

Mount Brown Conservation Park Management Plan

Southern Flinders Ranges

South Australia



Department for Environment
Heritage and Aboriginal Affairs
Government of South Australia



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**This plan of management has been prepared
and adopted in pursuance of section 38 of
the National Parks and Wildlife Act, 1972-81**

*Cover photo:
Summit of Mount Brown viewed from the north.*

Published by the
Department for Environment, Heritage and Aboriginal Affairs
February 1999

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ISBN 0 7308 5856 1

Prepared by the National Parks and Wildlife SA,
Southern Flinders District,
Heritage and Biodiversity division of the
Department for Environment, Heritage and Aboriginal Affairs

Maps produced by
Reserve Planning Section,
Heritage and Biodiversity division of the
Department for Environment, Heritage and Aboriginal Affairs
and
Department for Transport, Urban Planning and the Arts

Public Communications and Marketing Unit,
Department for Environment, Heritage and Aboriginal Affairs
FIS 15845

FOREWORD

Mount Brown Conservation Park, situated approximately 20 km west of Port Augusta and 15 km south of Quorn, contains native vegetation associations that are absent or poorly represented elsewhere in South Australia's reserve system. The park conserves examples of Grey box woodlands, grassy woodlands and grasslands within the 1749 ha conservation area. The area was formerly a forest reserve and was dedicated under the National Parks and Wildlife Act in 1993.

A plan of management was released in draft form for public comment in February 1996. At the close of the public exhibition period several submissions were received and were subsequently considered by the Northern Consultative Committee and the Reserves Advisory Committee, both which made further comments and suggestions. The review process resulted in minor changes to the plan text. Thanks to all contributors who took time to make comments as part of the planning process.

The plan of management for Mount Brown Conservation Park is now formally adopted under the provisions of section 38 of the National Parks and Wildlife Act 1972.



Hon. Dorothy Kotz MP
MINISTER FOR ENVIRONMENT AND HERITAGE

ACKNOWLEDGEMENTS

This draft plan was prepared by Department of Environment, Heritage and Aboriginal Affairs Southern Flinders District staff with editorial input from the Reserve Planning Branch.

Assistance was also given by other groups and agencies:

- The Nature Conservation Society of S A Inc provided the Mt Brown Vegetation Survey report and preliminary fauna survey data.
 - The Information Data and Analysis Branch, Department of Housing and Urban Development, in particular Sandy Carruthers (provision and adaptation of maps);
 - The Department of Mines and Energy; background information on geology.
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1. INTRODUCTION

There is a requirement under Section 38 of the National Parks and Wildlife Act, 1972, to prepare a management plan for each reserve constituted under the Act. Such plans set out proposals to manage and improve reserves and the means by which the Objectives of Management of the Act will be accomplished. These objectives are set out in the context of the issues and management actions of the particular reserve.

This document is the Management Plan for Mount Brown Conservation Park, the draft of which has been through a formal process of public comment culminating in final approval by the Minister for Environment, Heritage and Aboriginal Affairs. The plan will be reviewed after about five years or may be amended in the mean time. The original formal process of public consultation applies in both these cases. Plans of management is legally binding and its provisions must be carried out in, in this case in relation to Mt Brown Conservation Park. No operations may be undertaken unless they are in accordance with the plan.

Mt Brown Conservation park is located 20 km west of Port Augusta. The park is well utilised by bushwalkers. The Waukarie Falls area is also a popular picnic area. The park has a high conservation value and conserves areas of grassland and grassy woodland not well represented elsewhere in South Australia's reserve system.

Park staff encourage public and community input and feedback regarding the management of reserves. Mt Brown Conservation Park is managed by the Southern Flinders District which has its headquarters in Mt Remarkable National Park (Mambray Creek section)
For input, information or discussion please contact:

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1.1 SYNOPSIS OF THE PLAN

This plan of management is the first prepared for Mt Brown Conservation Park and follows release of the draft in 1996. This former forest reserve was dedicated under the National Parks and Wildlife Act in November 1993 following revocation of forest reserve status in 1990.

Forestry activities at Mount Brown ceased at the end of the 19th century and the land was then leased to local landholders for grazing. Grazing under annual licence occurred since the 1960's. Park dedication brought about not only a change of land tenure but also a change in land use emphasis from primary production to conservation. This change requires significant alteration to land management practices, including a review of grazing activity.

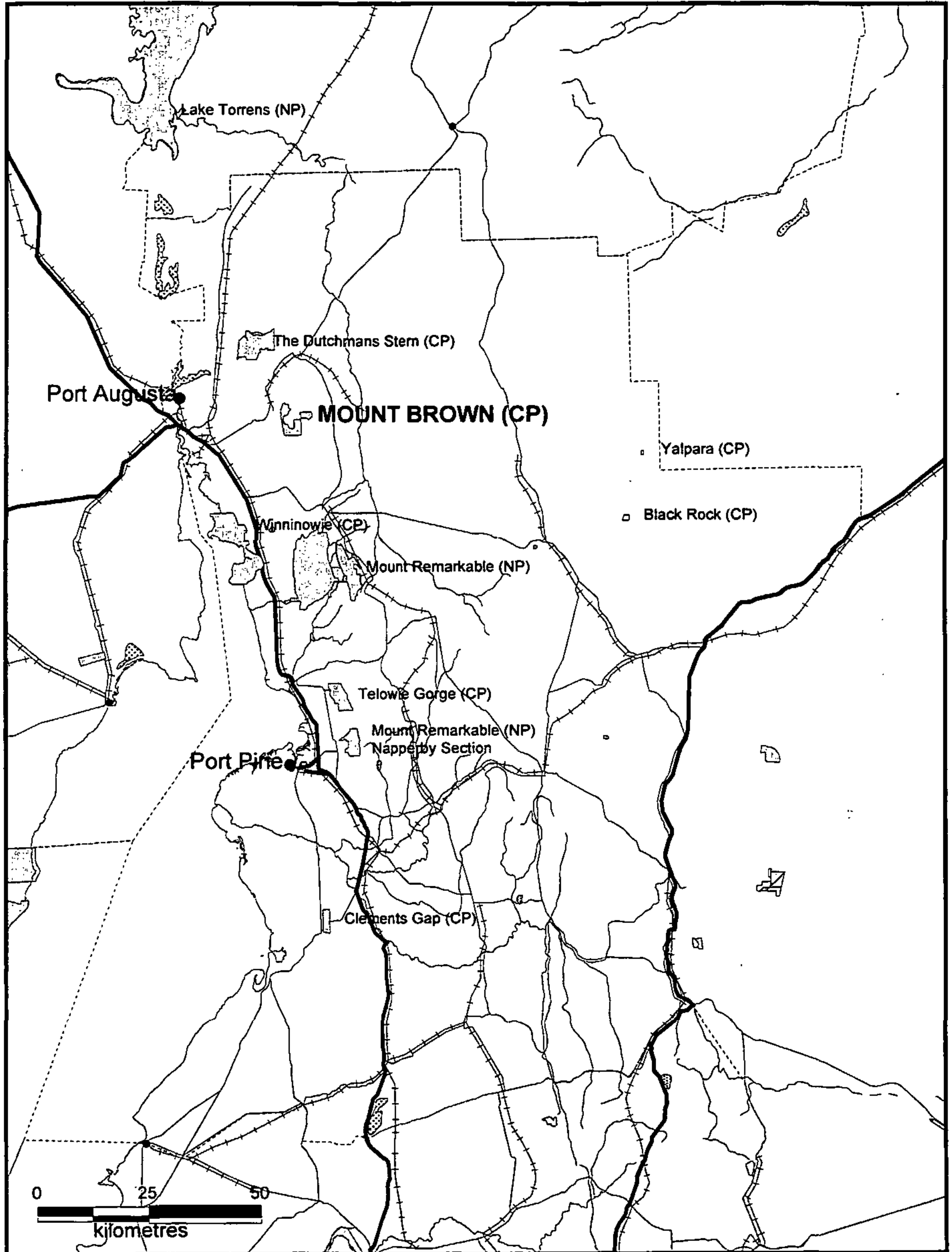
Cessation of grazing is the primary recommendation for the future management of Mt Brown Conservation Park.

This plan discusses grazing and other issues and sets the preferred management direction for the park in the context of the planning process for public land.






In particular this plan highlights the need for:

- commitment to a resource management regime which ensures the long-term integrity of the park's natural systems, particularly its grassland and woodland habitat,
- commitment to providing for low impact visitor activities,
- commitment to the provision of park facilities and services which conform with best practice standards,
- commitment to community involvement in park management and related activities.

Figure 1- Location of Mount Brown Conservation Park



Legend

-  District Boundaries
-  Minor Roads
-  Major Roads
-  Railway
-  Water Body



This map was produced by Reserve Planning,
Heritage and Biodiversity, DEHAA.
Map Projection: AMG (AGD 66)
July 1998
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DEHAA
Department for Environment,
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2. MANAGEMENT CONTEXT

2.1 CONSERVATION PARKS IN SOUTH AUSTRALIA

The classification which a reserve receives on dedication under the National Parks and Wildlife Act, 1972, is a general statement of its purpose within the reserve system. Conservation parks are areas which should be protected to preserve and manage wildlife, natural systems and historic features.

Conservation is an important part of a regional pattern of land use. Other land uses such as agriculture, forestry or mining are distinguished by community acceptance of environmental modification. The management of conservation parks aims to minimise disturbance and modification while providing for public use and enjoyment.

2.2 OBJECTIVES OF MANAGEMENT

The National Parks and Wildlife Act, 1972, specifies a number of objectives that the Minister, Chief Executive Officer and Director NPWS shall have regard to in managing the Reserve. These are:

- The preservation and management of wildlife.
- The preservation of historic sites, objects and structures of historic and scientific interest.
- The preservation of features of geographical, natural or scenic interest.
- The destruction of dangerous weeds and the eradication or control of noxious weeds and exotic plants.
- The control of vermin and exotic animals.
- The control and eradication of disease of animals and vegetation.
- The prevention and suppression of bushfires and other hazards.
- The encouragement of public use and enjoyment of reserves and education in, and a proper understanding and recognition of their purpose and significance.
- Generally the promotion of public interest.

2.3 LOCATION AND REGIONAL CONTEXT

Mount Brown Conservation Park is located in the Southern Flinders Ranges, some 20 km east of Port Augusta and 15 km south of Quorn. (See Figure 1) The park covers an area of 1749 ha, comprising sections 150, 151, 163, 230, 238, 246 and 257, Hundred of Woolundunga.

The former forest reserve came under the care and control of the (then) Minister for Environment and Planning in 1990 when tenure as a forest reserve was withdrawn as a result of Woods and Forests Department rationalisation of its land. The conservation and recreational value of the area had long been recognised, hence its recommendation and acceptance for addition to SA's reserve system. Mt Brown Conservation Park was dedicated in November 1993.

