



MOUNT CRAWFORD FOREST RESERVE
TOWER HILL NATIVE FOREST RESERVE
MANAGEMENT PLAN

September 2016



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INTRODUCTION

Tower Hill Native Forest Reserve (NFR) consists of 130 hectares of relatively undisturbed native vegetation forming part of the Mount Crawford Forest Reserve in the Southern Mount Lofty Ranges. The Tower Hill NFR contributes to a regional area of native vegetation that extends south from Hale Conservation Park to incorporate the Warren Reservoir Reserve, Warren Conservation Park, a large area of privately owned native vegetation and Watts Gully NFR at the southern extremity. This total area of approximately 1 300 hectares forms a large remnant of reserved native forest in the Mount Lofty Ranges.

The Mount Lofty Ranges Forest Reserves Management Plan (ForestrySA 2014) is the overarching plan for management of forest reserves in the Mount Lofty Ranges and describes the management context and planning framework in greater detail. The Tower Hill Native Forest Reserves Management Plan provides a statement of purpose for the area based upon an assessment of its natural features, management philosophies and community use. It is intended to replace these plans in the future with conservation management plans which will cover the management of all conservation areas within a forest reserve.

The Management Program identifies priority tasks for the reserve. The natural resources data (Appendices 1-2) provides the latest available information on flora and fauna.

Purpose of Reserve

Tower Hill NFR will be managed and protected to conserve their biodiversity by sustaining its indigenous plant and animal communities as an enduring and dynamic ecosystem.

ForestrySA currently manages approximately 4 000 hectares of native forest reserve in the Mount Lofty Ranges gazetted under the *Forestry Act 1950*.

Location

Tower Hill NFR is located at the end of Tower Road, approximately 2km south-west of Warren Road approximately 6km south east of Williamstown in the District Council of Barossa (Figures 1). The reserve is shown in the Emergency Services Map book Mount Lofty Ranges, (Edition 3, 2014), Grid Reference 095 555 – Map 178B. Map of Tower Hill is displayed in Figure 2 and Figure 3.

The reserve comprises Part Section 6622, and Allotment 204 in the Hundred of Para Wirra. The reserve is contiguous with native vegetation on three boundaries, on the north with areas zoned for conservation and managed by ForestrySA, on the west with Warren Conservation Park and on the south with a privately owned Heritage Agreement. The eastern boundary is predominantly open grassland with scattered remnant native vegetation.

Administration and Access

The area is under the management control of the Mount Crawford Forest Information Centre, located 745 Warren Road (Williamstown to Gumeracha) 7km south-east of Williamstown. Pedestrian access is permitted during daylight hours except on days when a Total Fire Ban is imposed or where erected signs or notices restrict access to specified areas.

There is no vehicular access to Tower Hill NFR. Vehicles access is allowed only up to Tower Picnic area (Figure 2). Vehicle access by the public is restricted by provision of Regulations under the *Forestry Act 1950*.

Access through NFRs by ForestrySA vehicles and vehicles of contractors employed by ForestrySA on existing tracks and firebreaks, will be permitted for management purposes, including fire prevention and suppression, and pest plant and animal control. The fire/communications tower located east of the NFR is accessed regularly by a variety of organisations for maintenance.

Management Objectives

ForestrySA manages some of the few remnant areas of native forest, woodland and wetland predominantly in the higher rainfall areas of South Australia, together with their associated fauna. These areas contribute significantly to the natural assets of the State and have been managed as Forest Reserves under the *Forestry Act* 1950 by the former Woods and Forests Department (now ForestrySA) which was established in 1882.

The primary management objective for areas of native forest under its control is to conserve and enhance native flora and fauna, and preserve biodiversity for the long-term benefit of the South Australian community.

In managing native forests, ForestrySA:

- recognises that the size and relative isolation of many native forest reserves increases the risk of species loss due to fire, drought or disease, where isolation is a barrier to re-colonisation;
- recognises that native forest reserves contribute to the conservation of valuable remnant habitats for many species and provide, in part, a representation of land cover before clearance and other changes following European settlement;
- recognises ecosystems will continue to change with time;
- will make decisions for the management of ecosystems, communities and processes, based on the information available;
- will use the least disturbed sites as scientific benchmark areas to monitor changes due to natural succession, and as reference sites for restoration of adjacent disturbed areas;
- will vary management programs, as required, to maximise biological diversity; and
- may involve regional co-ordination with neighbouring landowners (private individuals, Local Government and other Government agencies) to maximise the conservation value of an area.

Prior to the early 1950s, most areas were disturbed by activities such as timber cutting, grazing, fire and invasion by introduced plants and animals. Since then, most of these areas have remained relatively undisturbed. Compared with other remnant areas of native vegetation in South Australia, those managed by ForestrySA are often the least disturbed due to their long history of consistent land tenure. Areas of native vegetation may require specific management prescriptions to achieve management objectives, depending upon their disturbance histories.

VALUES AND CURRENT USES

Conservation

- The Tower Hill Native Forest Reserve is an IUCN (International Union for the Conservation of Nature & Natural Resources 2005) Category IV Reserve. Category IV Reserves are habitat or species management areas, protected areas managed mainly for conservation through management intervention to ensure the maintenance of habitats and/or to meet the requirements of species.
- The reserve conserves remnant native vegetation characteristic of the region where it is estimated less than 15% of the original vegetation remains (Long 1999).
- The reserve contributes to the area of native vegetation that extends south from Hale Conservation Park to Watts Gully NFR.

- The reserve is contiguous with approximately 65 hectares of privately owned Heritage Agreement on its southern boundary that links the reserve to other areas of native forest managed by ForestrySA for conservation.
- The reserve is contiguous with Warren Conservation Park and substantially increases the overall size of remnant vegetation in this area.
- The reserve contains remnants of tall eucalypt forest, *Eucalyptus obliqua* (Messmate stringybark) and *E. viminalis ssp. cygnetensis* (Rough-bark manna gum).
- Conservation zones, adjacent to the Native Forest Reserve, contain populations of the Nationally Endangered orchid, *Caladenia behrii* (Pink-lipped spider-orchid).

