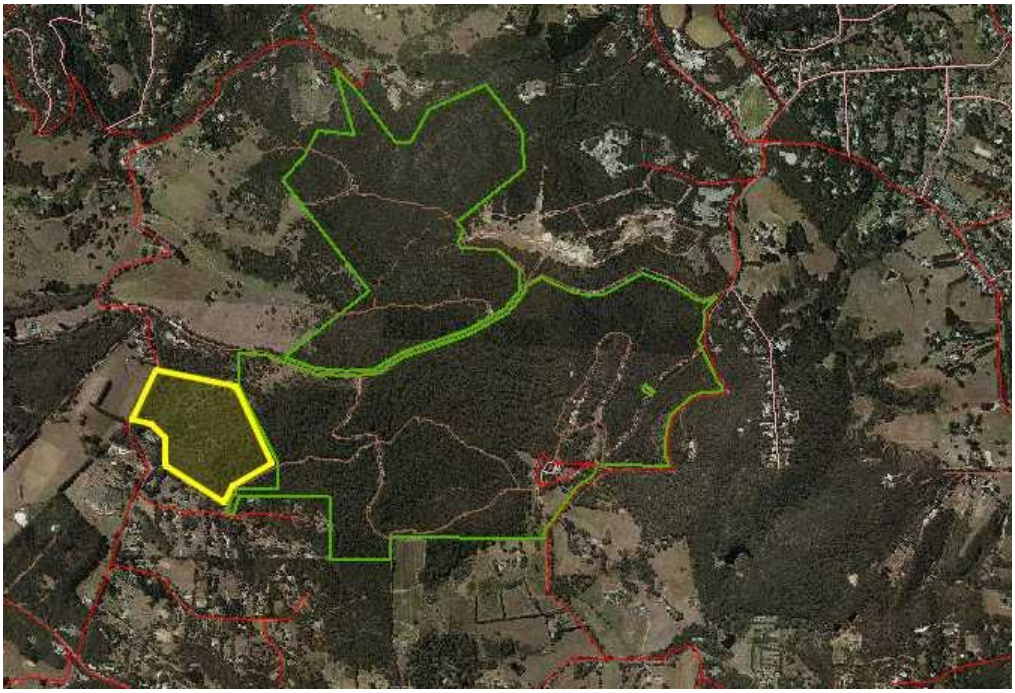


Figure 5- Whole of Ironbank Bushland block including allotment 1 and 2 (Yellow) in relation to the Conservation Park (green outline) and other contiguous areas of native vegetation.

The Ironbank Bushland also falls into the Cape Borda to Barossa NatureLinks Corridor which is one of five major landscape corridors conserving South Australia's species and habitats. The SA Government, in partnership with private landowners and the community, is establishing major strategic ecological links across the state which in certain areas extends into the marine environment.

3. Conservation values of the Heritage Agreement Area

3.1 Native vegetation

3.1.1 Importance for conservation

The Ironbank bushland is important for conservation in the Southern Mount Lofty Ranges because it is an excellent example of intact heathy Eucalyptus woodland with a high diversity of indigenous native plant species (See appendix 7.1). As a result of low levels of weed invasion and high plant species diversity the Ironbank bushland provides quality habitat for a number mammals, reptiles and woodland bird species. Of particular importance is the Southern Brown Bandicoot (*Isoodon obesulus obesulus*) which is currently listed as Endangered under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999.* In South Australia the species is listed as Vulnerable under the *National Parks and Wildlife Act 1972*.

Of the eight species of bilby and bandicoot that originally occurred in South Australia, only the Southern Brown Bandicoot, *Isoodon obesulus*, can still be found in the state. One subspecies of this taxa, *Isoodon obesulus obesulus*, occurs in the Mount Lofty Ranges. The bandicoot's demise in South Australia has been caused by habitat loss and fragmentation; habitat degradation; rabbit control methods; bushfire and modification of habitat as a result of fire management regimes; and predation by foxes, dogs and cats[4].

Recent surveys conducted on the property suggest that high numbers of the Southern Brown Bandicoot have persisted. The reasons behind the large numbers of bandicoots are, to date, unknown. Nevertheless, the success of the Southern Brown Bandicoot at this location highlights the importance of active ongoing management to reduce the threatening processes facing the species and ensure its continued survival.

3.1.2 Vegetation description

The main vegetation association within the property is Messmate (*Eucalyptus obliqua*) Open Forest, with some Rough Barked Manna Gum (*E. viminalis* ssp*. cygnetensis*) in parts. Common species in the understorey include Golden Wattle (*Acacia pycnantha*), Daisy Bush (*Olearia ramulosa*), Large-leaved Bush-pea (*Pultenaea daphnoides*), Bracken (*Pteridium esculentum*), low shrubs such as Honeypots (*Acrotriche serrulata*), Common Flat-pea (*Platylobium obtusangulum*), Common Raspwort (*Gonocarpus tetragynus*), Guinea-flower (*Hibbertia virgata*), and sedges such as Wire Rapier Sedge (*Lepidosperma semiteres*).

The vegetation appears to be mostly intact. Relatively recent fire scars are apparent, and some post-fire weed invasion has occurred.

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[4] Nerissa Haby and Kirstin Long (2005), *Recovery Plan for the Southern Brown Bandicoot in the Mount Lofty Ranges, South Australia, 2004 to 2009*. Department of Environment and Natural Resources

3.1.3 Plant species diversity

Sixty-four native plants were recorded during a brief inspection. One hundred plant species, including thirty plants of conservation significance, have been recorded for the adjoining allotment 205 by Darrell Kraehenbuhl. Allotment 205 in Deposited Plan 34327 is now part of the Mark Oliphant Conservation Park. The number of species present is considered to be high species diversity for this vegetation association.

Representative area of Ironbank Bushland

3.2 Plant Species of Conservation Significance

During the field inspection, specimens of the following plant species of conservation significance were recorded.

		Conservation Rating		
Scientific Name	**Common Name**	**AUS**	**SA**	**ML**
Acrotriche fasciculifolia	Pink Ground-berry	R	U	U
Danthonia linkii var. fulva	Leafy Wallaby-grass	U	U	
Dichelachne inaequiglumis	Short-hair Plume-grass	U	U	

AUS=Australia SA=South Australia R= Mount Lofty Botanical Region E=Endangered: rare and in danger of disappearing from the wild in the short term T=Threatened: likely to be either endangered or vulnerable but insufficient data for a more precise assessment. V=Vulnerable: rare and in danger of disappearing from the wild in the long term R=Rare: occurring infrequently, either locally abundant in a limited area or sparsely distributed over a wide area K=status uncertain, but considered likely to be either rare, vulnerable or endangered U=Uncommon: less common species of interest but not rare enough to warrant special protective measures Q=Not yet assessed but flagged as being of possible significance N=Common: not of particular importance (Definitions based on regional ratings obtained from Lang, PJ & Kraehenbuehl, DN (2005). Plants of Particular Conservation Significance in South Australia's Agricultural Regions. August 2005 update of unpublished database. Department for Environment and Heritage.)