The park conserves Grey Box woodlands, grassy woodlands and grasslands either absent or poorly represented elsewhere South Australia's reserve system and nationwide.

Mt Brown CP lies within the Flinders Ranges Environmental Region described by Laut et al (1977). Part of it is in the Buckaringa Environmental Association, and part in that of Mt. Remarkable. The park is dominated by quartzite ridges covered by low open scrub. This grades to steep hills with an open woodland cover, the understorey varying from shrubby to grassy, and to undulating grassland in the eastern section.

Forestry operations began in the 1870's and continued to around the turn of the century. Woods and Forests records show that the area was assessed in 1925 apparently for grazing potential. Pastoral leases of 30 years duration were set up (the exact date is unknown). In the early 1960's the (then) Woods and Forests Department changed these leases to annual licences, which continued to June 1997.

Mt Brown Conservation Park is under the care and control of the National Parks and Wildlife Service Southern Flinders District within the North Region of the Department of Environment, Heritage and Aboriginal Affairs. The District is responsible for 9 reserves with a total area of 31 589 ha within a general area shown on figure 1. The parks comprise 1 National Park and 7 Conservation Parks. The District is also responsible for various off-park functions for the area and its communities.

The Southern Flinders District managed by the District Ranger based at Mt Remarkable National Park along with 4 other operational staff. The District Ranger is responsible to the Manager, Parks and Wildlife based at Port Augusta, who is in turn responsible to the Regional Manager North, also based at Port Augusta. The Regional Manager oversees the entire northern DEHAA operation, including several Parks districts and a number of other Departmental functions.

2.4 MANAGEMENT CONSIDERATIONS

Mt Brown CP is not subject to proclamations relating to prospecting, mineral exploration or mining.

Other considerations are:

Flinders Ranges Regional Development Plan
Quorn Bushfire Prevention Plan
Mt Remarkable Bushfire Prevention Plan
Water catchment

3. BACKGROUND INFORMATION

3.1 LANDSCAPE AND GEOLOGY

Mt Brown is located on the western edge of Flinders ranges about 24 km south east of Port Augusta. The Flinders Ranges comprise rocks that range in age from around 850 to about 540 million years old. The rocks are part of a large basin called the Adelaide Geosyncline that includes the Flinders and Mount Lofty Ranges. The sediments making up these rocks were deposited in shallow seas before hard-bodied organisms had developed. Following folding, faulting and uplift mountains were formed and erosion over the last 500 million years has left us with the present landscape.

The rocks exposed on Mount Brown belong to the ABC Range Quartzite and the other units become progressively older to the east. Mount Brown is on the southern end of a north-plunging syncline, consequently the rocks are also younger to the north. The western edge of the park is made up of carbonates of the Wonoka Formation, while most of the park is the ABC Range Quartzite which a very thick unit here and forms the rim to the Richman Valley. The valley is a syncline with the younger rocks in the middle. On the western side of the valley north of Mount Brown is shale of the Bunyerroo Formation. Generally synclines form hills because of the compressed rocks in the centre. In this case, however, the central core consists of more easily eroded shale with a resistant rim of quartzite. The floor of the valley consists of silt-derived shale, hence forming relatively good soil.

Mount Brown is more than 900 m high and is at the south western corner of the park. It is the highest point in the southern Flinders Ranges. Rapid erosion of the sides of the mountain is currently producing scree slopes and boulders. This shows that the ranges were uplifted quite recently and may even be rising now. Because of this, steep slopes and narrow gorges are common in the area. Waukarie Creek demonstrates this quite well.

A submarine canyon has been mapped west of the conservation park with only its eastern edge within the park boundaries. It was a submarine erosional valley cut into sediments to hundreds of metres depth and now filled with the Wonoka Formation. West of the park is a thin band of rock fragments that were blown out from an area at Lake Acraman when a meteorite struck, the debris layer has been recognised in several places in the Flinders Ranges and as far northwest as the Great Victoria Desert. Such features are of particular scientific value.

3.2 SOILS

Soils of Mt Brown CP are mostly skeletal due to underlying rocks and steep topography. The extent to which soil development occurs is determined by slope, aspect and parent material, so that soils are locally variable. This is often reflected in vegetation. Wonoka Formation carbonate rocks give rise to calcareous soils which are highly susceptible to disturbance and erosion. Grasslands and grassy woodlands are underlain by shales and siltstones over which develops brown earths with reasonable depth and nutrient levels.

3.3 CLIMATE

The climate of the area is typically Mediterranean, with hot, dry summers and cool, wet winters. Summer daytime temperatures are generally high with low relative humidity. Evenings and nights are mostly mild. Night frosts are frequent from April until September. Evaporation rates exceed rainfall.

Specific rainfall data are not available for the park. The general rainfall range for the area is 275 to 350 mm. Average rainfall at Quorn, north of the park is 328 mm, which falls from late summer to late spring. Rainfall pattern is, however, quite variable. Frequent electrical storm activity in summer often results in sudden deluges, influencing runoff and erosion. Lightning is the most common cause of fires in the area and is an important land management consideration. The mountain range increases rainfall locally, so that the ridgetops and summit have considerably higher rainfall and higher humidity.

Prevailing winds are south-west to south east. In the park, the topography affects winds direction locally.

3.4 VEGETATION

A survey of the vegetation of Mt Brown Conservation Park was carried out in 1994 by the Nature Conservation Society of SA funded by SANPWS Wildlife Conservation Fund. A report was published in December 1995. Prior to this, a joint NPWS/Department of Housing and Urban Development project produced a base Geographic Information System map of vegetation cover from a limited amount of field work, local knowledge and air photo interpretation. The NCS survey provided comprehensive ground-truthing of the existing maps. Woods and Forests records provided good early vegetation details. The combined result is a comprehensive record of the vegetation of Mt Brown. Figure 2 shows the location and distribution of 17 vegetation associations and gives their dominant species. Further details are provided in the survey report (Opperman and Bates 1995).

Ridgetops are mostly covered with long-leaved box (*Eucalyptus goniocalyx*) growing as mallee with a shrubby understorey dominated by *Xanthorrhoea quadrangulata*. Middle and upper slopes are also covered by long-leaved box, sometimes in association with she-oak (*Allocasuarina verticillata*) and grey box (*E. microcarpa*). Patches of sugar gum (*E. cladocalyx*) also occur high on slopes on the western side of the park.

Lower slopes and steep hills are also covered by grey box, the understorey varies with altitude and soil from shrubby and sparse to grassy. Native pines (*Callitris glaucophylla*) may also be present. Grassy woodlands grade to grasslands in the undulating country in the east of the park. Hilltops are covered by *Triodia irritans* and *Themeda triandra* hummock grasslands which grade into *Stipa/Danthonia* grasslands on lower hillslopes and vales.

The area of the park underlain by Wonoka Formation carbonate rocks is covered mainly by *Acacia calamifolia*, *Melaleuca lanceolata* and *A. victoriae* open shrubland, with few trees excepted along streamlines where river red gum (*E. camaldulensis*) creek communities occur.

Mt Brown Conservation Park has a high proportion of grey box woodlands and grasslands which are not well represented elsewhere in the reserve system. The park also has a number of plant species of conservation significance. Of these, 7 are of national significance, 43 are identified as being significant statewide and 42 are regionally important. These species are summarised below (Table 1) and listed in Appendix 1.

Significance	Australia	State	Region
Extinct			1
Endangered			2
Vulnerable	3	1	1
Threatened			1
Rare	3	14	16
Uncertain		5	4
Uncommon		17	14
Unknown	1	6	2
Total	7	43	42

Table 1. Plant species of conservation significance, Mt Brown Conservation Park. (Briggs and Leigh, 1988, 1993 for Australia, Lang and Krahenbuehl, 1994 for State and Region.) Source: Opperman & Bates 1995.

3.5 FAUNA

A preliminary survey of the fauna of Mt Brown was undertaken in conjunction with the vegetation survey in 1994, and further carried out in October 1995. Weather conditions on both occasions were less than ideal. Appendix 2 gives a list of bird and reptile species recorded.

The park provides a range of habitats and could be expected to be home to a wide range of fauna species. Habitat modification has occurred through grazing, although some areas have remained relatively undisturbed due to terrain and inaccessibility to stock. The euro (*Macropus robustus*), common throughout the park. The western grey kangaroo (*Macropus fuliginosus*) is less common in lower areas. Yellow footed rock wallabies (*Petrogale xanthopus*), found throughout the southern Flinders Ranges have not been observed in the park in recent years. The echidna (*Tachyglossus aculeatus*) and several species of bat and are expected to be present.

3.6 HISTORY

Mt Brown was named by Matthew Flinders on his early expedition around Australia during which he charted the coastline and adjacent features. The mountain is named after Robert Brown, the expedition botanist, who, with Westall and Bauer (also members of Flinders'

party) climbed to the summit (with much difficulty) on March 10 and 11 1802, to view the surrounding country. A plaque at the Mt Brown summit commemorates this event.

Aboriginal people, of course, occupied the Flinders Ranges long before Flinders voyage and European settlement. It is understood to have been known as Wirtiartu meaning lump, or burl (D. Tunbridge pers. comm. 1996). Robert Brown reported that he encountered native people during his ascent to the Mt Brown summit in 1802 (Flinders, 1814). Details of occupation and cultural sites are not well known or documented. The Nukunu people are traditional custodians of the land.