Cultural Heritage

- According to Tindale (1974), the area containing the reserve was occupied by the Peramangk Aboriginal people, and most likely the Kurna Aboriginal people, as the approximate boundary of both these groups is close to the reserves. Many archaeological deposits have cultural significance for Aboriginal people today and many may have scientific significance. Certain sites have landforms that are more likely to contain evidence of Aboriginal historic occupation than others, such as claypans; rocky outcrops; dunes; and bush or forested areas. A site may also be important for historic events that occurred there. Such places may contain no archeological evidence, but can have great significance to Aboriginal people.

The South Australian Government is responsible for the protection and preservation of sites, objects and remains of sacred, ceremonial, mythological or historical significance to Aboriginal people. Known sites of significance to Aboriginal archaeology, anthropology, history and tradition are listed on the Register of Aboriginal Sites and Objects (*Aboriginal Heritage Act 1988*). There are no known registered sites within these reserves.

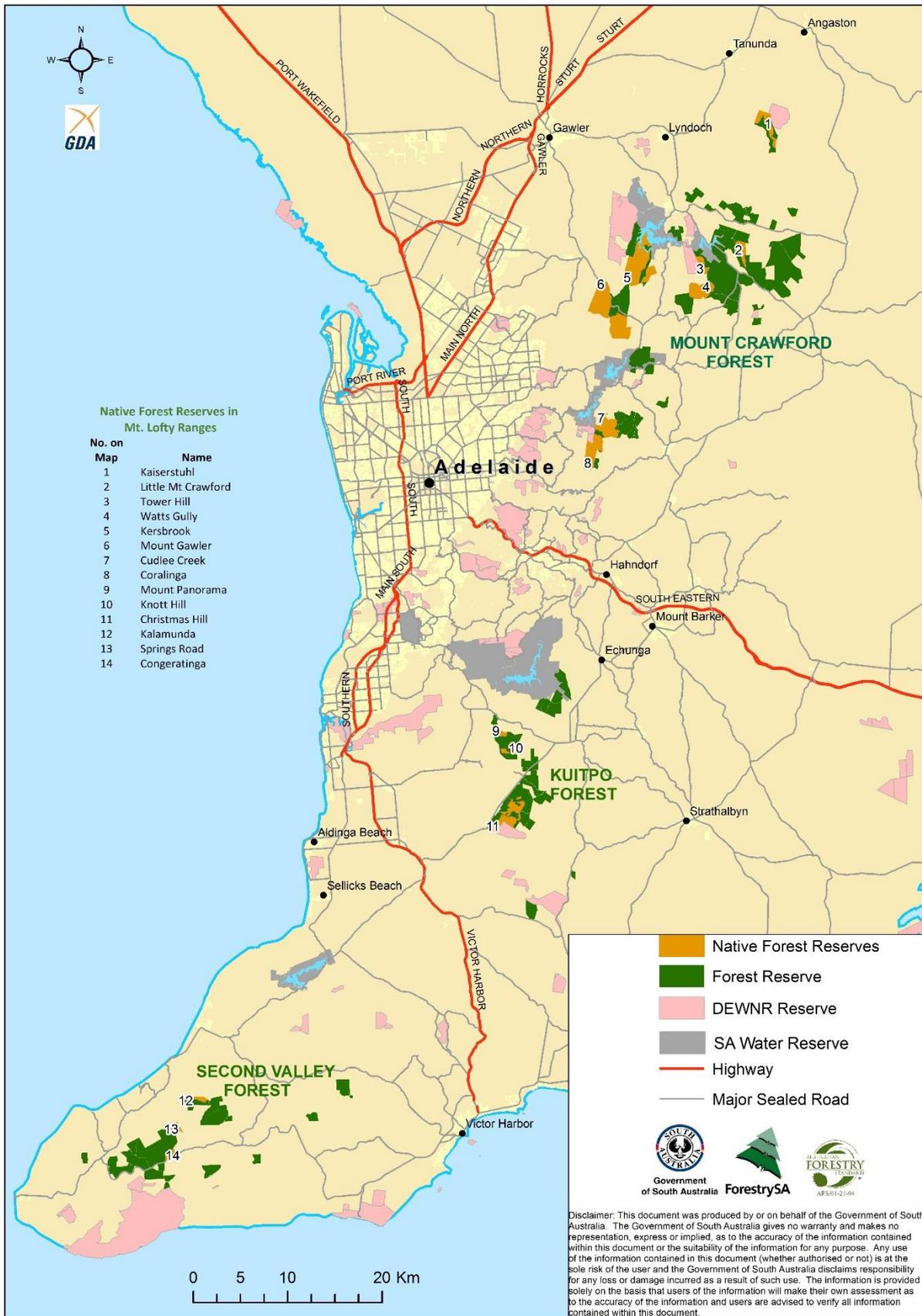
Recreation

- The Heysen Trail is a long-distance walking trail, which traverses the Mount Lofty Ranges, extending from Cape Jervis in the south to the Flinders Ranges in the north. The trail extends from Warren Conservation Park, through Tower Hill NFR and continues in a south-easterly direction through commercial pine plantations. A segment of the Mount Lofty Walking Trails, which extend from Lyndoch to Gumeracha, passes through the southern section of the reserve and connects with the Heysen Trail. (Figure 2).

Fossicking

- The reserve is currently part of the Mount Crawford fossicking Area. Most of the fossicking activity occurs outside the eastern boundary of the NFR, in areas east of the fire tower, and in predominantly cleared areas. Fossickers are required to obtain a permit from the Mount Crawford Forest Information Centre. Fossickers must comply with the conditions set out in the permit. ForestrySA is reliant upon their co-operation in order to protect the forest environment, and to safeguard the recreational nature of fossicking.

Figure 1-Location of Native Forest Reserves in Mt. Lofty Ranges



PLANNING AND MANAGEMENT FRAMEWORK

Land use within forest reserves is defined through a forest zoning agreement with the Department for Environment - Native Vegetation Council which identifies three main management zones-

- General Forestry zone – commercial plantation areas exempt from requirements of the *Native Vegetation Act 1991*
- Conservation zone – includes gazetted native forest reserves and other areas of remnant native vegetation managed for conservation
- Transition zone – areas of former plantation managed to increase conservation value through removal of pine and other weeds with the ultimate goal to transfer to conservation zone.

Tower Hill NFR is one of fourteen NFRs in the Mount Lofty Ranges. Significant biodiversity assets are also contained within other areas of native vegetation outside of native forest reserves managed as conservation zone. Annual operational plans are prepared for all forest reserves targeting pest plants and animals.