Of the thirty plant species of conservation significance recorded for allotment 205 (part of Mark Oliphant C.P.), many would be likely to occur within the Ironbank Bushland, and due to the season may have been missed during the original Heritage Agreement inspection in 1997.

3.3 Native fauna

3.3.1 Birds

The vegetation at Ironbank bushland is considered to be suitable habitat for a diversity of the following bird species of conservation significance.

		Conservation Rating		
Scientific Name	**Common Name**	**AUS**	**SA**	**ML**
Falcunculus frontatus	Crested Shrike-tit		V	V
Strepera versicolor melanoptera	Grey Currawong		U	U
Phylidonyris pyrrhoptera	Crescent Honeyeater		U	
Sericornus frontalis frontalis	White-browed Scrubwren		U	
Pardalotus punctatus	Spotted Pardalote			U
Cormobates leucophaeus	White-throated Treecreeper		U	U
Calyptorhynchus funereus	Yellow-tailed Black Cockatoo		V	V

AUS=Australia SA=South Australia ML= Mount Lofty Region. E=Endangered: rare and in danger of disappearing from the wild in the short term V=Vulnerable: rare and in danger of disappearing from the wild in the long term R=Rare: occurring infrequently, either locally abundant in a limited area or sparsely distributed over a wide area K=status uncertain, but considered likely to be either rare, vulnerable or endangered U=Uncommon: declining and inadequately conserved, but not yet rare or vulnerable C=Common: not of particular importance. (Definitions based on regional ratings obtained from Carpenter, G & Reid, J (2000) The Status of Native Birds in South Australia's Agricultural Regions. Unpublished Database, 2000. Department for Environment & Heritage, South Australia.)

A Further 50 native bird species (see appendix 7.2) have been recorded in the local area either on the property or in Mark Oliphant Conservation Park. The proximity of the property to a much larger area of remnant vegetation contributes to a functional corridor that allows bird species to move freely through the landscape.

3.3.2 Mammals

Recent fauna surveys have found that a number of native mammals are utilising the Ironbank Bushland including Southern Brown Bandicoot (*Isoodon obesulus obesulus*), Yellow-footed Antechinus (*Antechinus flavipes*), Native Bush Rats (*Rattus fuscipes)*, Common Brushtail (*Trichosurus vulpecula*), Ringtail Possums (*Pseudocheirus peregrinus*), Echidna (*Tachyglossus aculeatus*), Western Grey Kangaroo (*Macropus fuliginosus*) and at least two species of bats are present; the White-striped Free-tail Bat (*Tadarida australis)* and Eastern Forest Bat (*Eptesicus pumilus)*. Koalas (*Phasacolarctos cinereus)*, a species introduced to the region, are also frequently seen.

Most notably, Southern Brown Bandicoot (*I .o. obesulus)*, a nationally endangered species, appears to be thriving on the property in higher than expected numbers, highlighting the conservation significance of the Ironbank Bushland.

Southern Brown Bandicoots are robust, compact, medium-sized marsupials with small, round ears and a short, pointed snout relative to other bandicoots. The species has short, spiny brown and straw coloured hairs over the animal's head and back which gives the coat a greyish brown appearance while its underside is a creamy white colour.

Southern Brown Bandicoot are known to occupy a range of different habitat types although in South Australia tend to be found in open forest, woodland and tall shrubland ecosystems containing the following species: Messmate *Eucalyptus obliqua,* Pink Gum *E. fasciculosa,* Prickly Tea-tree *Leptospermum juniperinum,* Heath Tea-tree *L. myrsinoides,* Silver Banksia *Banksia marginata,* Large-leaf Bush-pea *Pultenaea daphnoides,* Bracken *Pteridium esculentum,* Pink Ground-berry*,* Common Flat-pea *Platylobium obtusangulum,* Yacca *Xanthorrhoea semiplana,* Wire Rapier-sedge *Lepidosperma semiteres* and Golden Wattle *Acacia pycnantha.*

Southern Brown Bandicoots are predominantly solitary, nocturnal or crepuscular (active at twilight) with some diurnal activity, and feed on a wide variety of invertebrates and plant matter.

For further information about Southern Brown Bandicoots see the Recovery Plan for the Southern Brown Bandicoot in the Mount Lofty Ranges[5].

[5] Recovery Plan for the Southern Brown Bandicoot in the Mount Lofty Ranges[5], South Australia, 2004 to 2009 prepared by Nerissa Haby and Kirstin Long

3.3.3 Reptiles and Amphibians

Although little is known about the reptilian species occurring on the property, it is thought that the vegetation is suitable habitat for the following reptiles.

		Conservation Rating		
Scientific Name	**Common Name**	**AUS**	**SA**	**ML**
Christinus marmoratus	Southern Marbled Gecko			
Hemiergis decresiensis	Three-toed Yellow-bellied Skink			
Lerista bougainvillii	Bouganville's Skink			
Lampropholis guichenoti	Garden Skink			
Pogona barbata	Bearded Dragon			
Austrelaps labialis	Adelaide Hills (Pygmy) Copperhead			V
Pseudonaja textilis	*Eastern Brown Snake*			
Egernia whitei	White's Skink			
Tiliqua rugosa	Sleepy Lizard			
Tiliqua scincoides	Eastern Blue-tongued Lizard			
Pseudophryne bibronii	Bibron's Toadlet		R	
Aprasia striolata	Striped Worm-lizard			

3.4 Fire History

The previous landowners bought the property 49 years ago. A major fire occurred just prior to that, in 1955. This fire, which started on the 2nd of January, was known as the Black Sunday Fire and burned over an area of 40,000 hectares from Gorge Road at Athelstone to Strathalbyn.

On 13 January 1994, a wildfire of more limited extent burned through most of the property, leaving significant fire scars. The vegetation has regenerated well with relatively few alien species having invaded.

4. Management objectives, issues and strategies

4.1 Management Objectives

The primary consideration for the management of the Heritage Agreement area is the protection and conservation of the native animals and vegetation contained within it, including animals that may visit from outside and utilise the area for varying lengths of time.

4.1.1 Protection

Protection entails the control and, if possible, the elimination of agents that would have a negative impact on the natural processes at play within the area.

These natural processes involve the way plants grow, set seed, germinate and develop into mature plants. It includes the competition between individuals of the same species and individuals of different species for space, light and nutrients. It includes the death of plants and the processes of subsequent decay and the degree to which other organisms become part of that decay and the benefits they derive from it.

Similarly, it involves the way animals including birds, mammals, reptiles and invertebrates (insects, spiders, slaters, worms, snails and myriad other small creatures) live out their lives, how they compete with and feed off each other and how they live within and use the plant community as their habitat.

These natural processes make up the ecology of the area.

Threats to the ecology of the area

The agents that can negatively impact on the ecology of native vegetation include weeds, feral animals and the things that people do that intrude upon a natural area. Fire that burns throughout the entire Heritage Agreement area also poses a significant threat to the natural ecological functioning of the area.

Weeds and feral animals are plants and animals that, originally, did not occur naturally in this area of bushland. Mostly, weeds and feral animals are species not native to Australia. They have been so successful in gaining a foothold because of the lack of natural predators. Weeds become a problem when they more successfully compete with native plants and animals for space, light and nutrients. Feral animals become a problem when they prevail over native animals in the search for food and nesting sites or when they use native animals for food.