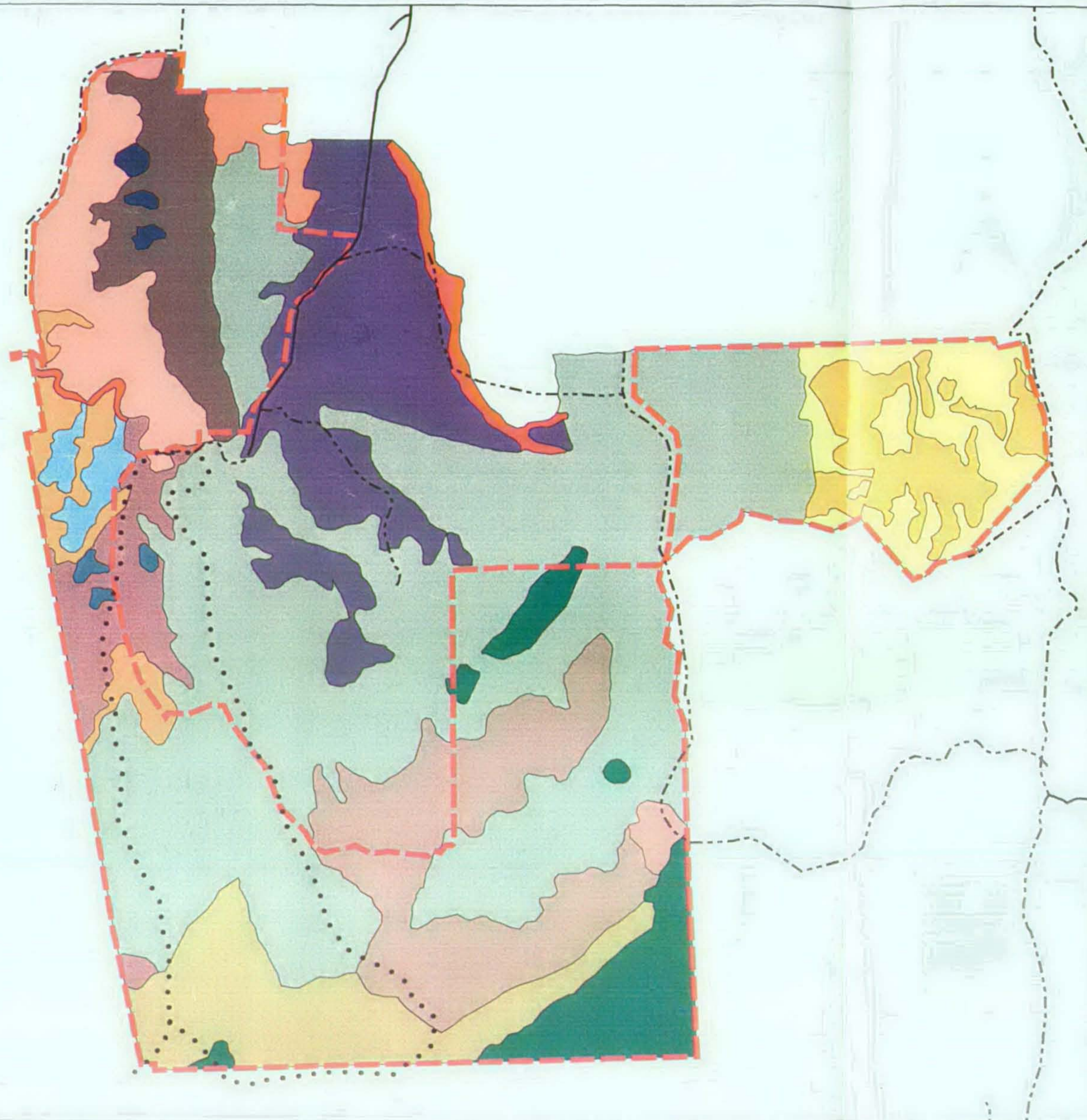
Forestry activities commenced at the time of European settlement of the region in the 1870's and continued until around the turn of the century. During this time the Woods and Forests operation at Mt Brown was the main nursery and distribution centre for amenity trees for the drier parts of South Australia, western Victoria and western New South Wales.

Pastoral leases were issued sometime after the nursery function ceased. The forest reserve was assessed, apparently for grazing potential, in 1925. Thirty year leases were changed to annual licences in the 1960's and have continued to the present. Forest Reserve status was revoked in 1990 as part of the Woods and Forests rationalisation of its lands. Park dedication occurred in November 1993.

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Figure 2 Vegetation of Mt Brown Conservation Park



- Walking trail
 - - - Vehicle tracks
 - Public vehicle access
 - Park boundary
- Structural Vegetation Associations**
- Eucalyptus cladocalyx* Tall open forest over *Bursaria spinosa*, *Stipa breviflorus*, *Xanthorrhoea quadrangulata*
 - Eucalyptus camaldulensis* Open forest over *Cassinia laevis*, *Acacia* spp., *Dodonea viscosa*, *Stipa eremophila*, *Lomandra densiflora*
 - Eucalyptus microcarpa* Woodland to Low open woodland over *Allocasuarina verticillata*, *Xanthorrhoea quadrangulata*, *Cassinia laevis*, +/- *Bursaria spinosa*, +/- *Lepidosperma viscidum*
 - Eucalyptus microcarpa* Woodland to Low open woodland over +/- *Stipa* sp., +/- *Acacia pycnantha*, +/- *Cassinia laevis*, +/- *Lomandra* spp. (+/- *Bursaria spinosa*), (+/- *Triodia irritans*), (+/- *Dianella revoluta*), (+/- *Lepidosperma viscidum*)
 - Eucalyptus microcarpa* Low open woodland over *Allocasuarina verticillata*, *Xanthorrhoea quadrangulata*, *Cassinia laevis*, +/- *Callitris glaucophylla*
 - Eucalyptus odorata*, *E. leucoxylo*, *E. viridis* Low open forest over *Cassinia laevis*, *Rhagodia parabolica*
 - Eucalyptus odorata*, *E. leucoxylo* Low woodland over *Bursaria spinosa*, *Stipa nodosa*, (*Triodia irritans*)
 - Eucalyptus goniocalyx* Low open forest to Low woodland over *Xanthorrhoea quadrangulata*, *Cassinia laevis*, +/- *Exocarpos cupressiformis*, +/- *Bursaria spinosa*, +/- *Pultenea daphnoides*
 - Allocasuarina verticillata* Low open forest to Low woodland over *Xanthorrhoea quadrangulata*, (+/- *Cassinia laevis*), (*Triodia irritans*), (*Lomandra densiflora*)
 - Callitris glaucophylla* Low woodland to Low open woodland over *Cassinia laevis*, *Triodia irritans*, +/- *Acacia* spp., (*Stipa* sp.), (*Lomandra* spp.)
 - Eucalyptus socialis*, *E. gracilis* Tree mallee over *Melaleuca lanceolata*, +/- *Zygophyllum confluens*, +/- *Stipa* spp.
 - Melaleuca lanceolata*, +/- *Acacia calamifolia* Tall open shrubland to Low open shrubland over grasses inc. *Stipa* spp.
 - Semi-native pasture and/or cropland
 - Acacia calamifolia*, +/- *Melaleuca lanceolata* Open shrubland over grasses inc. *Stipa* spp.
 - Zygophyllum confluens*, +/- *Lycium australis*, +/- *Lawrenzia squamata*, +/- *Eremophila alternifolia* Shrubland to Open shrubland over grasses
 - Stipa* (Tussock) grassland over *Danthonia* sp., herbs
 - Triodia irritans*, (*Themeda triandra*) Hummock grassland over herbs and grasses

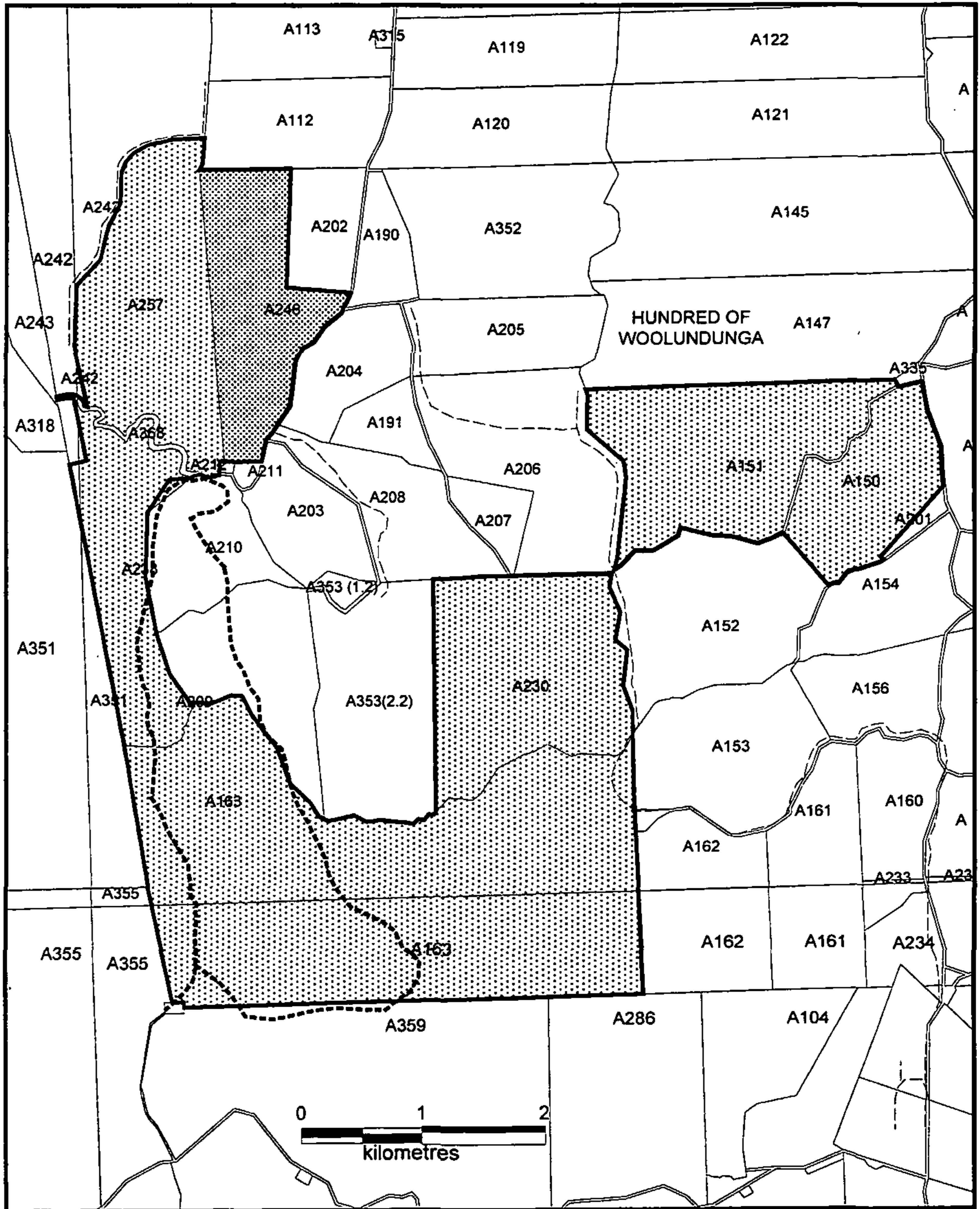
Produced by: Geographic Analysis & Research Unit, Planning SA
 Department for Transport, Urban Planning and the Arts
 Projection: Transverse mercator
 Data Analysis: ESRI ARC/INFO Geographic Information System
 Date: September 1998
 Tracks supplied by DEHAA

Vegetation mapped from 1:40,000 colour aerial photography by the GAR Unit, Planning SA. Vegetation boundaries mapped outside of Reserve where information was available


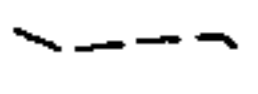







Legend abbreviations: sp. refers to identification to genus only, spp. refers to more than one species, +/- indicates species to be either present or absent, () signifies lesser abundance of species.