Planning for community use covers both commercial plantation forest and native forest areas. Community use of forest reserves is not restricted to specific areas, but determined according to compatibility and level of impact.

The management objectives for the NFRs complement existing state and regional plans, including:

- Our Place. Our Future, State Natural Resources Management Plan, South Australia 2012-2017.
- Adelaide and Mount Lofty Ranges Natural Resources Management Plan 2014-15 to 2023-24
- Informing Biodiversity Conservation for the Adelaide and Mount Lofty Ranges Region South Australia.
- Regional Recovery Plan for Threatened Species and Ecological Communities of Adelaide and the Mount Lofty Ranges, South Australia.

ForestrySA maintains certification to the AFS (AS 4708) via the Forest Management System (FMS), which provides a framework of sustainable forest management practices and processes.

A large part of ensuring appropriate management of these forests is to understand, identify, assess and manage environmental aspects and impacts. ForestrySA achieves this through a formal process identified within the FMS and records the details of these in its Risk Register. The controls from this process flow into management procedures and actions on the ground.

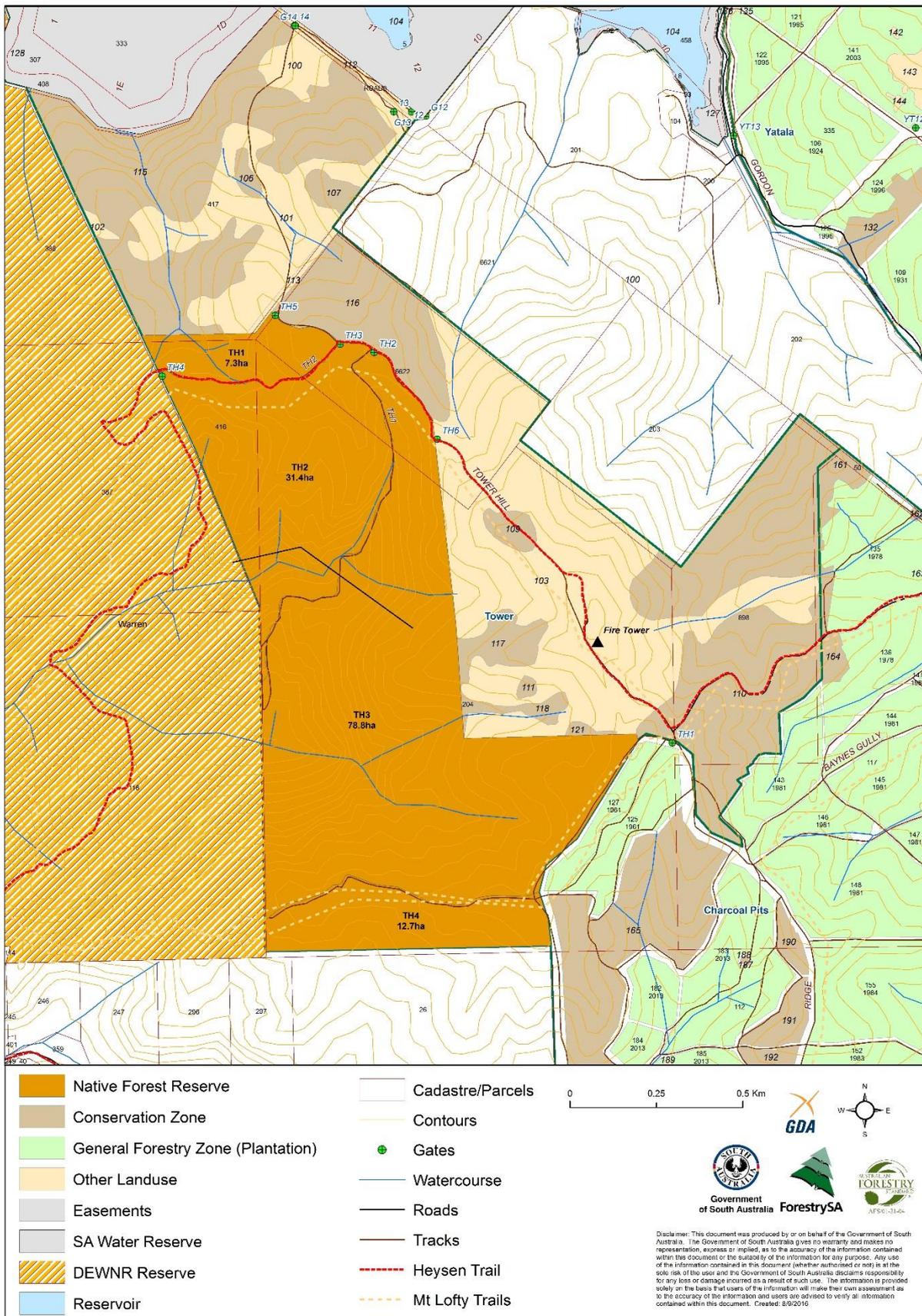
Community Engagement

There is regular engagement with other agencies and community projects to implement integrated work programs and to foster cross agency and community relationships. ForestrySA has a long working relationship with the South Para Biodiversity Project (SPBP) in this management area. This community based natural resource management project started in 2000 and aims to improve integrated land management throughout the region by engaging public and private land managers and natural resource management boards. ForestrySA has been a committee member of SPBP, in its many different guises, since inception.

There is also a long working relationship with Urrbrae TAFE who utilise forest areas for study purposes every year while providing ForestrySA with useful on-ground resources.

ForestrySA also runs a community focussed Friends of the Forest volunteer program which engages community volunteers to undertake various tasks in the forest including feral animal control, weed control, flora and fauna surveys and other monitoring.

Figure 2 – Tower Hill Native Forest Reserve



NATURAL RESOURCES

Climate

The area typically experiences a climate with cool, wet winters and warm, dry summers receiving an average rainfall of over 750 millimetres, in which approximately 80% falls in the seven months from April to October. During the period of record the lowest rainfall was 406 millimetres for 1914, one of the worst drought years on record in southern Australia. The impact of intermittent drought may have significant impact on plant regeneration in these elevated areas with shallow soils.

Typical of the Mount Lofty Ranges, the average maximum temperatures exist from November to March and are between 20°C and 28°C, but with periods of over 35°C in hotter years. Winter temperatures are recognised as some of the coldest in the Mount Lofty Ranges, with frequent days of less than 8°C.