While fire is a natural part of the ecology of the Australian bush, the complete burning of remnant bushland blocks, separated from other bushland can mean the death of animals during the fire and an inability of the block to recruit new animals because of its isolation. The smaller and more isolated the bushland block, the greater the potential for species loss in any fire that burns the entire block.

Plants will tend to regenerate following fire. Plant species loss can be experienced if a subsequent fire burns the block before plants have matured to the stage where they can set seed and so, as a species, survive a fire.

Protection, therefore, means that the native vegetation must be shielded from access and attack by these agents.

4.1.2 Conservation Management

Conservation is primarily the work that is done to control or eliminate harmful agents once they have become established. It is also the work that needs to be done to restore native species once the impact of weeds and feral animals has been significantly reduced or eliminated.

4.2 Management Issues and how to address them

Effective conservation management requires:

- identifying those agents that negatively impact on the proper functioning of natural ecological processes;
- putting in place programs to eliminate or reduce the impact of those agents;
- accurately recording the extent and nature of the work carried out to control these agents and monitoring those areas treated to determine how successful the treatments were.

This section of the plan deals with the key management issues and management programs for the Ironbank Bushland. Recording and monitoring are dealt with under Section 5.6 of the plan.

4.2.1 Weeds

4.2.1.1 Principles of weed control

Weed control in bushland areas should aim to control or, preferably, eliminate weed infestations without seriously disturbing the native species amongst which the weeds are growing. It is also critical that, as far as possible, the soil should be disturbed as little as possible. Disturbed soil is an ideal seedbed and the seeds of weeds seem best able to capitalise on favourable seedbed conditions.

The Minimum Disturbance approach was developed by Robertson (1999). The following is an outline of the approach.

MINIMUM DISTURBANCE APPROACH

Restoration of indigenous vegetation is most effectively achieved through the Minimum Disturbance Approach which relies on the systematic removal of pest species by hand, wherever possible, and in preference to the use of machinery or broad-scale application of herbicide.

The three key principles of the **Minimum Disturbance Approach** are:

Principle 1 – Work from areas of native plants towards weed-infested areas

Work in the best or most intact areas first. Through the control or removal of threats from competition and predation in this zone, the conservation values of the native vegetation will be conserved and enhanced.

Principle 2 - Make minimal disturbance

Avoid excessive soil disturbance. Replace the topsoil and mulch. All weeds are vigorous, quick to germinate, grow, flower and set seed. They have few local natural predators so they can out-compete most indigenous species in disturbed sites.

Principle 3 – Let native plant regeneration dictate the rate of weed removal

It is very important not to "over-clear" dense weeds in degraded remnants. Instead work gradually along a weed "front" so that (a) native species can regenerate within the cleared zone and (b) you can maintain the necessary "follow-up" weeding. This Principle is particularly relevant in high rainfall areas and in riparian zones where higher moisture levels assist weed invasion.

Key references

Techniques for controlling weed species in native vegetation are covered in great detail in the book "Stop bushland weeds: A Guide to Successful Weeding in South Australia's Bushland" by Meg Robertson[6].

The "Introductory Weed Management Manual"[7], published for the CRC for Australian Weed Management by the Commonwealth Department of Environment and Heritage is another valuable, more recent, resource.

4.2.1.2 Weeds of ecological concern

Eighteen introduced plant species have been recorded at the Ironbank Bushland. Several of these weed species pose significant threat to the health of the native vegetation if left uncontrolled. Weed species of ecological concern are, in order of priority:

1. **Tree Heath (*Erica arborea*)**- prevalent on the north of the property;
2. **Broom species (*Cytisus scoparius & Spartium junceum*)**- Are a problem in the drainage line adjacent to the fire track on the southern boundary;
3. **Blackberry (*Rubus ulmifolius* var. *ulmifolius)***- not present in large thickets at this stage, needs to be given serious attention; But clear in small stages if Bandicoots are present.
4. **Boneseed (*Chrysanthemoides monilifera*)**- more prevalent near the western border near Ironbank Rd;
5. **Pines (*Pinus sp)-*** Scattered throughout property*;*
6. **Acacia species e.g. Cootamundra Wattle & Sallow Wattle-** Scattered throughout property;
7. **Bulbil Watsonia (*Watsonia meriana* var *bulbillifera)***- A problem on the north western boundary*;*
8. **Freesia (*Freesia Hybrid* sp.*)***- Abundant at the entrance of Mark Oliphant Conservation Park on Nioka Drive threatening to invade bushland; and
9. **Sweet Pittosporum (*Pittosporum undulatum)*** - Scattered throughout property.

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[6] Robertson, M. (1984) *Stop Bushland Weeds,* Nature Conservation Society of South Australia

[7] Commonwealth of Australia, Dept. of Environment and Heritage (2004), *Developing and Implementing a Weed Management Plan.*

Other alien species are Hair-grass (*Aira sp.*), Pimpernel (*Anagallis arvensis*), Large Quaking-grass (*Briza maxima*), Rough Cat's ear (*Hypochoeris radicata*), Pussy tail (*Pentachistis pallida*), South African Daisy (*Senecio pterophorus*) and White cudweed (*Vellereophyton dealbatum*). Plants of these species are generally present at low density throughout the bushland. As a weed issue, Pussy tail and African Daisy have the potential to become a serious issues and therefore need to be monitored closely and removed if possible.

Bridal Creeper (*Asparagus asparagoides*) at this point has not been detected on the property but an owner should always be on the lookout for this weed. If Bridal Creeper is found on the property it should be removed immediately with care taken to remove all of the tubers, as it poses a serious threat to native vegetation.

Management strategy

The presence and impact of weeds will require regular monitoring and a commitment to control. If work on removing weeds is regularly performed, the problem will be quite manageable. However, without sufficient attention, weeds have the capacity to become a daunting problem over time.

Tree Heath (*Erica arborea*)

In removing Tree Heath, it is important to remove the lignotuber located just below the ground. This is best done by hitting the base of the plant with the back of an axe or similar implement. The implement should be well weighted to ensure the lignotuber is broken off but not so heavy as to easily tire the person doing the job. Once the lignotuber is broken, the plant should be easy to pull. If the plant is too large to be pulled, it should be cut and swabbed with Triclorpyr (Garlon) 600g/L and diesel fuel mixed according to the manufacturer's specifications.

Broom species (*Cytisus scoparius* & *Spartium junceum*)

English Broom (*Cytisus scoparius*)

Spanish Broom (*Spartium junceum)*

Smaller plants can be removed by hand pulling. Where the plants are larger and too difficult to pull, they must be cut and swabbed using Glyphosate or Triclorpyr (Garlon) 600g/L in diesel fuel, mixed according to the manufacturer's specifications. It is important to record, on a map, the areas where removal has taken place. Broom seedlings will appear for a number of years after the mature seed-bearing plants have been removed. It is necessary to revisit these areas to remove young seedlings. This should be done when the soil is moist and soft and pulling is easy.

Ideally, control should be attempted well before the plant has a chance to set seed capsules.