Figure 3- Mount Brown Conservation Park Cadastre and Reserve Access



Legend

-  Walking Trail
-  Vehicle Track
-  Public Vehicle Access
-  Park Boundary
-  Section Boundary
-  Development Zone
-  Conservation Zone



This map was produced by Reserve Planning,
 Heritage and Biodiversity, DEHAA.
 Map Projection: AMG (AGD 66)
 July 1998
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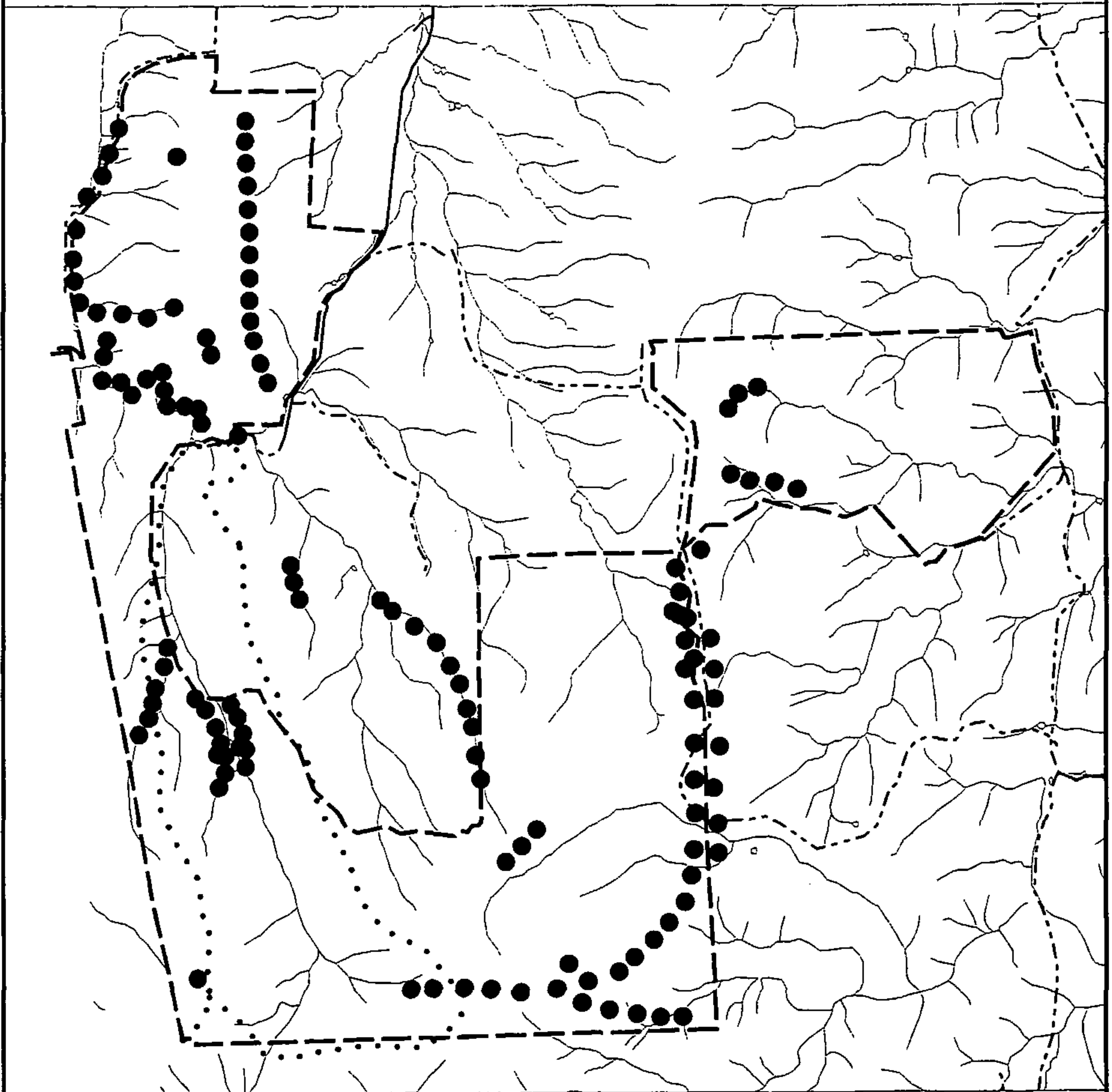
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Figure 4

Plant Species of National Conservation Significance

Derwentia decorosa



- • Walking trail
- - - Tracks
- Public vehicle access
- Drainage
- Park boundary
- *Derwentia decorosa*



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Data Analysis: ESRI ARC/INFO Geographic Information System
Date: September 1998
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Species locations collected by the Nature Conservation Society. Information is maintained in the South Australian Environmental Database, Planning SA.

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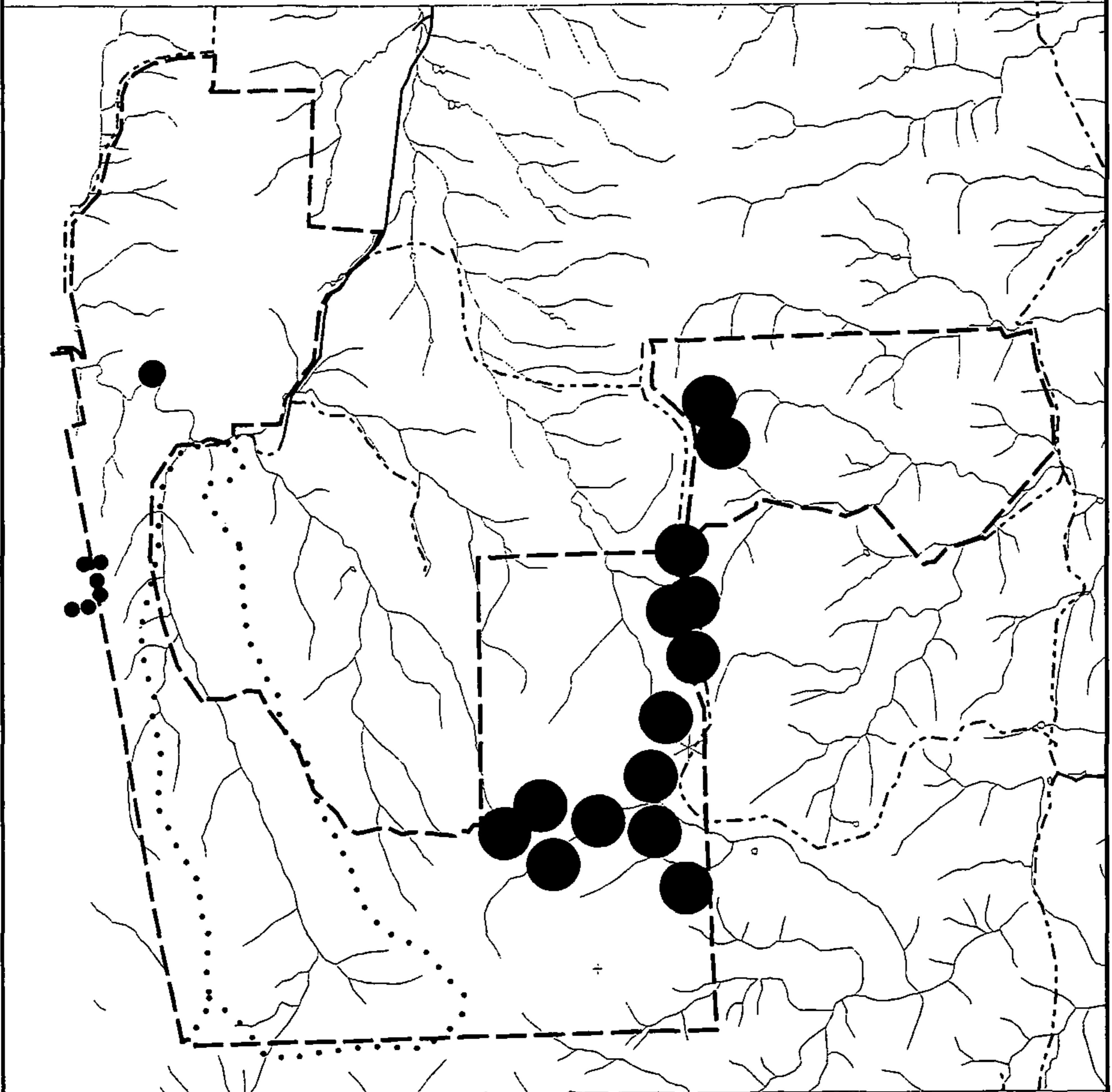


2.5km



Figure 5 Plant Species of National Conservation Significance

Olearia pannosa ssp. pannosa *Eucalyptus percostata* *Lepidium pseudopapillosum* *Prasophyllum validum* *Stipa petrea*



- • Walking trail
- - - Tracks
- Public vehicle access
- Drainage
- Park boundary
- + *Lepidium pseudopapillosum*
- * *Prasophyllum validum*
- *Eucalyptus percostata*
- *Stipa petrea*
- *Olearia pannosa ssp. pannosa*

ENVIRONMENTAL &
SOCIO-ECONOMIC

DATABASES

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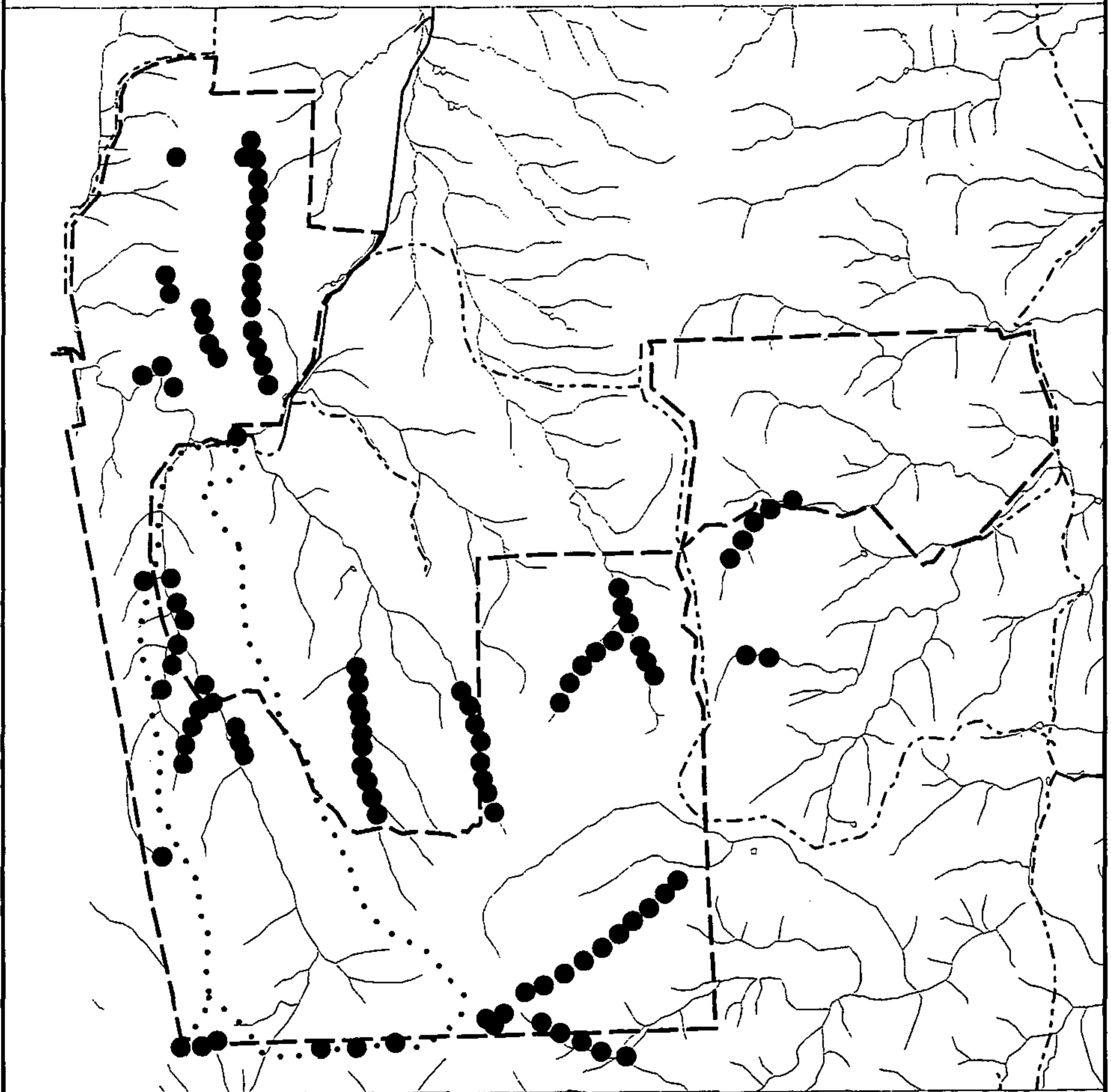
Species locations collected by the Nature Conservation Society. Information is maintained in the South Australian Environmental Database, Planning SA.