Detailed climatological information has been collected at the Mount Crawford Forest office since 1954. This information is available on the Bureau of Meteorology website (www.bom.gov.au).

Geomorphology and Soils

The soils in Warren and Hale Conservation Park and Tower Hill NFR are generally similar due to their proximity.

The oldest rock type in the area is the Warren Inlier. The predominant rock type within the Barossa Complex is a coarse-grained schistose - quartz-feldspar-mica-gneiss. It appears to have had a similar metamorphic history to the later Adelaidean schists and gneisses.

The surface of the unconformity separating the basement Barossa Complex from later rocks is visible in the southern part of Warren Conservation Park in the steep gorges commencing in Tower Hill NFR. There is a large angular discordance between the banding in the basement gneisses and the near vertical bedding of the overlying metasandstone. The metasandstone basal units are strongly schistose and rich in muscovite, which weather relatively rapidly and become friable, resulting in a negative relief against the more massive basement gneisses. The metasandstone supports relatively sparse vegetation and usually forms large leucocratic outcrops.

Skeletal soils occur on ridgetops and steeper slopes where they show minimal development, only the surface layer is humic acid stained and a surface litter layer is sometimes present. The soils in the gullies are usually deeper due to transportation of weathered material. All of these soils are classified as weakly structured sandy soils or dense loams. Neither of these soil types have very good water holding ability, reflected in the rapid vegetation changes which occur with microclimatic and topographic changes (i.e. slope and aspect differences).

The area east of the NFR around the fire tower is prone to erosion and land slips due to sodic soils. The most recent landslip happened in 2011 following a period of heavy rainfall. Grazing was removed and restricted the areas north of the fire tower and the landslip was revegetated with tubestock.

Hydrology and Topography

The majority of Tower Hill NFR is an extension of the eastward and upper slopes of Warren Conservation Park. The landform is dissected into steep westward flowing shallow streams that ultimately drain into the South Para River, and finally the South Para Reservoir, within the South Para sub-catchment of the Gawler River. Tower Hill is 525m above sea level and is one of the highest peaks in the area.

Vegetation

The vegetation communities in the reserve can be regarded as an extension of those occurring in the Warren Conservation Park, ranging from Open Forest to Low Open Woodland.

Species composition and dominance is affected by the geology and topography of the area. Two steep drainage lines commence on the westward slopes of the reserve and join to extend through the Warren Conservation Park. The major dominant species throughout the reserve are *Eucalyptus obliqua* (Messmate stringybark) and *E. goniocalyx* (Long-leaf box).

The following broad vegetation associations have been identified:

***Eucalyptus goniocalyx/ E. fasciculosa* Low Woodland**

E. goniocalyx and *E. fasciculosa* predominantly occur throughout the higher slopes and ridges in the reserve (Plate 1). Most are multi-stemmed coppice regeneration, too small to contain nesting hollows. They occur over a diverse shrub and ground flora (Plate 2) containing *Xanthorrhoea semiplana*, *Acacia pycnantha*, *A. paradoxa*, *A. myrtifolia*, *Astroloma conostephiodes*, *Hakea carinata*, *Hibbertia exutiacies*, *Dodonea viscosa* and *Spyridium parvifolium*.



Plate 1 – *Eucalyptus goniocalyx/ E. fasciculosa* Low Woodland. Plate 2 – Diverse shrub and ground flora.

***E. obliqua/E. goniocalyx/E fasciculosa* Low Open Forest**

Eucalyptus obliqua, *E. goniocalyx* and *E. fasciculosa* occur primarily on the lower slopes and gullies. They occur over an understorey of predominantly *Xanthorrhoea semiplana*, *Acacia paradoxa* and *A. pycnantha*.

***E. leucoxyton/E. viminalis ssp. cygnetensis/ E. obliqua* Tall Open Forest**

The drainage lines are often permanently moist and support remnants of tall open *E. leucoxyton*, *E. viminalis ssp. cygnetensis* and *E. obliqua* forest (Plate 3), over an understorey of *Xanthorrhoea semiplana*, *Acacia paradoxa*, *A. pycnantha*, *Dodonea viscosa* and *Hibbertia exutiacies*. *Pteridium esculentum* and introduced grasses can be found on the higher slopes. Many of these trees are mature and contain nesting hollows for fauna, unlike the overstorey on the more accessible slopes, which is multi-stemmed coppice regeneration as a result of past timber cutting.

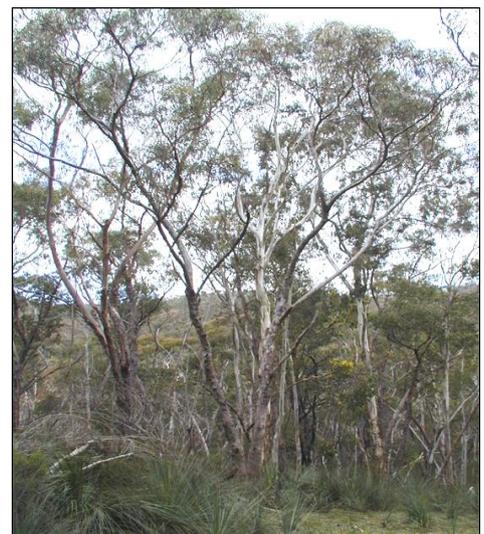


Plate 3- Tall open forest

In 1986 two permanent vegetation monitoring sites were established as part of the Mount Lofty Ranges Survey by DEWNR. All plant species recorded for the reserve are included in Appendix 1.

The Nationally Endangered orchid, *Caladenia behrii* (Pink-lipped spider orchid), is present in the northern section of the reserve just outside the boundary of the gazetted native forest reserve.

Introduced Plants

The reserve is relatively free from invasive weed species with potential to threaten the biodiversity of the area. However, there is a small infestation of Gorse (*Ulex europaeus*) along the lower, eastern boundary of the reserve and scattered occurrences of Blackberry (*Rubus* spp.) along creek lines. Gorse and Blackberry have the potential to form dense thickets that exclude all indigenous vegetation, and provide cover to pest animals such as Rabbits and Foxes. Wild pine (*Pinus radiata*) has invaded as single, isolated trees in the reserve which need occasional control. Weed presence is monitored and control is undertaken on a needs basis as part of annual weed management programs.

Fauna

Four fauna surveys have been carried out in the reserve between 1985 and 2001 which has contributed to the information for the fauna species list in Appendix 2.