Blackberry (*Rubus ulmifolius* var. *ulmifolius)*

Blackberry is a serious weed and grows abundantly in the Mount Lofty Ranges. Blackberry prefers, but is not restricted to, moist sheltered sites along watercourses and drainage lines. If not controlled this weed will begin to smother and out compete native species dramatically reducing biodiversity. Where there are native plants growing among Blackberry control should occur in summer and care taken to avoid non target damage. In this situation cutting and swabbing with Triclorpyr (Garlon) 600g/L in diesel fuel, mixed according to the manufacturer's specifications is the safest method to employ.

Boneseed (*Chrysanthemoides monilifera*)

Boneseed is a large spreading shrub with masses of bright yellow daisy flowers. If left uncontrolled, Boneseed can become quite a problem in native vegetation shading out ground level shrubs, grasses, orchids and lilies. Fortunately, Boneseed is easily controlled by cutting and swabbing with Triclorpyr (Garlon) 600g/L in diesel fuel, mixed according to the manufacturer's specifications. The smaller plants and seedlings can be hand weeded.

Pines (*Pinus sp.)*

Pines readily invade native vegetation from gardens and plantations. Their dense foliage of needles forms a thick layer on the ground underneath the tree, changing the soil chemistry, which stops most native plants from growing. Care should be taken not to mistake Native Cherry (*Exocarpus cupressiformes)* with introduced Pines, which are similar in appearance. Pine seedlings should be hand pulled if possible and larger trees cut down below the bottom branches or ring barked.

Acacia species e.g. Cootamundra Wattle & Sallow Wattle

Cootamundra Wattle (*Acacia baileyana)*

Sallow Wattle (*Acacia longifolia)*

Flinders Ranges Wattle (*Acacia iteaphylla)*

Black Wattle (*Acacia mearnsii)*

A number of Native Wattle species that are not indigenous to the Mount Lofty Ranges have become weeds in bushland. In particular, the Wattle species pictured above have the ability to readily invade areas of native vegetation and compete for resources. These species are easily controlled by hand pulling small species and ringbarking or cutting down larger trees. Usually they don't require poisoning but if shooting occurs Glyphosate 360g/L can be applied to ensure no regrowth. Proper identification is needed before controlling the acacias, so please seek advice from your Bush Management Advisor or staff at the herbarium.

Bulbil Watsonia (Watsonia *meriana* var. *bulbillifera*)

A Perennial summer-dormant herb to 2m high with large underground corms and small stems. Salmon pink to orange-red trumpet-shaped, curved flowers appear in summer on terminal spikes growing from amongst clumps of strap-like green leaves.

To control, grub out bulbs when leaves are visible and just before bulbils form (winter to early summer) taking care to remove and bag all bulbs or bulbils or wipe sword shaped leaves directly with Glyphosate 360g/L and monitor effectiveness.

Freesia (*Freesia Hybrid* sp.*)*

Freesias are another garden escapee that poses significant problems for native vegetation if allowed to become established. Its aggressive foliage and tubers outcompete native ground covers. Currently, there is potential for invasion from the Nioka Drive entrance to the Mark Oliphant Conservation Park. There are also clumps of Freesias randomly dispersed around the property and if seen should be removed before they can multiply.

This weed if left unmanaged can be especially difficult to control because it reproduces very quickly to form dense patches. Isolated plants can be removed by using a screwdriver to lever out bulbs when the soil is soft. In dense patches the leaves can be wiped with Glyphosate 360g/L or foliar sprayed with Metsulfuron Methyl mixed according to the manufacturer's specifications in winter. Metsulfuron Methyl is a selective herbicide and should not affect native grasses. Care should be taken to avoid Gahnias, Sedges, Orchids Lilies and other native species.

Sweet Pittosporum (*Pittosporum undulatum)*

Sweet Pittosporum is a slender-branched shrub or tree to 12 m tall with smooth grey bark, shiny, pointed leaves with wavy prominent margins. Flowers are fragrant, white with five petals which bend abruptly downwards at the ends. It has globe shaped orange-tan fruit 1cm in size.

This species is native to north eastern Australia and has become a weed in the Mount Lofty Ranges after being planted as a hedge species. To control, hand pull small trees up to 1 metre and cut and swab larger trees with either Glyphosate 1:5 with water or Triclopyr (Garlon) 600g/L in diesel fuel, mixed according to the manufacturer's specifications.

Access for weed control

The area is steep and inaccessible to vehicles. Where materials and equipment for weed control are required to be taken onto the property, they will be required to be carried by those people involved in the control operations.

Get professional advice

For advice on how best to manage the native vegetation on the property, contact should be made with the Bush Management Advisor (BMA), from the Department of Environment and Natural Resources. The local BMA is located at the Black Hill Conservation Park, 115 Maryvale Road, Athelstone. The contact number is 8336 0903.

4.2.2 Feral animals

4.2.2.1 Scoping the problem

Before any action is taken to control feral animals, it is necessary to determine the level of the problem.

4.2.2.2 Rabbits

There is some evidence of rabbit activity within Ironbank Bushland. Their presence is always a matter of concern and it would be unwise to neglect control measures.

Rabbits impact on native vegetation by the selective grazing of palatable species and, under conditions of restricted food resources, the overgrazing of all but the most unpalatable of species. Rabbits cause death and loss in some species and a serious loss of vigour in others.

Reduced plant cover increases soil disturbance as these and other animals, particularly kangaroos, move around. Increased soil disturbance creates favourable seed bed conditions for colonising weeds when rains come.

The presence of rabbits is generally easy to see. However, scrapings alone may be misleading and confused with the diggings of Southern Brown Bandicoots which are smaller in size and conical in shape. Echidnas also leave scrapings when foraging for food and are present in the bushland. Therefore, be on the lookout for droppings around popular feeding areas and the presence of burrows. Rabbits in the Mount Lofty Ranges tend not to have burrows but shelter in the dense bush and blackberries.

Management Strategy

It is important in the control of rabbits to destroy any warrens on the property. It may be necessary to consult with neighbours to encourage the control of any rabbits on their properties.

Rabbits are routinely controlled by collapsing warrens in conjunction with fumigants, 1080 poison and biological controls.

Managing rabbit problems is best achieved by working with officers of the local Natural Resource Management Board, as the techniques required may be beyond the skill and experience of the landholder. The contact number for the Boards' Office at Lobethal is 8389 6166. It will also be necessary to seek complementary advice from the BMA to ensure that the control activities recommended by the Board's officer are entirely appropriate to the management of bushland. The BMA will be able to provide advice on technique modification.

4.2.2.3 Foxes and cats

[8]Foxes (*Vulpes vulpes*) and cats (*Felis catus*) are predators of small native animals and may well be causing some impact on the native animal populations in the bushland.

A number of qualities have helped the fox be so successful in Australia. Foxes have a wide dietary range including mammals, birds, reptiles, amphibians, insects and fruit. However, wherever rabbits are common they form the major staple food of foxes. Although litters are small and females only breed once per year, foxes have high reproductive success as cub survival is high. The fox has few serious diseases and few natural enemies in Australia[9].

A significant active fox den system is present at the site of the old sand extraction pit. Appropriate monitoring and eradication measures should be adopted. Please contact your Animal and Plant Control Officer for control techniques that can be used in this peri urban area.