0  2.5km


Figure 6

Plant Species of National Conservation Significance

Stipa breviglumis



- • Walking trail
- - - Tracks
- Public vehicle access
- Drainage
- Park boundary
- *Stipa breviglumis*



Produced by: Geographic Analysis & Research Unit, Planning SA
Department for Transport, Urban Planning and the Arts
Projection: Transverse mercator
Data Analysis: ESRI ARC/INFO Geographic Information System
Date: September 1998
Tracks supplied by DEHAA

Species locations collected by the Nature Conservation Society. Information is maintained in the South Australian Environmental Database, Planning SA.

0



2.5km



4. MANAGEMENT PRESCRIPTION

4.1 ZONING

Zoning of reserves is a management tool (referred to in Section 39 of the *National Parks and Wildlife Act*) that can provide a framework for park management. A zoning strategy is a way of achieving a balance between development, visitor needs and conservation.

Most of Mount Brown CP is accessible to the public by walking access only. The park's proximity to Quorn and the already well-established use of the Waukarie Falls area makes the north-western end of the park a natural focus for visitor activity. Park zoning needs to anticipate future visitor needs; over time, increases in visitor numbers resulting from park establishment will have to be provided for. The park is likely to benefit local tourism and the Quorn community.

Objective

Zone Mt Brown Conservation Park to cater for the most appropriate and sustainable visitor use, while protecting the park's natural assets.

Action

- ***Adopt and implement the zoning plan for the park (Figure 3) as an integral component of the plan of management. Prescriptions for the zones are as follows:***

Development Zone

Encompasses the eastern portion of section 246 adjacent to the Richman Valley Road. The zone includes the area of traditional visitor activity near Waukarie Falls. Future investigation may prove this zone suitable for vehicle-based camping activity and the provision of associated built infrastructure.

Conservation Zone

Includes the remainder of the park. Zone prescription provides for walking access only for visitors. Overnight campsites or cabins for walkers may be provided in designated sites. Use of such accommodation sites to be monitored and managed to keep human impacts to a minimum.

4.2 CONSERVATION OF NATURAL RESOURCES

4.2.1 SHEEP GRAZING LICENCES

The former forest reserve has had a long history of sheep grazing, probably commencing early in the 20th century. In the 1960's the (then) Woods and Forests Department stopped issuing longer term leases, reverting to a system of annual licences for grazing. These

licences have continued to operate until 1995/96. Mt Brown Forest Reserve was transferred to the (then) Minister for Environment and Planning in 1990, and the land dedicated under the *National Parks and Wildlife Act* in November 1993.

The change from Forest Reserve to Conservation Park came as a result of the Woods and Forests Department increasing focus on its core business of commercial softwood production. As a consequence, the department commenced divesting itself of marginal or non-productive forest areas. The reserve land at Mt Brown had well-recognised conservation values, including native grasslands, woodlands and significant species. These were key factors that resulted in its eventual dedication as a conservation park.

The change in tenure brought with it a change in purpose and land use, that is the major emphasis of the reserve changed from primary production (forestry and grazing) to conservation of the natural environment. Given that significant change of function, the grazing activity needed to be reviewed.

The existing annual grazing licences were not terminated on change of tenure due to practical considerations (eg disruption to lessees, drought conditions). Instead, the licences were renewed annually for a number of years under existing terms and conditions. The lessees were advised however, that the situation would alter in the near future.

Four annual grazing licences are currently held by landholders of neighbouring properties. No stocking rates are specified. Licensees are responsible for pest plant and animal control and fire protection. They are also responsible for fence maintenance to the standard in place at the time of commencement of the lease. Fences are in fact in poor condition, due in part to the Woods and Forests Department's disinterest in the area, and an unwillingness or inability to provide materials maintain fences to a reasonable standard.

An objective assessment indicates that current licence conditions are insufficient to ensure adequate management of grazing activity, and many of the licence conditions have not been adhered to.

Overall, stocking rates have ranged from around 0.6 sheep/ha to 1.4 sheep/ha. However, the nature of the grazing operations and the terrain are such that grazing impact is variable. As a result, inaccessible parts are, naturally, relatively unaffected, whereas areas to which stock have relatively easy access are much more heavily grazed.

Revenue raised from annual leases is insignificant in terms of providing financial support for park management operations (total revenue from licences amounts to less than \$1,000 per year) and does not justify the negative impact on the park environment. Continuing the current grazing regime is not considered to benefit the park in any way.

Grazing, except under very special and prescribed circumstances, is not appropriate for land set aside for conservation, and is at variance with the objectives of the *National Parks and Wildlife Act*. The presence of domestic stock detrimentally affects vegetation structure and associated habitats, contributes to soil compaction and erosion, inhibits regeneration and alters nutrient cycles.

A recent vegetation survey of Mount Brown set up permanent monitoring points and provided a comprehensive map of vegetation in the park. Figure 2 illustrates vegetation associations; nationally significant species locations are shown in Figures 4,5,and 6. The report also comments on grazing impacts, including modification of vegetation structure and species composition, erosion and species loss and recommends strongly that this activity be terminated.

Cessation of grazing is fundamental to the long term well being of the reserve.

Objective

Ensure that the park's natural systems can operate free from disturbance by domestic stock.

Conserve and manage the park environment to ensure there is no further loss of native species and natural habitat.

Actions

- *Phase out grazing from June 1996. Any further annual licences will be issued only under the most extenuating circumstances, with strict conditions applying, as well as revised fees.*
- *Ensure that all residual stock are removed from the park by June 1997.*
- *Monitor vegetation using existing monitoring points.*

4.2.2 WOODLANDS AND GRASSLANDS

Grasslands and woodlands were identified early as important natural assets. They are not well represented elsewhere in the South Australian reserve system, or indeed nationwide.

It is these vegetation associations which also provided the best grazing for domestic stock and came under the most pressure from grazing activities from the earliest days of European settlement. Grazing is known to modify the structure of vegetation. Invasion by introduced species has also occurred to a large degree in these structural formations, primarily as a result of a long history of grazing by domestic stock.

Woodlands and grasslands are shown in Figure 2.

Objective

Ensure long term conservation the park's woodland and grassland habitats.

Ensure that woodlands and grasslands are not further degraded, rather that they are rehabilitated and managed.

Actions

- *Phase out grazing as from June 1996.*
- *Monitor woodlands and grasslands over time using established monitoring programmes.*

- *Actively manage areas of native grasslands to ensure its long term viability and aid its rehabilitation in conjunction with a detailed monitoring programme.*

4.2.3 SIGNIFICANT SPECIES

Mt Brown Conservation Park is home to 7 plant species of national significance, 43 of state significance and 42 which are regionally important. These totals indicate the important role this reserve plays in species conservation.

Park vegetation is shown in figure 2. The distribution of species of national significance are shown in Figures 4,5,and 6. Appendix 1 lists other significant species. For their distribution refer to the Nature Conservation Society report (Opperman and Bates, 1995).

Objective

Ensure that viable populations of significant species remain in the park in perpetuity.

Ensure no further species loss occurs.

Action

- *Phase out grazing from June 1996.*
- *Monitor vegetation changes over time throughout the park.*
- *Monitor nationally significant species in particular.*
- *Formulate and implement action plans for nationally significant species and others as necessary.*

4.2.4 FAUNA

Information on the existing fauna Southern Flinders Ranges was collated in 1981. This yielded 7 species of frog, 59 reptile, 19 mammal and 163 bird species. (Opperman and Bates, 1995).

Work was carried out on the native fauna of Mount Brown CP by the Nature Conservation Society in 1994 and 1995. Weather conditions on both occasions were severe, affecting results. It is likely that many species found in The Dutchmans Stern Conservation Park and Mt Remarkable National Park may be present at Mt Brown. It might be expected too that woodland and grassland habitats will yield other species as yet unrecorded in reserves in the area. Survey results are listed in Appendix 2.

The park, like the Flinders Ranges generally has abundant and diverse invertebrate fauna which has not been surveyed. Species of conservation significance are likely to occur. Information on invertebrates is held in the Southern Flinders District office.

As a broad management strategy, caring for habitat and ensuring that natural systems can operate free from disturbance in turn enhances opportunities for native fauna to flourish. Grazing has dramatically reduced understorey and altered vegetation structure generally. Cessation of grazing will result in improvement in habitat quality and should encourage native fauna.

Pest animals have an adverse impact and need to be controlled. Refer to section 4.4.2

Objective

Provide quality habitat for native fauna within the park.

Action

- *Phase out grazing from June 1996.*
- *Monitor vegetation over time using established monitoring points.*
- *Survey fauna as opportunities and resources permit and record on a park data base and/or GIS.*
- *Encourage research/recording by interested groups and individuals in accordance with DEHAA standards and practices.*

4.2.5 SOILS AND EROSION

A proportion of Mt Brown CP is underlain by carbonate rocks of the Wonoka formation which give rise to soils which are susceptible to disturbance and erosion. The legacy of grazing on the park is that soil erosion has occurred in various locations. The Nature Conservation Society report provides details of eroded sites.

Objective

Control soil erosion in the park; restore and rehabilitate areas currently affected by soil erosion.