Birds

There is a diverse bird presence in the reserve. The full list is included in Appendix 2. The Crested Shrike-tit (*Falcunculus frontatus frontatus*) which is rated Vulnerable for the region has been recorded here. There are numerous other declining bird species recorded, including the Scarlet Robin (*Petroica boodang boodang*) and the White-naped Honeyeater (*Melithreptus lunatus*).

Mammals

Mammal species in Tower Hill NFR include the Brushtail Possum (*Trichosurus vulpecula*), Western-grey Kangaroo (*Macropus fuliginosus*), Short-beaked Echidna (*Tachyglossus aculeatus*) and the Koala (*Phascolarctos cinereus*).

The Nationally Endangered, Southern-brown bandicoot (*Isodon obesulus obesulus*) has not been recorded in the Mount Crawford area since the 1960s. The presence of this species could not be confirmed from previous field surveys in the Mount Lofty Ranges between 1986 and 1990. The nearest known colonies are approximately 25km south of Mount Crawford area, and they may be biogeographically isolated by the River Torrens. However, an unconfirmed report in 1993 suggests bandicoots may be present in the Warren Reservoir Reserve, approximately 1km north of the dam wall. More recently a fox scat thought to contain bandicoot hairs was found in Warren Conservation Park adjacent to Tower Hill NFR, however further searches and infra-red sensor cameras have failed to conclusively confirm bandicoot presence. The habitat within the reserve with dense understorey vegetation certainly would provide good bandicoot habitat.

Reptiles and Amphibians

The DEWNR survey in 2000 detected seven species of reptiles and amphibians (Appendix 2) but most species expected to occur in the Mount Lofty Ranges should be present in the reserve due to the diversity of terrestrial and adjacent aquatic niches.

Introduced Animals

Fallow deer (*Cervus dama*), the European rabbit (*Oryctolagus cuniculus*), Red Fox (*Vulpes vulpes*) and Brown Hare (*Lepus capensis*) have been observed the reserve. In 2001 the South Australian Mammal Club surveys recorded both the Black Rat (*Rattus rattus*) and House Mouse (*Mus musculus*). Goats (*Capra hircus*) were present in the reserve but due to control efforts since 2001 involving all land managers in the area and coordinated by the Adelaide and Mt. Lofty Ranges

Natural Resources Management Board and the South Para Biodiversity Project goats seem to have been controlled in this area.

Abundant Native Animals

Western grey Kangaroos (*Macropus fuliginosus*) live mostly in native vegetation, but often feed on adjacent pastures. In large numbers they may damage fences when moving to and from feeding or drinking sites and prevent regeneration of native vegetation.

Control for abundant native species occurs only when there are regional control programs in place involving private landholders and other public land managers. Private landholders can obtain destruction permits under the *National Parks & Wildlife Act* from DEWNR, which allows the shooting of a prescribed number of animals.

Introduced Disease

Many root pathogens are known to cause root-rot disease in Australian flora species, but the introduced *Phytophthora cinnamomi* (Pc) has had the greatest effect and poses the greatest threat. Dieback caused by *Phytophthora cinnamomi* is listed as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth of Australia 2014)

Pc grows in a thread-like fashion through the roots and trunks of infected plants. The only outward sign of its presence is sickness, or death, of the infected plant. Infestation is permanent – spores are long-lived and can remain dormant in cool, dry soils, until conditions are right for fungal growth. It is dispersed by water and other vectors, such as native animals, vehicles and bushwalkers. Yaccas and Banksias are particularly sensitive and have been regarded as indicator species.

The whole of the Mount Lofty Ranges is deemed to be a High Risk Area, where Pc is known to be present, or is likely to become established (Phytophthora Technical Group 2003). Within the region there are Risk Management Zones that have been designated by DEWNR. Tower Hill NFR falls within a Low Risk Management Zone, The adoption of management strategies appropriate to the zone, and any activities in that zone, can minimise the spread of Pc. These strategies, as outlined in the *Phytophthora Management Guidelines* (Government of South Australia 2006), must be incorporated into the planning of high-risk activities.

LAND USE

History

The natural history of the Tower Hill area has been broadly described in the "*Natural History of the Adelaide Region*", published by the Royal Society of SA in 1976.

Acquisition and Name

The land tenure prior to dedication as a Forest Reserve in 1919 and 1925 is outlined in Appendix 3. The name Tower Hill is in recognition of the fire observation tower adjacent the reserve. The fire tower was erected in the 1940s.

ForestrySA have established a permanent observation tower and automatic weather station at the highest point adjacent the reserve. The structure was upgraded in 1994 and is now one of only two permanent fire-spotting towers in the Mount Lofty Ranges. The tower enables reporting of fires to ForestrySA and the Country Fire Service. The tower is accessible by an unsealed road, but vehicle access to the tower and into the reserve is restricted to authorised personnel.

Timber Cutting

According to local narrative, part of the reserve was cleared around the 1930s but timber was left lying on the ground. The more accessible slopes were also cut over which is evident from both

stumps and the multi-stem coppice regeneration. The lack of regeneration in the open areas may also be a function of shallow, poor soils and a history of grazing.

Fire

Two wildfires burnt from the west in 1955 and 1957. The northern part of the reserve was burnt on 31 January 1955 in a relatively mild and patchy fire. On 31 March 1957, fire burnt all of the area contiguous with the Warren Conservation Park. Prescribed burning was undertaken in small areas between 1965 and 1970, but the exact locations are not known. In 2008 a bushfire burnt out 30 hectares north east of the reserve and in 2010 a DEWNR prescribed burn in the adjacent Warren Conservation Park escaped and burnt out a section in the centre of the NFR. ForestrySA has supplied fire history information to DEWNR and it is available online at 'NatureMaps'. Due to the regional impacts from the Sampson Flat bushfire in January 2014 there are no immediate plans to implement prescribed burning in Tower Hill NFR.

Tower Hill NFR is within the planning area covered in the *South Para Collaborative Fire Management Plan* (DEWNR 2015), a plan developed through a partnership between State Government land management agencies (ForestrySA, DEWNR & SA Water) and the South Australian Country Fire Service (CFS) to promote collaborative bushfire risk mitigation.

ForestrySA is also a member of the Mt Lofty Ranges Fire Cooperative, which includes DEWNR, SA Water, and the CFS. This cooperative seeks to integrate prescribed burning programs and to coordinate bushfire responses in the region.