[10]Feral cats are often nocturnal and require large amounts of fresh animal protein to successfully survive and reproduce. Inadequate diet is considered to be a major factor regulating their population. Ideally they prefer live animal food although they will take some carrion and refuse at tips. Cats can have two litters a year, averaging four kittens a litter. Few survive to become adults but those that do are weaned at 8 weeks and become sexually mature at approximately 12 months. The major diet is small native and exotic mammals but they also take birds, lizards and insects[11].

The abundance of foxes and cats is sometimes more difficult to determine. The presence of a well used den system is a clear indication that the native animals in the Bushland are under a high threat of predation by foxes. For the reasons indicated above, it is safe to assume there will be some impact from domestic and feral cats.

Management Strategy

Fox and cat control requires there to be an assessment of damage, the pattern of their movement, the location of dens and the places at which their territories are marked. Fox control usually involves the setting of poisoned baits. Cat control requires that they be shot in the open or trapped and shot. This work needs to be carried out by operators with the appropriate level of training and experience. Dog and Cat Management Act 1995 and the Firearms Act 1997 give guidance on trapping and destroying cats within 1 km of a residence.

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[8] Photo sourced from www.canadabay.nsw.gov.au
[9] http://www.feral.org.au
[10] Photo sourced from http://www.feral.org.au
[11] http://www.feral.org.au

Due to the presence of Southern Brown Bandicoot (*Isoodon obesulus obesulus*), Yellow-footed Antechinus (*Antechinus flavipes*), Native Bush Rats (*Rattus fuscipes)* and a number of reptile species, it is critically important that foxes and cat populations are assessed, controlled and monitored to improve the chances of long term survival on the property. This should be a priority in the landholder's management actions.

Access for feral animal control

The area is steep and inaccessible to vehicles. Where materials and equipment for feral animal control are required to be taken onto the property, they will be required to be carried by those people involved in the control operations.

Get professional advice

Feral animal control is a specialist activity and it is not recommended that landowners with limited experience undertake this activity without expert advice, specific to the property.

Fox control generally requires the setting of poisoned baits. For this reason, it is best to consult the local Natural Resource Management Board at Lobethal to determine the best means of control for the level of the problem. Cats must be shot in the open or trapped and shot. Again advice should be obtained from the Board.

In any program to control feral animals, it is important to cause minimum disturbance to the vegetation and to native animal populations. As indicated above, when obtaining advice from the local NRM Board regarding control technique, it is necessary to have that advice complemented with comment from the Bush Management Advisor as to if or how those techniques need to be modified or adjusted to meet minimum disturbance requirements.

4.2.3 Fire

The nature of the topography, the relatively high levels of fuel generated under conditions of moderate and generally reliable annual rainfall and the likelihood of fire starting in a closer settled rural area means that, under favourable conditions, bushfire may well burn significant areas before being brought under control.

The primary concern for the maintenance of biodiversity in the bushland is the capacity for the area to recover if local plant and animal species are lost in a fire. Full recovery could only be achieved through the re-colonisation of lost species from unburnt areas, for example, any areas of the Mark Oliphant Conservation Park that were not burnt.

The area may be considered to pose a potential threat to surrounding properties and the Ironbank Township. The capacity of a single landowner to achieve effective protection for a neighbourhood such as Ironbank is limited, however, coordination with the Country Fire Service (CFS) (working under a approved Bushfire Prevention Plan for the district) and the local community is highly recommended for any fuel reduction work carried out.

Management strategy

It is necessary that a high level of bushfire vigilance and preparedness are maintained. As far as possible, the Heritage Agreement area should be protected from fire, either from a wildfire, or from an escapee prescribed fuel reduction burn.

Advice should be sought from the CFS Prevention Officer, Region 1 (08 8391 1866) as to life and property protection matters and what level of fuel reduction works should be carried out.

Fire protection measures should be consistent with the Government of SA bushfire management planning processes and legislation, including *The Fire and Emergency Services Act 2005* (SA) (Part 1, Subdivision 2 & 5) and *The Native Vegetation Act 1991* (SA) Regulations 5(1)(k) Clearance around prescribed building or structure and 5A Clearance for Fire Prevention and Control.

Refer to the document titled *Managing Native Vegetation, Reduce the Impact of Bushfire*, September 2009, prepared jointly by the South Australian Government, the South Australian Country Fire Service and the Native Vegetation Council. A copy is available from the CFS website at *www.cfs.sa.gov.au*. The document refers to three different fire management zones where specified vegetation fuel levels are recommended for each of the following zones:

- Asset Protection Zone, (provides for a defendable space around built assets)
- Bushfire Buffer Zone (provides strategically located fuel reduced areas to help minimise the risk of large bushfires spreading, and
- Conservation Land Management Zone (such as the area under Heritage).

Bushfire Management Plans

Preparation of a Bushfire Management Plan (BMP) is a useful tool for identifying fuel reduction works and fire management zones on an individual property or may be prepared on a district scale in conjunction with the CFS and Local Council.

Bushfire Management Plans should have due regard for the need to limit encroachment into the Heritage Agreement area where possible. It should be remembered however, that even with these strategies, given the size and location of the Heritage Agreement area, and the nature of the fuel loadings and topography, it may not be possible to achieve effective protection except for low intensity fires. Additionally, cleared areas fragment the bush allowing weeds to invade and prevent the migration of small native mammals.

For information on preparing a Bushfire Management Plan for your property contact DENR, Native Vegetation & Biodiversity Management Unit on 8303 9733.

Get professional advice

Planning for fire requires a sound understanding of fire behaviour under a range of conditions. In any fire management program, it is important to minimise disturbance to the vegetation and to native animal populations. Obtaining advice from the CFS Regional Prevention Officer regarding

management techniques needs to be complemented with advice from the Bush Management Advisor on how those techniques could be modified to minimise impact on native plants and animal populations.

Prescribed Burning

Without formal training, landowners should not carry out prescribed burns. Carrying out a burn is will require assistance from CFS and or Department of Environment and Natural Resources (DENR). Under the terms of the Heritage Agreement, the use of some fire management techniques within the Heritage Agreement area, such as prescribed burning for ecological purposes, requires the approval of the Native Vegetation Council and the Minister. Contact the Native Vegetation & Biodiversity Management Unit (DENR) on 8303 9777 for information.

DENR Reserves Fire Management Plan

In March 2011 The Department of Environment and Natural Resources released the Onkaparinga Valley Fire Management Plan. This plan includes fuel management recommendations for Mark Oliphant Conservation Park and adjacent Heritage Agreement Land. A copy of the summary letter to relevant Heritage Agreement owners from DENR is attached to this Management Plan. The Fire Management Plan is available from *www.environment.sa.gov.au/fire* or by phoning the information line on 8204 1910.

4.2.4 Fencing

A fence exists along the western boundary of Allotment 1, adjacent to Ironbank Road. This should be maintained to prevent unauthorised access by horse-riders and trail-bike riders. There is also a section of fence along the central section of the southern boundary. Any part of the boundary that is unfenced does not need fencing as the bushland is contiguous with the surrounding native vegetation on the neighbouring properties, and is not required to limit livestock straying into the Bushland. Fencing between allotment 1 and 2 in the Heritage Agreement area is not permitted.