Action

- *Remove grazing pressure*
- *Monitor eroded areas using photopoints*
- *Rehabilitate badly affected areas if recovery after grazing is not sufficient to arrest erosion. Ensure that adequate pest animal control occurs in the park to support erosion control and rehabilitation.*

4.2.6 GEOLOGICALLY SIGNIFICANT FEATURES

A submarine canyon is located just west of the Mt Brown CP, with its eastern edge within park boundaries. It was a submarine erosional valley cut into older sediments and now filled with the Wonoka Formation.

Surface features of geological significance need to be preserved and protected. Park management activities which require surface disturbance such as track works should not be carried out at these locations.

Objective

Preserve and protect sites of geological significance in Mt Brown Conservation Park.

Action

- *Map and describe the surface features of the submarine canyon and enter into park records and data base.*
- *Manage and protect the feature accordingly in accordance with best practice.*
- *Ensure that visitor impacts and park development works do not compromise geological sites.*

4.3 VISITOR MANAGEMENT

4.3.1 PARK ACCESS

Public access to, and within the Park, is currently as follows:

- * Principal public vehicle access is to Waukarie Falls area. Another public road (dry weather only) leads along the easternmost boundary of the park.
- * There is provision for walking access through the park along established walking trails, including a section of the Heysen Trail, and a circuit including part of the Heysen trail and the ascent of the Mt Brown summit. Agreements have been reached with neighbouring landholders where trails traverse land adjoining the park.
- * Vehicle access for park management purposes is provided through adjoining land. Some tracks are on existing public road reserves which are leased to and controlled by the landholder. As a result they are operated as private access tracks, often with locked entrances.

Upgrading of the Waukarie Falls area, including improved road surface, a car park, signs and visitor information is necessary. This may include restricting public access in this area to provide for better and safer visitor use.

DEHAA does not intend to provide additional public vehicle access, at least in the short term. Increased public risk, additional cost, and less effective visitor and park management would preclude such moves for the foreseeable future.

Walking access (along designated trails) is considered adequate at this stage. Off-trail self-guided bushwalking may be appropriate once grazing leases are terminated. It is also desirable to establish a walking trail from the existing circuit trail to the eastern boundary track.

Currently, park management access arrangements by means of landholder agreements and locked gates are considered to be satisfactory.

Park access is detailed in Figure 3.

Objective

Provide visitor access to Mt Brown Conservation Park consistent demand and the status and conservation value of the reserve.

Provide vehicle access as necessary and appropriate for efficient park management.

Action

- *Upgrade the Waukarie Falls access to include a car park, signs and information.*
- *Install a traffic counter at the main park access road to monitor vehicle numbers.*
- *Maintain existing walking trails as per existing agreements with other agencies (Royal Geographic Society, Department of Recreation, Sport and Racing) and adjoining landholders.*
- *Maintain park management access to other areas of the park.*
- *Maintain liaison with adjacent landholders regarding access.*
- *Investigate incorporating portions of road reserves into the park where appropriate.*
- *Investigate options for extension of the walking trail network in line with district plans and priorities.*

4.3.2 VISITOR ACTIVITIES AND FACILITIES

Mt Brown CP provides opportunities for low impact, passive recreational activities. The park's remoteness, rugged terrain and limited vehicle access make it an ideal bushwalking destination for locals and travellers alike. It is within a few hours drive of Adelaide, and complements experiences offered in other parks in the Flinders Ranges.

Mount Brown has traditionally provided recreation for a variety of visitors. The walk to Mt Brown summit has been popular for years, and the section of Heysen Trail which traverses it is well used. The establishment of a circuit trail to the summit and re-routing of a section of the Heysen Trail has been popular with visitors. The new trail is one promoted as part of the Royal Geographic Society's "Explore the Flinders" project which established a number of trails throughout the Flinders Ranges, along with interpretive notes and a field guide book of the same name.

The Waukarie Falls area is a popular picnic spot for locals, and some camping also occurs in this vicinity, although this has decreased over the last few years due to a vehicle track (essentially in a creek-bed) becoming impassable. Facilities and signs need to be upgraded in order to provide visitors with the advice and information they need and to facilitate a commitment to park management. The historical importance and interest of Mount Brown should be included in park information and interpretation.

A day visitor area needs to be developed at Waukarie Falls, which is the traditional focus of visitor activity. The Falls themselves are on leased private land, which means that there may be difficulties in managing the site. Cooperative programmes need to be instigated in this regard.

Bushcamping (a bushwalker activity, not vehicle based) is provided for and occurs along the Heysen Trail. It may be desirable to designate sites and establish wilderness cabins to reduce impact and enhance visitor experience. Water supplies are not available within the park. Visitor information needs to state clearly that they must carry their own. Fire water supplies may double as emergency water supplies if suitably located in the future as part of fire protection plan implementation.

A viewing platform at the Mt Brown summit would enable visitors to fully appreciate the view whilst managing visitor impact on the site.

Vehicle based camping has occurred in the past at a few sites along Waukarie Creek. Track deterioration has limited this activity. This track will not be reinstated and camping will be discouraged in the vicinity of Waukarie Falls in order to reduce impact. The possibility of a limited number of vehicle-based camping nodes will be investigated on Section 246. This would also complement what is offered in other Flinders Ranges Parks. Such a development would need to be well-planned to ensure that the impact on Grey Box woodland and other important species would be avoided or minimised. Sufficient resources would need to be available to ensure adequate management and cost effectiveness.

Use of campfires (wood fires) throughout the park will be banned due to impact, fire risk and limited fuel resources. Visitors are encouraged to use gas or spirit stoves.

Activities such as hang gliding and rock climbing are precluded in this reserve in line with policy.

Horse riding is precluded due to likely environmental impacts, access, safety and potential conflict with other park visitors.

Cycling is precluded too. There are no suitable tracks within the park which could be designated for such a purpose.

No commercial operators currently utilise Mt Brown. Self-guided four wheel-drive tours operate on the western side of the park, but are essentially on private land. Future commercial user activities within the park will not involve vehicular activity (there are no internal tracks). Other agreements, such as walking tours, may be an option for the future, but would need to be negotiated by commercial user agreement.

Objective

Provide for and manage appropriate, low impact visitor activities within Mt Brown Conservation Park.

Provide a level of visitor facilities in Mt Brown Conservation Park consistent with its patterns of use, conservation, policy and safety objectives.

Action

- ***Upgrade the Waukarie Falls area to act as a day visitor focus.***
- ***Upgrade park information and direction signs.***
- ***Maintain public access arrangements.***
- ***Investigate closure of part road reserve areas within the park boundaries to facilitate management.***
- ***Maintain walking trails and information material for visitors.***
- ***Investigate other facility development opportunities consistent with low impact, passive visitor activities. Promote low impact camping practices within the park.***

- *Encourage use of "Trip Intentions" forms for groups using the park for activities.*
- *Maintain contact with tourism and community organisations and park visitors generally.*
- *Impose a year-round ban on wood fires to reduce impact and risk.*
- *Survey and monitor visitor use of the park on a regular basis; assess the needs of visitors.*

4.4 PARK PROTECTION

4.4.1 PEST PLANTS

DEHAA has similar obligation as any landholder to control weeds scheduled under the *Animal and Plant Control Act*. Requirements under this Act may vary locally. Other introduced plant species need to be controlled because they pose a threat to natural systems, and although there may be no legal requirement for control, the objectives of the *National Parks and Wildlife Act* clearly impose an obligation to do so.

The Nature Conservation Society vegetation survey at Mt Brown identified 116 introduced species. Although control measures for the majority of these are not practical or desirable, several species pose a significant threat to the integrity of native vegetation and need to be controlled. Species such as Boxthorn (*Lycium ferrocissimum*) and Horehound (*Marrubium vulgare*) are scattered throughout the park. Others are more localised; *Olea europea*, *Schinus areira* and *Juncus acutus* are examples. It is important that these species be controlled early to halt their spread and minimise their effects. Other species such as introduced grasses and star thistle (*Centaurea calcitrapa*) will gradually be out-competed by recovering native vegetation once grazing pressure is removed.

It is possible that new or different pest plant problems may emerge as a result of the ceasing of grazing. Monitoring and control measures will be necessary. This will be dealt with in the Southern Flinders weed control plan.

Objective

Control and/or eradicate pest plants within the park, giving priority to those species which DEHAA is legally obliged to control and/or which pose the greatest threat to natural systems.

Action

- *Discontinue sheep grazing to minimise disturbance .*
- *Prepare a weed control plan for the park. Map areas of infestation, determine priorities for control and formulate and carry out eradication programmes.*
- *Undertake control measures for localised species according to recommendations of botanists and Animal and Plant Control Officers.*
- *Monitor vegetation associations, particularly grasslands and woodlands, for changes over time.*
- *Maintain contact with Animal and Plant Control officers with regard to weed status and control methods.*

4.4.2 PEST ANIMALS

The Department of Environment, Heritage and Aboriginal Affairs is required to comply with the *Animal and Plant Control Act* by controlling and eradicating pest animals on its land. There are other animal pests which may threaten the integrity of the reserve and should also be controlled in order to comply with the objectives of the *National Parks and Wildlife Act*.

Animals pests in the first category (required to be controlled by the *Animal and Plant Control Act*) are goats, rabbits and foxes. Goats have been observed on the park in small numbers. Rabbits are also present in less rugged parts of the park. There are also signs of fox presence.

Feral cats are likely to be throughout the park.

Sheep losses are inevitable in areas of the park because of the terrain. Stray sheep are a considerable problem, from both an environmental and animal welfare viewpoint.

Current bee licences operate in the park.

Objective

Monitor, control and where possible eradicate pest animals from Mt Brown Conservation Park. Emphasise control for those species for which there is a legal requirement or which pose the greatest threat to park values.

Action

- *Maintain contact and liaison with Animal and Plant Control officers.*
- *Assess numbers and status of pest animals at Mt Brown CP and plan eradication accordingly.*
- *Include Mt Brown in helicopter operations from 1996, initially to determine goat and sheep presence, numbers and location, and in due course for eradication if required (and practical).*
- *Integrate pest animal control for Mt Brown CP into district and regional programmes.*
- *Remove any stray sheep from the park as and when required.*

4.4.3 FIRE

As a landholder, DEHAA is required under the *Country Fires Act* to take necessary steps to prevent and control fire within the park.

In the past fire protection has been the responsibility of licenceholders. Fire protection activities have been limited to grazing, which reduces fuel loads by altering understorey structure and composition. Wildfire has not occurred in the area for many years, and the last major fire occurred some time before the end of the 19th century (A. Searle, pers. comm.). There is some evidence of previous fire in the form of burnt, hollowed out large trees.

It is not known if grazing had a role in preventing the outbreak of fire for so long. It is certainly established that grazing is detrimental to the natural values of the park. It is intended that a different style of fire prevention and protection will have to be applied in order to achieve conservation objectives.