MANAGEMENT PROGRAM

The Management actions proposed will be carried out in accordance with guidelines contained in the relevant procedural policies. In determining priority for management of the reserve's natural or physical resources, it is considered that:

- 1 = High priority; threat has a high capacity to degrade the resource;
- 2 = Medium priority;
- 3 = Low priority; threat has a low capacity to degrade the resource.

OBJECTIVE: Conservation Management		Priority for Action
Goals	Performance Indicator(s)	
Manage the reserve for the conservation of biodiversity.	No loss of species identified within the survey results.	1
Continue occasional biological monitoring to assist in long term management decisions	Maintain monitoring programs .	1
New survey information is provided to DEWNR for inclusion in Biological Database of SA	Survey data is supplied to DEWNR and is available to ForestrySA and other agencies/groups/individuals for retrieval	1

OBJECTIVE: Community Use		Priority for Action
Goals	Performance Indicator(s)	
Provide visitors with appropriate information regarding the reserve values.	Educational material available at reserve and/or Mount Crawford Forest Information Centre. Signs erected at appropriate locations.	2
Maintain walking trails and signage to acceptable specified standards.	Condition of walking trails and signage in the reserve - trails should be free from erosion, clear and accessible. Signs maintained in good condition. Trails relocated if required.	3

OBJECTIVE: Protection		Priority for Action
Goals	Performance Indicator(s)	
Implement management actions to reduce the spread of <i>Phytophthora</i> , other plant pathogens and weed seeds within the reserve.	Area affected by <i>Phytophthora</i> does not increase. No new pathogens or weed species introduced.	1
Minimise the impact of wildfire using a range of fire protection measures.	Annual wildfire prevention programs are completed. Fire-breaks are maintained. Public access and use is regulated in periods of high fire danger.	1
Identify activities with the potential for deleterious impacts and facilitate monitoring programs, including activities resulting from forest operations in adjacent forest reserves.	Impacts of permitted activities are monitored and reported by recreation users or ForestrySA.	1

OBJECTIVE: Protection		Priority for Action
Goals	Performance Indicator(s)	
Minimise the impact of introduced plants and/or animals on the conservation values of the reserve.	A reduction in the distribution and number of introduced plant and animal species in the reserve. Annual weed control program in place.	2
	Continue implementation of wild pine control programs within the reserve	1
Continue to maintain boundary fences.	Boundary fence line is in a serviceable condition.	3

OBJECTIVE: Rehabilitation		Priority for Action
Goals	Performance Indicator(s)	
Rehabilitate and/or revegetate degraded areas within the reserve.	Number of hectares rehabilitated relative to the previous year	2
Rehabilitate and/or revegetate tracks and/or firebreaks no longer required for vehicle access.	Number of tracks and/or firebreaks relative to previous year.	3
Remove infrastructure, e.g. fence, wire, posts no longer in use	Redundant infrastructure removed from reserve	3

OBJECTIVE: Stakeholder Involvement		Priority for Action
Goals	Performance Indicator(s)	
Maintain links with other natural resource and environmental agencies, and community groups – their programs, activities and/or projects.	Established and/or maintained links with other agencies and groups.	2
Maintain communication with adjacent landholders and pursue opportunities for co-operative management.	Number of complaints received regarding management.	As required
Encourage involvement by volunteers and community groups in the control of pest plants and animals, and rehabilitation and monitoring of sites within the reserve.	Participation of volunteers and community groups.	1

APPENDIX 1 FLORA SPECIES LIST

(Includes records from conservation zone adjacent to Tower Hill NFR)

* Weed

	SPECIES	COMMON NAME	AUS	SA	AMLR	FAMILY
	<i>Acacia myrtifolia</i>	Myrtle wattle				Leguminosae
	<i>Acacia paradoxa</i>	Kangaroo thorn				Leguminosae
	<i>Acacia pycnantha</i>	Golden wattle				Leguminosae
	<i>Acaena echinata</i>	Sheep's burr				Rosaceae
	<i>Acrotriche depressa</i>	Native currant			RA	Epacridaceae
	<i>Acrotriche serrulata</i>	Cushion ground-berry				Epacridaceae
	<i>Amyema miquelii</i>	Box mistletoe				Loranthaceae
	<i>Arthropodium strictum</i>	Common vanilla-lily				Liliaceae
	<i>Astroloma conostephioides</i>	Flame heath				Epacridaceae
	<i>Astroloma humifusum</i>	Cranberry heath				Epacridaceae
*	<i>Briza maxima</i>	Large quaking-grass				Gramineae
	<i>Brunonia australis</i>	Blue pincushion				Goodeniaceae
	<i>Burchardia umbellata</i>	Milkmaids				Liliaceae
	<i>Caladenia behrii</i>	Pink-lip spider-orchid	EN	E	EN	Orchidaceae
	<i>Caladenia tentaculata</i>	King spider-orchid				Orchidaceae
	<i>Calochilus robertsonii</i>	Purplish beard-orchid				Orchidaceae
	<i>Calytrix tetragona</i>	Common fringe-myrtle				Myrtaceae
	<i>Cassytha glabella f. dispar</i>	Slender dodder-laurel				Lauraceae
	<i>Cassytha pubescens</i>	Downy dodder-laurel				Lauraceae
	<i>Centrolepis aristata</i>	Pointed centrolepis				Centrolepidaceae
	<i>Centrolepis strigosa ssp. strigosa</i>	Hairy centrolepis				Centrolepidaceae
	<i>Chamaescilla corymbosa var. corymbosa</i>	Blue squill				Liliaceae
	<i>Cheilanthes austrotenuifolia</i>	Annual rock-fern				Adiantaceae
	<i>Cheiranthra alternifolia</i>	Hand flower				Pittosporaceae
	<i>Chrysocephalum baxteri</i>	Fringed everlasting				Compositae
	<i>Comesperma calymega</i>	Blue-spike milkwort				Polygonaceae
	<i>Coronidium scorpioides</i>	Button everlasting				Compositae
	<i>Crassula closiana</i>	Staked crassula				Crassulaceae
	<i>Crassula decumbens var. decumbens</i>	Spreading crassula				Crassulaceae
	<i>Dampiera dysantha</i>	Shrubby dampiera				Goodeniaceae
	<i>Daucus glochidiatus</i>	Native carrot				Umbelliferae
	<i>Daviesia leptophylla</i>	Narrow-leaf bitter-pea				Leguminosae
	<i>Dianella revoluta var. revoluta</i>	Black-anther flax lily				Liliaceae
	<i>Digitaria sp.</i>	Summer grass				Gramineae
	<i>Dillwynia hispida</i>	Red parrot-pea				Leguminosae
	<i>Diuris sp.</i>	Donkey orchid				Orchidaceae
	<i>Drosera auriculata</i>	Tall sundew				Droseraceae
	<i>Drosera macrantha ssp. planchonii</i>	Climbing sundew				Droseraceae
	<i>Drosera peltata</i>	Pale sundew				Droseraceae
	<i>Drosera whittakeri ssp. whittakeri</i>	Scented sundew				Droseraceae
	<i>Eriochilus cucullatus</i>	Parson's bands				Orchidaceae
	<i>Eucalyptus fasciculosa</i>	Pink gum		R	NT	Myrtaceae
	<i>Eucalyptus goniocalyx ssp. goniocalyx</i>	Long-leaf box				Myrtaceae