Unnecessary fencing is an obstacle to the free movement of native fauna.

4.2.5 Walking tracks

Currently, there are no walking tracks on the property. It would be desirable for the property owners to be able to move more about their properties on foot in order to enjoy the beauty and tranquillity of the bushland, and to carry out management actions.

Management strategy

It is proposed that this plan provide for the establishment of a single loop walking track to allow access. Remembering it is preferable to minimise disturbance to the bush.

New tracks should be informal and not constructed, and should be limited to pedestrian use. Horses, motorbikes or bicycles should not be permitted access to the tracks. Disturbance to the bush should be minimised. The new route of the trail should become apparent through recurrent use. Initially it may be necessary to install a series of removable pegs or attach flagging tape to trees. Once pedestrian use has established the tracks clearly, the pegs or ribbons can be removed.

The walking track system should be limited. It is important to limit contact of the walking tracks with boundaries close to roads, to discourage unauthorised access by trail bikes or horses.

Users of the tracks must take care to ensure that weed seeds are not introduced on clothing and footwear. Boots and shoes should be disinfected with methylated spirits using a brush, due to the possibility of having been worn in an area infested with Cinnamon Fungus (*Phytophthora cinnamomi*).

4.2.6 Vehicular tracks

There are no vehicular access tracks within the Heritage Agreement area although an access track on the south-east boundary of the property, within the Mark Oliphant Conservation Park, is available to both the Ironbank Bushland Lot 1 and 2 property owners to gain access for management purposes.

Management strategy

Informal arrangements exist with the Department of Environment and Natural Resources for the track on the south-east boundary of Allotments 1 and 2, within the Mark Oliphant Conservation Park, to be available for use, by the owners of the properties, for management purposes such as weed control within the Heritage Agreement area.

5. Management Action Plan

5.1 Weeds

Management Actions		Timing
1. Tree Heath (*Erica arborea*)	Undertake weed mapping to determine location of Tree Heath.	All year. Preferably before flowering When soil is moist and pulling is easy.
	Hand pull, dig or cut and swab individuals.	
2. Broom species (*Cytisus scoparius & Spartium junceum*)	Undertake weed mapping to determine the location of Broom species.	All year. Before Seed sets. When soil is moist and pulling is easy.
	Hand pull, dig or cut and swab individuals.	
3. Blackberry (*Rubus ulmifolius* var. *ulmifolius)*	Undertake weed mapping to determine the location of Blackberry. Check for signs of bandicoots at all times.	Summer time. Consult BMA if having difficulty controlling.
	Cut and swab canes.	
4. Boneseed (*Chrysanthemoides monilifera*)	Undertake weed mapping to determine the location of Boneseed.	All year. Before Seed sets. When soil is moist and pulling is easy.
	Hand pull, dig or cut and swab individuals.	
5. Pines (*Pinus sp.*)	Hand pull, cut, ringbark or drill and fill.	All year.
6. Acacia species e.g. Cootamundra Wattle & Sallow Wattle	Hand pull, cut, ringbark or drill and fill.	All year. Before Seed sets.
7. Bulbil Watsonia (*Watsonia meriana* var bulbillifera)	Undertake weed mapping to determine the location of Watsonia.	Winter to early summer
	Grub out bulbs isolated bulbs or wipe with herbicide.	
8. Freesia (*Freesia*	Undertake weed mapping to determine	Winter

Hybrid sp)	the location of Freesia.	
	Hand Dig or wipe.	
9. Sweet Pittosporum (*Pittosporum undulatum)*	Hand pull or cut and swab	All year
10. Other weeds (e.g. African Daisy)	Undertake weed mapping to determine the location of other weed species.	Consult BMA for control techniques.
	Undertake removal where practicable.	
11. Bridal Creeper (*Asparagus asparagoides)*	During survey work, search should be made for any presence of any Bridal Creeper. If it is detected, irrespective of its extent, it should be elevated to the status of a principle weed species and dealt with as a priority.	Ongoing.
	Small and isolated patches should be grubbed to remove all tubers. Larger patches should be spot sprayed or wiped. Contact BMA to discuss biological control options.	Winter to Spring.
12. Patrol & Monitor	Conduct regular patrols to determine if there are other weeds that need some action. Record their location and extent. Discuss weeds and weed control measures with the local Bush Management Adviser. Implement control measures as advised.	All year round to include winter weeds and summer weeds.

5.2 Feral animals

Management Actions		**Timing**
1.Monitor Foxes, Cats & Rabbits	Conduct regular patrols to determine the extent of rabbit and fox presence. If evidence is persistent, contact the local Animal and Plant Control Officer for advice. Sightings of Foxes and Cats should be noted by time, date, location.	Regularly during the year.

2.Plan Rabbit Control	Consult with Animal and Plant Control Officer and neighbouring property owners to devise a coordinated plan for rabbit control on property.	Within the first 12 months of Management Plan
3.	If such advice requires that action be taken and following consultation with BMA, prepare a schedule of control for each pest animal identified as a problem.	By the end of May in each year.
4.	Implement program of feral animal control.	As per schedule.

5.3 Fire management

Management Actions		Timing
1.	Meet CFS Regional Prevention Officer for fire management advice. Consider preparation of a Bushfire Management Plan for the property. Seek complementary advice from BMA.	As soon as practical. September (may be leaving it too late as work load increases for CFS Prevention Officers.
2.	Refer to DENR Reserves of the Onkaparinga Valley Fire Management Plan 2011-2021 and obtain advice from the CFS Regional Prevention Officer as to recommended works. Consider preparation of a Bushfire Management Plan for the property. Contact DENR Native Vegetation Management Unit on 8303 9733.	By November.

5.4 Fencing

Management Actions		Timing
1.	Patrol fencing along Ironbank Rd and maintain in good condition.	Patrol fence lines in April, August and December each year, but also after each storm.
2.	Do not install a fence on the common boundary with the Mark Oliphant Conservation Park or on the boundary with Allotment 2 (Ironbank Bushland East property).	Ongoing.

5.5 Walking Tracks

Management Actions		Timing
1.	Identify a single loop walking track (1.0 km max) to provide walking access to all sections of Allotment. Ensure that the track system makes no contact with the boundaries. Walking tracks are to be maintained only through their continued use by pedestrian traffic.	
2.	Restrict use to pedestrian traffic.	Ongoing
3.	Ensure users are monitored to reduce the possible introduction of weeds and Cinnamon Fungus.	Each time tracks are used.

5.6 Work Monitoring and Progress Reporting

5.6.1 Monitoring

The purpose of monitoring is to determine the effectiveness of the management work done. It is therefore best to set up a simple system of photo-monitoring points and record keeping.

Record keeping should be seen as an aid to management rather than a burden. Don't overcomplicate it.

Careful recording of all management actions and monitoring work will assist:

- the success of the outcomes to be measured;
- methods / techniques to be revised and improved;
- long term changes resulting from restoration/revegetation work to be noted.

Before success can be measured, it is important to have some way of assessing or measuring the current state of a problem.