Mt Brown Conservation Park is essentially comprised of rocky ridges including or surrounded by steep hills. The terrain is such that it is impractical and undesirable to establish internal tracks. Control lines need to be at boundaries or well away from the park, even on main roads. Negotiation and cooperation with neighbours and a good working relationship with the CFS and local community are essential for effective fire management.

A fire prevention plan was prepared in 1992. A fire suppression plan also needs to be prepared and the prevention plan incorporated into a total planning document.

Some fire track work has already been undertaken on adjoining land and along some of the park boundary. A programme of pre-fire season preparation and prevention works is carried out, the level of activity increasing yearly.

In dealing with fire management of Mt Brown CP it is necessary to liaise with both the District Council of Kanyaka-Quorn. and the District Council of Mt Remarkable and their respective bushfire prevention plans.. Although the park lies within the former, the access arrangements for the southern end of the park lie in the Mt Remarkable council area.

There is a ban of wood fires in the park from November 1st until April 30th each year, which is standard for all reserves unless otherwise specified. The ban for Mt Brown also specifies that people are not permitted to enter the park on days of extreme fire danger. The onus is on visitors to observe this. A sign to this effect is situated at the entrance to the park near the walking trail trailhead.

It is proposed that a year-round ban on wood fires be imposed for the park.

Objective

Develop and implement a fire management strategy for Mt Brown CP consistent with protecting park values and neighbouring assets within the context of known regional fire patterns.

Action

- ***Prepare a Fire Suppression Plan which incorporates the revised Fire Prevention Plan.***
- ***Maintain and develop liaison with landholders, local community, and Country Fire Services.***
- ***Maintain and develop an annual programme of protection works.***
- ***Impose a year round ban on campfires to minimise risk of escape.***

4.5 LAND TENURE

Land tenure arrangements in and around Mt Brown CP are complex and create difficulties in day to day management. It is likely that DEHAA will be perceived to be managing areas which are not, in fact, within the park. Figure 3 provides cadastral information and defines park boundaries.

The area to which the public has access at Waukarie Falls includes part of a public road reserve, private leasehold land, a water reserve, in addition to the dedicated conservation park.

The summit of Mt Brown itself actually within a small trig reserve which houses communication infrastructure, including an emergency telephone, visitor book and commemorative plaque.

Objective

Simplify land tenure in the vicinity of Mt Brown Conservation Park with a view to effective management.

Action

- *Investigate incorporation of road, water and trig reserves into the park*
- *Acquire additional land as opportunities present themselves.*
- *Seek to improve the aesthetics and amenity of the Mt Brown summit.*
- *Maintain contact and foster good relationships with neighbours to develop cooperative management programmes .*

4.6 PARK BOUNDARIES

The shape of the park makes for a disproportionately long and impractical boundary. There is a need for rationalisation of the boundary to enhance the values of the park. Such rationalisation would have practical advantages and provide a fenceable boundary to exclude domestic stock and improve management access. Fencing of some of the current boundary is prohibitively expensive and difficult.

Objective

Provision and maintenance of a practical and cost effective park boundary, including fencing to exclude domestic stock.

Action

- *Rationalise park boundaries by purchasing appropriate sections if and when opportunities present.*
- *Develop a capital works programme to facilitate rationalisation and fencing.*

4.7 ABORIGINAL INVOLVEMENT

DEHAA has a commitment to involving Aboriginal people traditionally associated with the land now in reserves and in the management of those reserves and actively seeks input in order to fulfil this commitment.

Aboriginal history and sites of significance have not been surveyed within Mt Brown CP.

Objective

Develop constructive relationships with Aboriginal groups who have traditional association with the park area and who demonstrate interest in park management and activities.

Action

- *Investigate who may have traditional association with the park area.*
- *Provide opportunities for Aboriginal people to be involved in park management activities.*
- *Identify, protect and manage culturally significant sites in accordance with the wishes of traditional custodians and in line with the requirements of the Aboriginal Heritage Act.*

4.8 SAFETY

DEHAA has a duty of care to provide a safe park environment for visitors, staff and volunteers. The park's ruggedness and remoteness in itself an attraction and asset, although these qualities have the potential to create safety problems for visitors as well as workers.

An emergency telephone is located at the Mount Brown summit.

Objective

Provide a safe park environment whilst allowing for rewarding and challenging visitor experiences.

Action

- *Ensure that safety is a major consideration in park management decisions, developments, works and activities.*
- *Ensure that safety information and advice is adequate.*
- *Carry out regular checks, identify, report and rectify hazards or problems.*
- *Ensure that DEHAA occupational health, safety and welfare policy and principles are observed.*
- *Promote and encourage the use of DEHAA "Trip Intentions" forms by groups using the park.*
- *Maintain contact and information flow with local emergency organisations and police*

5. SUMMARY OF MANAGEMENT ACTIONS

ACTION	PRIORITY	DURATION
Adopt the zoning plan.	medium	short
Phase out grazing	high	short
Ensure that all residual stock are removed from the park by June 1997.	high	short
Monitor vegetation using existing monitoring points.	high	ongoing
Monitor vegetation changes over time, particularly grasslands and woodlands.	high	ongoing
Actively manage areas of <u>Themeda triandra</u> .	medium	ongoing
Monitor nationally significant species.	medium	ongoing
Formulate and implement action plans for nationally significant species and others as necessary.	medium	ongoing
Survey fauna as opportunities and resources permit and record on park data base and/or GIS.	medium	ongoing
Monitor eroded areas using photopoints	medium	medium
Rehabilitate specific areas if recovery after grazing is not sufficient to arrest erosion	medium	medium
Ensure that pest adequate pest animal control occurs in the park.	high	ongoing
Map and describe the surface features of the submarine canyon and enter into park records and data base.	high	short
Manage and protect geological features.	high	ongoing
Upgrade the Waukarie Falls access to include a car park, signs and information.	high	short
Install a traffic counter at main park access to	high	short

Mount Brown Conservation Park Management Plan

ACTION	PRIORITY	DURATION
monitor vehicle numbers.		
Maintain existing walking trails as per existing agreements	high	ongoing
Maintain park management access to other areas of the park.	high	ongoing
Maintain liaison with adjacent landholders regarding access.	high	ongoing
Investigate incorporating portions of road reserves into the park where appropriate.	high	medium
Upgrade day visitor area at Waukarie Falls to act as a visitor focus.	high	ongoing
Maintain public access arrangements.	high	ongoing
Investigate facility development opportunities consistent with low impact passive visitor activities.	medium	ongoing
Promote low impact camping practices within the park.	high	ongoing
Maintain walking trails and information material for visitors.	high	ongoing
Encourage use of "Trip Intentions" forms for groups using the park for activities.	high	ongoing
Maintain contact and with tourism and community organisations	high	ongoing
Impose a year-round ban on wood fires to reduce impact and risk.	high	medium
Survey and monitor visitor use of the park.	high	ongoing
Monitor sites of visitor use for impact and manage accordingly.	high	ongoing
Prepare a weed control plan for the park.	high	ongoing
Undertake control measures for localised weed species.	high	ongoing

Mount Brown Conservation Park Management Plan

ACTION	PRIORITY	DURATION
Maintain contact with Animal and Plant Control officers.	medium	ongoing
Determine numbers and status of pest animals at Mt Brown and plan eradication accordingly.	high	ongoing
Include Mt Brown in helicopter operations from 1996.	high	ongoing
Integrate pest animal control for Mt Brown into District and Regional programmes.	high	ongoing
Remove or eradicate stray sheep in park on a regular basis.	medium	ongoing
Prepare a Fire Suppression Plan which incorporates the revised Fire Prevention Plan.	high	ongoing
Maintain and develop liaison with landholders, community, and Country Fire Services.	high	ongoing
Maintain and develop an annual programme of protection works.	high	ongoing
Acquire additional land as opportunities present.	high	ongoing
Seek to improve the aesthetics and amenity of the Mt Brown summit.	medium	ongoing
Maintain contact and foster good relationships with neighbours.	high	ongoing
Rationalise park boundaries by purchasing appropriate sections if and when opportunities present.	high	ongoing
Develop a capital works programme to facilitate rationalisation and fencing.	high	medium
Investigate traditional custodianship of the park.	high	short
Provide opportunities for Aboriginal people to be involved in park management activities.	medium	ongoing
Identify, protect and manage culturally significant sites.	high	ongoing

Mount Brown Conservation Park Management Plan

ACTION	PRIORITY	DURATION
Ensure that safety is a major consideration in park management decisions, developments, works and activities.	high	ongoing
Ensure that safety information and advice is adequate.	high	ongoing
Carry out regular checks, identify, report and rectify hazards or problems.	high	ongoing
Ensure that DEHAA occupational health, safety and welfare policy and principles are observed.	high	ongoing
Maintain contact and information flow with local emergency organisations and police.	high	ongoing
Establish additional walking trails from existing circuit trail on eastern boundary	medium	medium

Appendix 1:

Plants of Conservation Significance, Mount Brown Conservation Park

(After Opperman & Bates, 1995)

Comments and suggested ratings Bates 1994, pers comm

Plant species	Aus	SA	FR	Comments/Located
<i>Acacia acinacea</i>			K(V)	one patch on high east slope
<i>Acacia pravifolia</i>		U	U	
<i>Acacia rupicola</i>			K(R)	some good pops
<i>Alternanthera</i> sp A		#	?	not listed for FR
<i>Alyxia buxifolia</i>			R	not recorded on survey
<i>Amphipogon caricinus</i> var <i>caricinus</i>			R	few in rocky woodland
<i>Anacampseros australiana</i>			U	not many on rocky slopes
<i>Anogramma leptophylla</i>		R	R	most N collection, under rocks in shade by creek
<i>Arthropodium fimbriatum</i>			U	in ranges
<i>Asplenium flabellifolium</i>			R	most N record, summit
<i>Brachycome leptocarpa</i>		U	U	good pops on E foothills, fertile woodland
<i>Caesia calliantha</i>			R	common in woodland
<i>Caladenia filamentosa</i> var <i>tentaculata</i>			U	
<i>Calocephalus citreus</i>		U	U	few in woodland
<i>Calotis lappulacea</i>		K	R	few on east ridge
<i>Carex inversa</i> var <i>major</i>		R	R	most N collection, in creeklines
<i>Chamaescilla corymbosa</i> var <i>corymbosa</i>			U	not recorded on survey
<i>Correa glabra</i>			R	few above 700m in rocks
<i>Crassula peduncularis</i>		#(U)	(E)	new record for FR
<i>Cryptandra amara</i> ssp <i>longifolia</i>		R	R	
<i>Cymbonotus preissianus</i>		U	V	fertile woodland above 500m
<i>Cynoglossum suaveolens</i>			R	most N record, few in woodland above 600m
<i>Danthonia auriculata</i>			K	open sites
<i>Danthonia eriantha</i>		R	R	in shady places
<i>Daviesia arenaria</i>		U	K	not found on survey
<i>Daviesia genistifolia</i>		U	U	in wodland
<i>Daviesia leptophylla</i>			U	most n record, few in high woodland
<i>Derwentia decorosa</i>	R	R	R	very common in Park
<i>Deyeuxia quadriseta</i>			X	few in high sheltered spots
<i>Dianella longifolia</i> ssp <i>grandis</i>		R	R	few at MB, sporadic
<i>Dichelachne crinita</i>			R	few in rocky places