	SPECIES	COMMON NAME	AUS	SA	AMLR	FAMILY
	<i>Eucalyptus obliqua</i>	Messmate stringybark				Myrtaceae
	<i>Euchiton involucratus</i>	Star cudweed				Compositae
	<i>Galium gaudichaudii</i> ssp. <i>gaudichaudii</i>	Rough bedstraw				Rubiaceae
	<i>Glischrocaryon behrii</i>	Golden pennants				Haloragaceae
	<i>Glossodia major</i>	Purple cockatoo				Orchidaceae
	<i>Gompholobium ecostatum</i>	Dwarf wedge-pea				Leguminosae
	<i>Gonocarpus tetragynus</i>	Small-leaf raspwort				Haloragaceae
	<i>Goodenia blackiana</i>	Native primrose				Goodeniaceae
	<i>Grevillea lavandulacea</i> var. <i>lavandulacea</i>	Spider flower				Proteaceae
	<i>Hakea carinata</i>	Erect hakea				Proteaceae
	<i>Hakea rostrata</i>	Beaked hakea				Proteaceae
	<i>Hibbertia exutiacies</i>	Prickly guinea-flower				Dilleniaceae
	<i>Hibbertia sericea</i>	Silky Guinea-flower			NT	Dilleniaceae
	<i>Hyalosperma demissum</i>	Dwarf sunray				Compositae
	<i>Hydrocotyle callicarpa</i>	Tiny pennywort				Umbelliferae
	<i>Hydrocotyle hirta</i>	Hairy pennywort			NT	Umbelliferae
	<i>Hypericum gramineum</i>	Small St John's wort				Guttiferae
*	<i>Hypericum perforatum</i>	St. Johns wort				Guttiferae
	<i>Isopogon ceratophyllus</i>	Horny cone-bush				Proteaceae
	<i>Ixodia achilloides</i> ssp. <i>achillaeoides</i>	Coast ixodia				Compositae
	<i>Laxmannia orientalis</i>	Dwarf wire-lily				Liliaceae
	<i>Lepidosperma carphoides</i>	Black rapier-sedge				Cyperaceae
	<i>Lepidosperma semiteres</i>	Wire rapier-sedge				Cyperaceae
	<i>Leptospermum myrsinoides</i>	Heath tea-tree				Myrtaceae
	<i>Leucopogon virgatus</i>	Common beard-heath				Epacridaceae
	<i>Levenhookia pusilla</i>	Tiny stylewort				Stylidiaceae
	<i>Logania recurva</i>	Recurved logania			RA	Loganiaceae
	<i>Logania saxatilis</i>	Rock logania		R	RA	Loganiaceae
	<i>Lomandra fibrata</i>	Mount Lofty matt-rush				Liliaceae
	<i>Lomandra micrantha</i> ssp. <i>micrantha</i>	Small-flower mat-rush				Liliaceae
	<i>Microtis arenaria</i>	Notched onion-orchid				Orchidaceae
	<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	Soft millotia				Compositae
	<i>Neurachne alopecuroidea</i>	Fox-tail mulga-grass				Gramineae
	<i>Olearia grandiflora</i>	Mount Lofty daisy-bush			LC	Compositae
*	<i>Oxalis corniculata</i> ssp. <i>corniculata</i>	Creeping wood-sorrel				Oxalidaceae
	<i>Phyllangium divergens</i>	Wiry mitrewort				Loganiaceae
	<i>Pimelea linifolia</i> ssp. <i>linifolia</i>	Slender riceflower				Thymelaeaceae
	<i>Pimelea octophylla</i>	Woolly riceflower				Thymelaeaceae
	<i>Pimelea phyllicoides</i>	Heath riceflower				Thymelaeaceae
	<i>Platylobium obtusangulum</i>	Holly flat-pea				Leguminosae
	<i>Plumatichilos plumosum</i>	Bearded greenhood				Orchidaceae
	<i>Poa clelandii</i>	Matted tussock-grass				Gramineae
	<i>Pterostylis sanguinea</i>	Blood greenhood				Orchidaceae
	<i>Rytidosperma clelandii</i>	Cleland's wallaby-grass				Gramineae
	<i>Rytidosperma</i> sp.	Wallaby-grass				Gramineae

	SPECIES	COMMON NAME	AUS	SA	AMLR	FAMILY
	<i>Scaevola albida</i>	Pale fanflower				Goodeniaceae
	<i>Schoenus apogon</i>	Common bog-rush				Cyperaceae
	<i>Schoenus breviculmus</i>	Matted bog-rush				Cyperaceae
	<i>Schoenus nanus</i>	Little bog-rush			RA	Cyperaceae
*	<i>Senecio pterophorus</i> var. <i>pterophorus</i>	African daisy				Compositae
	<i>Spyridium parvifolium</i>	Dusty miller				Rhamnaceae
	<i>Spyridium vexilliferum</i> var. <i>vexilliferum</i>	Winged spyridium				Rhamnaceae
	<i>Stackhousia aspericocca</i> ssp. " <i>Cylindrical inflorescence</i> "	Bushy candles				Stackhousiaceae
	<i>Stylidium calcaratum</i>	Spurred trigger-plant				Stylidiaceae
	<i>Tetraloche pilosa</i> ssp. <i>pilosa</i>	Hairy pink-bells				Tremandraceae
	<i>Thelymitra grandiflora</i>	Great sun-orchid		R	RA	Orchidaceae
	<i>Thelymitra pauciflora</i>	Slender sun-orchid				Orchidaceae
	<i>Thysanotus patersonii</i>	Twining fringe-lily				Liliaceae
	<i>Tricoryne elatior</i>	Yellow rush-lily				Liliaceae
*	<i>Ulex europaeus</i>	Gorse				Leguminosae
	<i>Wahlenbergia stricta</i> ssp. <i>stricta</i>	Tall bluebell				Campanulaceae
	<i>Xanthorrhoea semiplana</i> ssp. <i>semiplana</i>	Yacca				Liliaceae
	<i>Xanthosia huegeli</i>	Hairy xanthosia				Umbelliferae