If the problem is, say, a patch of weeds, a photo-point may be set up to take a photo of the area, prior to the commencement of control work. This is then compared with the same view of the bush at a later date after the weeds have been treated. The photo-point technique gives a qualitative, visual assessment of whether there are fewer weeds and more native plants than before.

Each photo-point will require a short peg in the ground to locate the position of the photographer, and a tall peg three to ten metres away forming the target to be photographed. This way, the photographer can ensure that the same area is being photographed each successive time.

The pegs need to be robust as they need to stay in place for a number of years. To be sure, the distance between the two pegs, and the compass bearing from the camera point to the target, may be recorded in case either peg is disturbed. Each photo-point needs to be given a simple identifying code and its position recorded on a map.

If the problem being photographed is a weed in the native vegetation that does not show up well in a photograph, a set of coloured markers placed at each patch of weeds assist a comparative evaluation. Density counts are another good way of monitoring plants that don't photograph well. For example, record the number of Horehound plants and native species present in 2m x 2m area of the site. Or record number of plants cut and swabbed, and number of plants hand pulled/grubbed at particular site. When follow up monitoring occurs record number of plants showing signs of reshooting.

The following table sets out, as an example, the information that should be recorded in a photo monitoring point.

Site Number, distance and bearing	**Date of photo**	**Treatment** **(i.e. control work done)**	**Comments** **(What has happened following the work)**
Site1, 270NW GPS or marked on map	2 June 08	Hand weeding the horehound in the open area	Cleared the primary infestation check next year for seedlings.

5.6.2 Progress Reporting

Progress reporting enables the useful assessment of the effort put in to management actions. Some efforts will be more successful than others. Various factors such as weather or control technique may affect outcomes. The following table records, as an example, action taken and the later results of that action.

Date	**Action taken**	**Weather conditions**	**Results**	**Comments**
2 June 08	Broom cut and swab with glyphosate 1:1 with water.	Overcast no rain 20C	Checked 1 year later 80% success rate	Retreat 20% by spot spraying regrowth using (Roundup at 1:150 do not Pulse near creek lines)

6. Appendices

6.1 Plant Species of Ironbank Bushland

Scientific Name	Common Name	Conservation Rating Aus	SA	R
**Acacia baileyana*	Cootamundra Wattle			
**Acacia longifolia*	Sallow Wattle			
**Aira sp*	Hair-grass			
**Anagallis arvensis*	Pimpernel			
**Asclepias rotundifolia*	Broad-leaved Cottonbush			
**Briza maxima*	Large Quaking-grass			
**Chrysanthemoides monilifera*	Boneseed			
**Erica arborea*	Tree Heath			
**Freesia Hybrid*	Freesia			
**Genista monspessulana*	Montpellier Broom			
**Hyprochoeris radicata*	Rough Cat's Ear			
**Pentaschistis pallida*	Pussy Tail			
**Pinus radiata*	Radiata Pine			
**Pittosporum undulatum*	Sweet Pittosporum			
**Rubus ulmifolius var. ulmifolius*	Blackberry			
**Senecio pterophorus* var. *pterophorus*	African Daisy			
**Spartium junceum*	Spanish Broom			
**Vellereophyton dealbatum*	White Cudweed			
**Watsonia bulbillifera*	Watsonia			
Acacia acinacea	Round-leaved Wattle			
Acacia myrtifolia var myrtifolia	Myrtle Wattle			
Acacia pycnantha	Golden Wattle			

Acacia verticillata	Prickly Moses			
Acaena novae-zelandiae	Bidgee Widgee			
Acrotriche fasciculiflora	Mount Lofty Ground-berry			
Acrotriche serrulata	Cushion Ground-berry			
Adiantum aethiopicum	Common Maiden-hair Fern			
Astroloma humufusum	Cranberry Heath			
Banksia marginata	Silver Banksia			
Burchardia umbellata	Milkmaids			
Bursaria spinosa	Sweet Bursaria			
Cassytha pubescens	Downy Dodder Laural			
Centrolepis artistata	Pointed Centrolepis			
Chrysocephalum apiculatum	Common Everlasting			
Danthonia linkii var. *fulva*	Leafy Wallaby-grass	-	R	R
Danthonia setacea var. *setacea*	Small-flower Wallaby-grass			
Daviesia leptophylla	Bitter Pea			
Daviesia ulicifolia	Gorse Bitter-pea			
Deyeuxia quadriseta	Reed Bent-grass			
Dianella revoluta var. *revoluta*	Black-anther Flax-lily			
Dichelachne inaequiglumis	Loose Plume-grass	-	R	R
Dichondria repens	Tom Thumb			
Drosera auriculata	Tall Sundew			
Drosera macrantha	Climbing Sundew			
Drosera whittakeri	Scented Sundew			
Epacris impressa	Common Heath			
Eucalyptus obliqua	Messmate Stringybark			
Eucalyptus viminalis ssp. *Cygnetensis*	Rough-bark Manna Gum			

Exocarpos cupressiformis	Native Cherry
Geranium solanderi	Native Geranium
Gonocarpus tetragynus	Small-leaf Raspwort
Hakea carinata	Erect Hakea
Hakea rostrata	Beaked Hakea
Helichrysum scorpioides	Button everlasting
Hibbertia riparia	Erect Guinea-flower
Hibbertia sericea	Silky Guinea-flower
Hibbertia virgata	Twiggy Guinea-flower
Isopogon ceratophyllus	Horny Cone-bush
Ixodia achillaeoides ssp. *Alata*	Hills Daisy
Juncus pallidus	Pale Rush
Juncus subsecundus	Finger Rush
Kennedia prostrata	Scarlet Runner
Lepidosperma carphoides	Black Rapier-sedge
Lepidosperma laterale	Tall Sword Sedge
Lepidosperma semiteres	Wire Rapier-sedge
Leptospermum continentale	Prickly Tea-tree
Leptospermum myrsinoides	Health Tea-tree
Leucopogon virgatus	Common Bearded Heath
Lomandra fibrata	Mount Lofty Mat-rush
Lomandra micrantha	Small-flower Mat-rush
Lomandra multiflora ssp. Dura	Hard Mat-rush
Olearia ramulosa	Twiggy Daisy-bush

Opercularia sp.	Stinkweed
Oxalis perennans	Native Oxalis
Pimelea linifolia ssp.*linifolia*	Slender Riceflower
Pimelea octophylla	Woolly Riceflower
Platylobium obtusangulum	Holly Flat-pea
Poa clelandii	Matted Tussock-grass
Pteridium esculentum	Bracken Fern
Pultenaea daphnoides	Large-leaf Bush Pea
Stipa mollis	Soft Spear-grass
Stylidium graminifolium	Grass Trigger-plant
Tetratheca pilosa ssp. pilosa	Hairy Pink-bells
Thelymitra sp.	Sun Orchid
Themeda triandra	Kangaroo Grass
Wahlenbergia stricta ssp. *stricta*	Tall Bluebell
Xanthorrhoea semiplana ssp. *Semiplana*	Yacca
Xanthosia pusilla	Hairy Xanthosia

Indigenous Species:	68
Alien Species:	18
Total Number of Species:	86

*weed/introduced plant

AUS=Australia SA=South Australia MU= Botanical Region E=Endangered: rare and in danger of disappearing from the wild in the short term T=Threatened: likely to be either endangered or vulnerable but insufficient data for a more precise assessment. V=Vulnerable: rare and in danger of disappearing from the wild in the long term R=Rare: occurring infrequently, either locally abundant in a limited area or sparsely distributed over a wide area K=status uncertain, but considered likely to be either rare, vulnerable or endangered U=Uncommon: less common species of interest but not rare enough to warrant special protective measures Q=Not yet assessed but flagged as being of possible significance N=Common: not of particular importance (Definitions based on regional ratings obtained from Lang, PJ & Kraehenbuehl, DN (2005). Plants of Particular Conservation Significance in South Australia's Agricultural Regions, August 2005 update of unpublished database. Department of Environment and Natural Resources.)