Mount Brown Conservation Park Management Plan

Plant species	Aus	SA	FR	Comments/Located
<i>Diuris palustris</i>		U	R	most N record, few in fertile woodland
<i>Drosera glanduligera</i>			R	few below rocky shelf
<i>Drosera peltata</i>			U	few in damp soil below rock face
<i>Echinopogon caespitosus</i>		?(E)	?(E)	New record for SA
<i>Echinopogon ovatus</i> var <i>ovatus</i>		R	R	good population at summit.
<i>Elymus scabrus</i> var <i>scrabus</i>			#(R)	common
<i>Epilobium billardierianum</i> ssp <i>cinereum</i>			E	few near water
<i>Eucalyptus</i> aff <i>viridis</i>		R	R	good population
<i>Eucalyptus percostata</i>	R	R	R	long buds along western fenceline short buds
<i>Galium biniflorum</i>		(V)	(V)	few in rocky woodland
<i>Goodenia albiflora</i>		U	U	common in Park, especially calcareous soils
<i>Goodenia berardiana</i>			E	red loams
<i>Goodenia pinnatifida</i>		#	?	
<i>Grevillea lavandulacea</i> var <i>sericea</i>		U	U	scattered in woodland
<i>Hibbertia exutiacies</i>			U	most N coll, common above 500m
<i>Hovea purpurea</i>		R	R	found and photographed by Jill Long, on summit ledge
<i>Hymenantha dentata</i>		U	U	N limit in SA, mostly above 500m
<i>Isolepis cernua</i>			U	few in damp depressions
<i>Isolepis hookeriana</i>			U	few at base of large rocks
<i>Juncus caespiticus</i>			V	few by spring
<i>Lagenifera huegelii</i>			R	very common in woodland
<i>Lepidium</i> aff <i>pseudotasmanicum</i>		K(V)	(R)	most N record, not listed FR, only near summit
<i>Lepidium pseudopapillosum</i>	V	T	T	found on rock faces
<i>Levenhookia dubia</i>			R	not many on bare red soils or damp spots
<i>Linum marginale</i>			U	
<i>Logania</i> sp B		R	R	few in gorges
<i>Luzula meridionalis</i>			U	most N record, local in woodland.
<i>Maireana excavata</i>		K(R)	K(V)	few on loamy slopes
<i>Microlaena stipioides</i> var <i>stipioides</i>			U	most N coll, few in damp gully
<i>Millotia muelleri</i>			R	bare earth
<i>Millotia tenuifolia</i>			R	
<i>Myoporum viscosum</i>		U	U	
<i>Olearia pannosa</i> ssp <i>pannosa</i>	V	V	V	common in Park.
<i>Persicaria decipiens</i>			R	few in old dam by road

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Plant species	Aus	SA	FR	Comments/Located
<i>Phyllanthus saxosus</i>		U	U	few chewed down
<i>Plagiobothrys elachanthus</i>		?	?	not recorded in FR, few on bare soil
<i>Plantago aff debilis</i>		R	R	in shady rocky places
<i>Plantago gaudichaudii</i>			R	Most N coll, few above 500m
<i>Plantago turrifera</i>			U	on clay scalds
<i>Podolepis tepperi</i>			(E)	new record for FR, few on bare limy slopes with better soil
<i>Pomaderris paniculosa</i>			K(R)	sporadic throughout
<i>Prasophyllum validum</i>	V	V	V	most N record, grassland at 500m
<i>Prostranthera behriana</i>			R	few in high rocky outcrops
<i>Ranunculus pachycarpus</i>		U	U	few in high valleys
<i>Rumex dumosus</i>		K	T	grassland
<i>Santalum spicatum</i>		R	R	localised
<i>Senecio cunninghamii</i> ssp <i>cunninghamii</i>			V	on fenceline Richman Valleyt Rd
<i>Senecio gawlerensis</i>			T	may be misidentified
<i>Senecio laceratus</i>			R	not recorded for survey
<i>Senecio odoratus</i> var <i>odoratus</i>			U	most N record, rocky places at summit
<i>Stipa breviglumis</i>	R	R	R	common in Park.
<i>Stipa curticoma</i>		V	?	Waukerie Falls and other rocky places
<i>Stipa petrea</i>	#	R	R	endemic Aust, 1 population in park
<i>Stipa puberula</i>		K	?	new record in FR, dry woodland
<i>Stipa setacea</i> var <i>setacea</i>		R	R	in rocky places
<i>Stipa tenuifolia</i>		R	?	in rocky places
<i>Templetonia aculeata</i>		U	U	scattered rocky grassland and scrub
<i>Thelymitra grandiflora</i>		U	R	few above 500m
<i>Thysanotus tenellus</i>		R	R	localised in rich soil S facing slopes
<i>Veronica plebeia</i>		U	U	few in woodland
<i>Wurmbea biglandulosa</i> ssp <i>flindersii</i>		U	U	common throughout

- X **Extinct/Presumed extinct:** not located despite thorough searching of all known and likely habitats; known to have been eliminated by the loss of localized population (s); or not recorded for more than 50 years from an area where substantial habitat modification has occurred
- E **Endangered:** rare and in danger of becoming extinct in the wild
- V **Vulnerable:** rare and at risk from potential threats or long term threats which could cause the species to become endangered in the future
- T **Threatened:** likely to be either Endangered or Vulnerable but insufficient data for a more precise assessment

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- R** **Rare:** having a low overall frequency of occurrence, confined to a restricted range or scattered sparsely over a wider area. Not currently exposed to significant threats, but warranting monitoring and protective measures to prevent reduction of population sizes.
- K** **Uncertain:** likely to be either Threatened or Rare but insufficient data for a more precise assessment.
- U** **Uncommon:** less common species of interest but not rare enough to warrant special protective measures.

or ? not yet assessed but flagged as being of possible significance

Appendix 2.

Fauna of Mt Brown Conservation Park

(Adapted from Nature Conservation Society preliminary fauna survey results)

Reptiles

Species	Common Name
<i>Aprasia pseudopulchella</i>	legless lizard
<i>Ctenophorus decresii</i>	dragon
<i>Ctenotus robustus</i>	skink
<i>Delma mollerii</i>	legless lizard
<i>Egernia striolata</i>	tree skink
<i>Gehyra variegata</i>	tree dtella
<i>Heteronotia. binoei</i>	Bynoes's gecko
<i>Morethia boulengeri</i>	skink
<i>Nephrurus levis</i>	Gekko
<i>Phyllodactylus marmoratus</i>	marbled gecko
<i>Pseudechis australis</i>	mulga or king brown snake
<i>Pseudonaja textilis</i>	eastern brown snake
<i>Tiliqua rugosus</i>	sleepy lizard

Birds of Mt Brown Conservation Park

Common Name	Euc. open Woodland		Mallee		Alloc/Callitris Woodlands		Grassland	
	v1	v2	v1	v2	v1	v2	v1	v2
Adelaide rosella	36	18	25	5	15	5	-	5
Australian magpie	17	6	11	-	4	1	-	4
Australian raven	7	7	3	-	6	-	2	-
broad-tailed thornbill	13	26	15	5	6	3	-	-
brown falcon	1	-	-	-	-	-	-	-
brown goshawk	1	1	-	-	-	-	-	-
brown treecreeper	2	2	-	-	-	-	-	-
brown-headed honeyeater	20	10	-	-	-	-	2	-
chestnut-rumped hylacola	-	2	-	-	-	-	-	-
chestnut-rumped thornbill	-	-	-	-	1	-	-	-
common bronzewing	-	-	1	-	-	-	-	-
dusky woodswallow	6	3	-	-	-	-	-	-
fairy martin	-	-	16	-	-	-	-	-
galah	50+	50+	20	-	11	-	37	30
grey butcherbird	3	5	1	-	-	-	-	-
grey currawong	2	-	2	2	-	-	-	-
grey shrike-thrush	6	3	-	-	-	-	-	-
grey-fronted honeyeater	4	3	2	-	-	-	-	-

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Common Name	Euc. open Woodland		Mallee		Alloc/Callitris Woodlands		Grassland	
	v1	v2	v1	v2	v1	v2	v1	v2
jacky winter	1	2	-	-	-	-	-	-
laughing kookaburra	4	4	-	-	-	-	-	-
little raven	3	8	1	-	-	-	-	-
magpie lark	-	-	-	-	-	-	1	-
mallee ringneck	-	3	-	-	-	-	4	-
mistletoebird	7	6	4	-	-	-	-	-
peregrine falcon	1	-	-	-	-	-	-	-
raven spp.	5	4	1	1	2	-	5	5
red wattlebird	3	-	2	2	-	-	-	-
red-capped robin	1	-	3	-	-	-	-	-
red-rumped parrot	11	-	-	-	-	-	-	2
rufous whistler	2	5	3	-	-	-	-	-
sacred kingfisher	1	1	-	-	-	-	-	-
scarlet robin	4	2	-	-	-	-	-	-
silveryeye	8	5	14	-	-	3	-	-
singing honeyeater	-	-	-	-	-	-	-	-
spiny-cheeked honeyeater	2	1	-	-	-	-	-	3
starling *	-	-	-	-	-	-	2	-
striated pardalote	12	2	4	-	3	-	-	-
tree martin	15	-	-	-	-	-	-	-
variegated wren	2	4	-	-	-	-	-	-
wedge-tailed eagle	-	-	-	-	-	-	1	-
weebill	11	26	20	5	-	5	-	23
welcome swallow	-	-	-	-	-	-	2	-
white-browed babbler	4	4	-	3	-	-	-	-
white-plumed honeyeater	5	1	-	-	-	-	-	-
willie wagtail	-	-	-	-	-	-	-	-
wren spp.	6	3	2	2	-	-	3	-
yellow thornbill	-	-	-	-	2	-	-	-
yellow-faced honeyeater	-	5	-	-	-	-	-	-
yellow-rumped thornbill	15	5	3	-	2	-	-	-

Legend:

Habitats: Eucalyptus Open Woodland with shrubby or grassy understorey, Mallee, Allocasuarina & Callitris Woodland, Grassland or Savannah (ie grass with very scattered trees/shrubs)

v1 - first visit 1-3/10/94, v - 2second visit 26-27/11/94 Refer attached map for areas surveyed.

* introduced

Source: NCSSA Bird Survey: Mt Brown Conservation Park (David Edey & Vicki-Jo Russell) 1994