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APPENDIX 2 FAUNA SPECIES LIST**Birds**

*introduced species

	Species	Common Name	AUS	SA	AMLR
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill			NT
	<i>Acanthiza lineata</i>	Striated Thornbill			
	<i>Acanthiza pusilla</i>	Brown Thornbill			
	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill			
	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill			
	<i>Accipiter fasciatus</i>	Brown Goshawk			
	<i>Aegotheles cristatus</i>	Australian Owletnightjar			RA
*	<i>Anthochaera carunculata</i>	Red Wattlebird			
	<i>Aquila audax</i>	Wedge-tailed Eagle			
	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo			
	<i>Cacomantis pallidus</i>	Pallid cuckoo			RA
	<i>Carduelis carduelis</i>	Goldfinch			
	<i>Carduelis chloris</i>	European Greenfinch			
*	<i>Colluricincla harmonica</i>	Grey Shrikethrush			
	<i>Corcorax melanorhamphos whitaea</i>	White-Winged Chough		R	RA
	<i>Cormobates leucophaeus</i>	White-throated Treecreeper			NT
*	<i>Corvus mellori</i>	Little Raven			
	<i>Dacelo novaeguineae</i>	Laughing Kookaburra			
	<i>Daphoenositta chrysoptera</i>	Varied Sitella			VU
	<i>Dicaeum hirundinaceum</i>	Mistletoebird			
	<i>Dromaius novaehollandiae</i>	Emu			VU
	<i>Eolophus roseicapilla</i>	Galah			
	<i>Falco cenchroides</i>	Nakeen Kestrel			
	<i>Falcunculus frontatus frontatus</i>	Crested Shriketit		R	EN
	<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet			
	<i>Gymnorhina tibicen</i>	Australian Magpie			
	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater			
	<i>Malurus cyaneus leggei</i>	Superb Fairy-wren			
	<i>Melithreptus lunatus</i>	White-naped Honeyeater			VU
	<i>Merops ornatus</i>	Rainbow Bee-eater			
	<i>Neochima teporalis</i>	Red-Browed Finch			
	<i>Pachycephala pectoralis fuliginosa</i>	Golden Whistler			
	<i>Pachycephala rufiventris rufiventris</i>	Rufous Whistler			NT
	<i>Paradalotus striatus</i>	Striated Pardalote			
	<i>Petrochelidon nigricans</i>	Tree Martin			NT
	<i>Petroica boodang boodang</i>	Scarlet Robin			VU
	<i>Phaps chalcoptera</i>	Common Bronzewing			
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater			
	<i>Phylidonyris pyrrhoptera pyrrhoptera</i>	Crescent Honeyeater			
	<i>Platycercus elegans x flaveolus</i>	Adelaide Rosella			
	<i>Pomatostomus superciliosus</i>	White-browed Babbler			

	Species	Common Name	AUS	SA	AMLR
	<i>Rhipidura fuliginosa</i>	Grey Fantail			
	<i>Sericornis frontalis</i>	White-browed Scrub-wren			
	<i>Strepera versicolor</i>	Grey Currawong			
	<i>Turdus merula</i>	Common Blackbird			
	<i>Zoothera lunulata</i>	Bassian Thrush		R	EN
	<i>Zosterops lateralis</i>	Silvereeye			

Mammals

	Species	Common Name	AUS	SA	AMLR
*	<i>Capra hircus</i>	Goat			
*	<i>Cervus dama</i>	Fallow deer			
*	<i>Lepus capensis</i>	Brown hare			
	<i>Macropus fuliginosus</i>	Western grey kangaroo			
*	<i>Mus musculus</i>	House mouse			
*	<i>Oryctolagus cuniculus</i>	European rabbit			
	<i>Phascolarctos cinereus</i>	Koala			
*	<i>Rattus rattus</i>	Black rat			
	<i>Tachyglossus aculeatus</i>	Short-beaked echidna			NT
	<i>Trichosurus vulpecula</i>	Brush-tail possum			
*	<i>Vulpes vulpes</i>	Fox			

Reptiles and Amphibians

	Species	Common Name	AUS	SA	AMLR
	<i>Bassiana duperreyi</i>	Eastern three-lined skink			
	<i>Egernia whitii</i>	White's skink			
	<i>Hemiergis decresiensis</i>	Three-toed earless skink			
	<i>Lampropholis guichenoti</i>	Garden skink			
	<i>Lerista bougainvillii</i>	Bougainville's skink			
	<i>Pseudonaja textilis</i>	Eastern brown snake			
	<i>Tiliqua rugosa</i>	Sleepy lizard			

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APPENDIX 3 LAND TENURE HISTORY

TENURE	LESSEE	TERM
Allotment 204 (redesignation of Section 116)		
Miscellaneous Lease 936	John Warren	1/1/1884 – 1890
	Alexander Warren	1890 – 31/12/1897
Miscellaneous Lease 6294	John C. Warren	1/1/1898 – 13/1/1901
	Margaret Warren	14/1/1901 – 31/12/18
Dedicated as Forest Reserve		10/4/1919
Section 416		
Miscellaneous Lease 911	William Scott	1/1/1884 – 31/12/1897
Miscellaneous Lease 6424	John Warren	1/10/1898 – 6/1/1903
	Margaret Warren	7/1/03 – 31/9/1919
Dedicated as Forest Reserve		21/5/1925
Part Section 6622		
Miscellaneous Lease 4147	John Warren	1/1/1888 – 6/1/1903
	Margaret Warren	7/1/03 – 31/12/08
Miscellaneous Lease 7366	Margaret Warren	1/7/09 – 1/8/24
Dedicated as Forest Reserve		2/4/1925

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