6.2 Bird Species of Ironbank Bushland

		Conservation Rating	
Scientific Name	**Common Name**	**SA**	**ML**
**Carduelis carduelis*	*Goldfinch		
**Columba livia*	Feral Pigeon (Rock Dove)		
**Passer domesticus domesticus*	*House Sparrow		
**Sturnus vulgaris vulgaris*	*(Common or European) Starling		
**Turdus merula merula*	*Blackbird		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill		
Acanthiza lineata	Striated Thornbill		
Acanthiza pusilla	Brown Thornbill		
Acanthiza reguloides reguloides	Buff-rumped Thornbill		
Acanthorhynchus tenuirostris tenuirostris	Eastern Spinebill		
Accipiter fasciatus fasciatus	Brown Goshawk		
Aegintha temporalis temporalis	Red-browed Finch		
Anthochaera carunculata carunculata	Red Wattlebird		
Aquila audax audax	Wedge-tailed Eagle		
Ardea novaehollandiae novaehollandiae	White-faced Heron		
Artamus cyanopterus	Dusky Woodswallow		
Cacatua roseicapilla	Galah		

Cacomantis flabelliformis flabelliformis	Fan-tailed Cuckoo		
Calyptorhynchus funereus	Yellow-tailed Black Cockatoo	V	V
Colluricincla harmonica	Grey Shrike-thrush		
Coracina novaehollandiae novaehollandiae	Black-faced Cuckoo-shrike		
Cormobates leucophaeus leucophaeus	White-throated Treecreeper	U	U
Corvus mellori	Little Raven		
Cuculus pallidus	Pallid Cuckoo		
Dacelo novaeguineae novaeguineae	Laughing Kookaburra		
Daphoenositta chrysoptera	(Varied) Sittella		
Dicaeum hirundinaceum hirundinaceum	Mistletoe Bird		
Falcunculus frontatus frontatus	(Crested) Skrike-tit	V	V
Glassopsitta concinna	Musk Lorikeet		
Glossopsitta porphyrocephala	Purple-crowned Lorikeet		
Grallina cyanoleuca	Magpie-lark		
Gymnorhina tibicen	Australian magpie		
Gymnorhina tibicen leuconota	White-backed Magpie		
Gymnorhina tibicen tibicen	Black-backed Magpie		
Halcyon sancta sancta	Sacred Kingfisher		

Hirundo neoxena	Welcome Swallow		
Hirundo nigricans nigricans	Tree Martin		
Malurus cyaneus	Superb Blue Wren		
Meliphaga chrysops	Yellow-faced Honeyeater		
Meliphaga melanops melanops	Yellow-tufted Honeyeater		
Meliphaga penicillata	White-plumed Honeyeater		
Melithreptus brevirostris	Brown-headed Honeyeater		
Melithreptus lunatus lunatus	White-naped Honeyeater		
Pachycephala pectoralis	Golden Whistler		
Pachycephala rufiventris rufiventris	Rufous Whistler		
Pardalotus punctatus	Spotted Pardalote		U
Pardalotus striatus	Striated Pardalote		
Petroica multicolor	Scarlet Robin		
Phaps chalcoptera	Common Bronzewing		
Phylidonyris novaehollandiae novaehollandiae	New Holland Honeyeater		
Phylidonyris pyrrhoptera	Crescent Honeyeater	U	
Platycercus elegans	Crimson Rosella		
Platycercus elegans 'adelaide'	Adelaide Rosella		

Platycercus eximius	Eastern Rosella		
Psephotus haematonotus	Red-rumped Parrot		
Rhipidura fuliginosa alisteri	Grey Fantail		
Rhipidura leocophrys leocophrys	Willie Wagtail		
Sericornis frontalis frontalis	White-browed Scrubwren	U	
Strepera versicolor	Grey Currawong	U	U
Trichoglossus haematodus	Rainbow Lorikeet		
Zosterops lateralis	Silvereye		

Indigenous species:	55
*Alien Species:	5
Total number of species	60

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6.3 Fauna Species of Ironbank Bushland

6.3.1 Mammal Species

		Conservation Rating		
Scientific Name	**Common Name**	**AUS**	**SA**	**ML**
**Canis familiaris*	Domestic Dog			
**Felis cattus*	Domestic Cat			
**Mus musculus*	House Mouse			
**Phasacolarctos cinereus*	Koalas			
**Rattus rattus*	Black Rat			
**Vulpes vulpes*	Fox			
Antechinus flavipes	Yellow-footed Antechinus			
Eptisicus pumilus	Eastern Forest Bat			
Isoodon obesulus obesulus	Southern Brown Bandicoot	E	V	
Macropus fuliginosus	Grey Kangaroo			
Pseudocheirus peregrinus	Ringtail Possums			
Rattus fuscipes	Bush Rat			
Tachyglossus aculeatus	Short-beaked Echidna			
Tadarida australis	White-striped Free-tail Bat			
Trichosurus vulpecula	Common Brushtail			

Indigenous species:	9
*Alien species:	6
Total number of species:	15

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6.3.2 Reptile Species

		Conservation Rating		
Scientific Name	**Common Name**	**AUS**	**SA**	**ML**
Christinus marmoratus	Southern Marbled Gecko			
Hemiergis decresiensis	Three-toed Yellow-bellied Skink			
Lerista bougainvillii	Bouganville's Skink			
Lampropholis guichenoti	Garden Skink			
Pogona barbata	Bearded Dragon			
Austrelaps labialis	Adelaide Hills (Pygmy) Copperhead			V
Pseudonaja textilis	*Eastern Brown Snake*			
Egernia whitei	White's Skink			
Tiliqua rugosa	Sleepy Lizard			
Tiliqua scincoides	Eastern Blue-tongued Lizard			
Pseudophryne bibronii	Bibron's Toadlet		R	
Aprasia striolata	Striped Worm-lizard			

Indigenous species:	12
*Alien species:	0
Total number of species:	12

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DATA SOURCES:

Data contributing to these lists where drawn from the following databases that contribute to the Environmental Databases of South Australia: Biological Survey, Opportune, Plant Population and Reserves. These are jointly managed by the Department of Environment and Natural Resources and the Department for Transport, Energy and Infrastructure for the South Australian Government.

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The individual people serving under these positions may change from time to time. Please check with the NRM Board, local council or the Nature Foundation SA, if these contact details are not current.